# Nutrient Neutrality Solution Finding

## Identifying Mitigation Requirements to 2030

Home Builders Federation

March 2023

LICHFIELDS

HBF
HOME BUILDERS FEDERATION

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# Contents

# Foreword

The restriction placed on housebuilding across large parts of England and Wales in the wake of the European Court of Justice (ECJ) 'Dutch-N' ruling in November 2018 is having a severe impact on housebuilding as well as the lives of the many people in desperate housing need. Based on statements by local authorities and the Home Builders Federation's (HBF) own survey of members, an estimated 150,000 homes have been delayed or cancelled by the nutrients issue and related water neutrality and recreational impact restrictions. Many of these – an estimated 40% – already benefit from planning permission. The rest are sites allocated in local plans. All these homes have taken many years of effort and expense to progress through the planning system. The HBF estimates that housing completions could fall by 41,000 homes annually across the 74 local authorities affected each year the issue remains unresolved.

The confidence of housebuilders and local authorities has been shaken profoundly by the way the restrictions were imposed by the Government and its environmental advisors without warning. So long as the restrictions continue local authorities are unable to plan the future. Housebuilders are now wary about making any further investments in the areas subject to the restrictions. One major housebuilder has decided it will cease to operate in one very large catchment where the restriction is in force.

Since the first moratorium was introduced in June 2019, local authorities and housebuilders have struggled to find ways to mitigate the impact of residents occupying new homes. Few schemes providing nature-based solutions (the Government's favoured route to achieving nutrient neutrality) are available. Where mitigation is available it involves decommissioning farms to make way for environmental schemes. In some areas, the amount of farmland required to be retired from production is huge. This has implications for food production in the UK and is unsustainable in the long-term.

As the report explains, although the contribution of new housebuilding to nutrient-related pollution is very small, the restrictions fall almost entirely on new housebuilding. Housebuilding, already subject to delays for up to three years in some areas, faces many more years of delay and uncertainty. SME housebuilders without the cash reserves to get them through lean times are particularly vulnerable.

In July 2022 the Government announced two measures to try and alleviate the issue. One of these is its proposal to impose a statutory duty on the water industry to improve the performance of wastewater treatment works. This is to be introduced through the Levelling Up and Regeneration Bill. This measure has been welcomed cautiously by some housebuilders. If enacted, achieving nutrient neutrality through nature-based solutions could become feasible in some areas, as the amount of land needed for nature-based solutions falls. Even so, the Government must recognise that the benefit of this intervention could be very limited especially for SME housebuilders operating in rural areas which have a greater number of small wastewater treatment works that are exempt from the provision, or where there is a high concentration of poultry farms which produce huge amounts of effluent, thereby negating any benefit from the improvements.

The Government must also acknowledge that the benefit of this intervention will not really begin to be felt until 2030. In the meantime, housebuilders will still need to purchase and convert considerable quantities of farmland in their attempt to achieve nutrient neutrality.

This report explains what the Government can do in the meantime to help the industry through this extremely challenging period. This report considers how changes to Natural England's nutrient budget calculator to reflect local data, particularly the evidence relating to household occupancy levels within each catchment, will provide a more accurate assessment of the likely levels of nutrient generated by people occupying new homes.

On the 14 February, the HBF convened a roundtable with Natural England and leading government departments to identify critical measures that could assist the housebuilding industry with the nutrients issue. This report is the industry's first substantive contribution to that discussion.

**Home Builders Federation, March 2023**

# Executive Summary

1. Despite not being a major contributor to the problem of nutrient pollution, the house building industry has faced – and continues to face – a disproportionate weight of sanctions which are resulting in a significant nationally under-delivery of much needed housing with associated economic and social harm.

2. The house building industry is working positively in looking for solutions such as reducing water consumption in new dwellings, incorporating on-site and offsite wetland creation, and exploring other off-site nature-based solutions. However, the level of mitigation required is currently disproportionate to the impact generated by development.

3. The Government's amendment to the Levelling Up and Regeneration Bill – which will place a new statutory duty on water and sewerage companies in England to upgrade wastewater treatment works to the highest technically achievable limits by 2030 in nutrient neutrality areas – represents a critical solution to the moratorium on house building. It is essential that the measures that are proposed by the amendment happen and that local planning authorities and the house building industry can continue to plan on this basis. Water companies must be held accountable in respect of the delivery of the required improvements and ensure that their baseline environmental standards are maintained to the highest degree.

4. Given the importance of the proposed measure, the Government should resist pressure to dilute the statutory duty on water companies such as the amendment currently proposed in the House of Lords.

5. It is also noted with some concern that the Levelling Up and Regeneration Bill exempts wastewater treatment works with a capacity of less than 2,000 population from the requirement to upgrade to the highest technically achievable limits unless the Secretary of State specifically designates them. This creates a risk in respect of housing delivery in the catchments of such small treatment works. This risk is expected to be particularly acute for SME builders that tend to be more active in rural locations. By exempting wastewater treatment works serving small catchments, the current requirement would remain and so the delivery of housing to meet local needs by SME builders will be constrained. The Government must consider measures to support stalled sites in rural areas in order to avoid SME builders from suffering a disproportionate effect post-2030.

6. It is essential to ensure that new housing can continue to be delivered in advance of the 2030 deadline. Critically this should involve a revision to the existing Natural England calculator which over-estimates significantly the nutrient impact of new housing, and in turn the associated mitigation requirements to the detriment of housing delivery and food security. The response should be a focus on:

   a. The net additional population that will result from the delivery of new housing – rather than a continued focus on the gross population of the new dwellings – based on an application of the net additional average household size; and,

   b. The number of dwellings that are to be delivered by 2030 rather than a requirement to mitigate a development in its entirety, regardless of when the houses will be delivered.

7. Such an approach, which represents a critical step in resolving the current barriers to housing delivery, will allow for a more proportionate approach to the assessment of nutrient impact. While it will still maintain a precautionary approach, it will overcome the problems associated with the existing Natural England calculator. Some authorities are already taking account of these considerations and are requiring more achievable levels of mitigation as a result. This is most welcome, but a more consistent approach supported by Natural England is required across all affected catchments and local authorities.

8. The nutrient load and mitigation requirements associated with new development proposals depend on a number of factors including site size, location, and proposed mitigation solution. However, application of the Natural England calculator typically results in a requirement for a quantum of land for mitigation that far exceeds the size of the site. A much more manageable and proportionate solution emerges as a result of the proposed amendments to the calculator. This is illustrated below in respect the scenarios that are assessed in this report.

9. These scenarios draw on the following baseline parameters which impact on the nutrient profile of each development such that the outputs associated with the different scenarios cannot be compared (even where they are located in the same catchment):

| Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Catchment | Stodmarsh | Solent | Stodmarsh | Solent | Teesmouth and Cleveland Coast | Teesmouth and Cleveland Coast |
| | Upper Stour | Upper and Middle Test | Lower Stour | Itchen | Tees Lower Estuary | Tees Middle |
| WWTW permit level/generic value | 8mgTP/l 27mgTN/l | 27mgTN/l | 2mgTP/l 27mgTN/l | 27mgTN/l | 27mgTN/l | 27mgTN/l |
| Soil drainage type | Impeded | Freely draining | Freely draining | Freely draining | Impeded | Impeded |
| Seasonally adjusted annual rainfall (mm) | 700-725 | 750-800 | 650-675 | 850-900 | 600-625 | 625-650 |
| Nutrient Vulnerable Zone | Yes | Yes | No | Yes | No | Yes |
| Pre-development land use | Lowland grazing | Cereals | Cereals | Lowland grazing | Urban | Cereals |

# Executive Summary

## Scenario 1: 500 unit greenfield site in Stodmarsh catchment

20ha
(Site Area)

500
(Total Dwellings)

272
(Dwellings by 2030)

### Current NE calculator

2.4
(Average Household Size)

1200
(Total Population)

**Arable reversion**

564ha
(area)

2820%
(% of site area)

**Wetland Creation**

43ha
(area)

215%
(% of site area)

### Recommended amended calculator

1.75
(Net Additional Average Household Size)

476
(Net Additional Population by 2030)

**Arable reversion**

211ha
(area)

1055%
(% of site area)

**Wetland Creation**

16ha
(area)

80%
(% of site area)

## Scenario 2: 1,000 unit greenfield site in Solent catchment

40ha
(Site Area)

1000
(Total Dwellings)

300
(Dwellings by 2030)

### Current NE calculator

2.4
(Average Household Size)

2400
(Total Population)

**Arable reversion**

104.1ha
(area)

260%
(% of site area)

**Wetland Creation**

2.78ha
(area)

7.0%
(% of site area)

### Recommended amended calculator

1.67
(Net Additional Average Household Size)

500
(Net Additional Population by 2030)

**Arable reversion**

0ha
(area)

0%
(% of site area)

**Wetland Creation**

0ha
(area)

0%
(% of site area)

## Scenario 3: 350 unit greenfield site in Stodmarsh catchment

14ha
(Site Area)

350
(Total Dwellings)

256
(Dwellings by 2030)

### Current NE calculator

2.4
(Average Household Size)

840
(Total Population)

**Arable reversion**

3143ha
(area)

22450%
(% of site area)

**Wetland Creation**

7.86ha
(area)

56%
(% of site area)

### Recommended amended calculator

1.75
(Net Additional Average Household Size)

448
(Net Additional Population by 2030)

**Arable reversion**

1729ha
(area)

12350%
(% of site area)

**Wetland Creation**

4.32ha
(area)

30.9%
(% of site area)

## Scenario 4: 200 unit greenfield site in Solent catchment

8ha
(Site Area)

200
(Total Dwellings)

146
(Dwellings by 2030)

### Current NE calculator

2.4
(Average Household Size)

480
(Total Population)

**Arable reversion**

26.16ha
(area)

327%
(% of site area)

**Wetland Creation**

0.72ha
(area)

9.0%
(% of site area)

### Recommended amended calculator

1.67
(Net Additional Average Household Size)

244
(Net Additional Population by 2030)

**Arable reversion**

12.2ha
(area)

153%
(% of site area)

**Wetland Creation**

0.34ha
(area)

4.3%
(% of site area)

## Scenario 5: 150 unit brownfield site in Teesmouth and Cleveland Coast catchment

6ha
(Site Area)

150
(Total Dwellings)

150
(Dwellings by 2030)

### Current NE calculator

2.4
(Average Household Size)

360
(Total Population)

**Arable reversion**

30.54ha
(area)

509%
(% of site area)

**Wetland Creation**

0.57ha
(area)

9.5%
(% of site area)

### Recommended amended calculator

1.52
(Net Additional Average Household Size)

228
(Net Additional Population by 2030)

**Arable reversion**

19.86ha
(area)

331%
(% of site area)

**Wetland Creation**

0.37ha
(area)

6.2%
(% of site area)

## Scenario 6: 750 unit greenfield site in Teesmouth and Cleveland Coast catchment

30ha
(Site Area)

750
(Total Dwellings)

272
(Dwellings by 2030)

### Current NE calculator

2.4
(Average Household Size)

1800
(Total Population)

**Arable reversion**

122.5ha
(area)

408%
(% of site area)

**Wetland Creation**

2.3ha
(area)

7.7%
(% of site area)

### Recommended amended calculator

1.52
(Net Additional Average Household Size)

413
(Net Additional Population by 2030)

**Arable reversion**

2.3ha
(area)

7.7%
(% of site area)

**Wetland Creation**

0.04ha
(area)

0.1%
(% of site area)

# Executive Summary

10. A large number of mitigation options exist, although often the quantum of mitigation land required can render on-site delivery physically unachievable. This is particularly the case for smaller schemes and those delivered by SME builders.

11. Given that agricultural use is the major driver of nutrient pollution, some solutions that are currently being proposed require land to be taken out of agricultural use (reversion) in order to reduce nutrient loading at source. This is clearly in conflict with the Government's objectives for food security. A more refined approach to establishing nutrient loadings based on a revised Natural England calculator will foster the opportunity for a variety of smaller nature-based solutions rather than a threat to the quantum of agricultural land and food security. The potential for such opportunities is greatest in relation to large mixed-use schemes where wetland/ nature-based solutions can be delivered comprehensively alongside environmental enhancement and residential development through good master planning. This again underlines the importance of identifying specific interventions to support SME builders and ensuring that they are not disadvantaged as a result of the implementation of solutions to the nutrient issue.

12. Flexibility is required to deliver a range of mitigation solutions, particularly for smaller development proposals to ensure that arable reversion only represents a temporary solution given the potential food security implications.

13. With an amendment to the Natural England calculator, the Government can have confidence in the delivery of housing, particularly from larger scale developments that have the ability to deliver comprehensive mitigation solutions. In turn this will underpin confidence in a plan-led planning system which builds in realistic levels of mitigation via development plan policy.

14. The current consultation on revisions to the NPPF provides an opportunity to provide clarity and a consistent approach to the issue of nutrient neutrality. It would be appropriate for the updated NPPF include reference to the long- and short-term mechanisms for the delivery of new housing in affected catchments so that a firm policy basis can be established.

15. Alongside this it would also be important to ensure that that nature-based proposals for mitigation solutions, such as planning applications for wetland creation, are seen as favourable proposals under the NPPF and are given considerable weight in the planning process, even in areas typically restricted from built development given the natural environment nature of the applications.

16. Going forwards a collaborative approach with, and assistance from, the Government and Natural England is required to establish a workable approach for the identification of nutrient impacts and the calculation of mitigation options so as to ensure the continued delivery of new housing.

17. Government will also need to give consideration to measures to support SME housebuilders who will struggle to achieve mitigation on-site or where the planned improvements to wastewater treatment works will have little appreciable benefit, such as in rural areas.

# 1.0 Introduction

1.1 This report considers how housing delivery might be maintained in the interim period ahead of 2030 by which time water companies will be subject to a new statutory duty requiring them to upgrade wastewater treatment works to the highest technically achievable levels.

1.2 This is an important measure which will increase the capacity of wastewater treatment works and thereby reduce the mitigation burden on new residential development. It reflects the reality – and Government acknowledgement – that new housing makes a limited contribution to the overall level of nutrient pollution but that the house building sector has been disproportionately affected by the requirement for nutrient neutrality.

1.3 Whilst the interim period until the introduction of the new statutory duty is lengthy, it is appreciated that this amount of time will be required for water companies to plan and deliver the necessary improvements to their wastewater treatment works. However, it is essential to ensure the delivery of housing in the interim, especially on larger sites.

1.4 It is important, however, to recognise that SME builders may continue to struggle to achieve nutrient neutrality owing to the cost of nature-based solutions and the difficulties associated with accommodating these on small sites.

1.5 This report provides a roadmap for the continued delivery of housing, reflecting on the true causes of nutrient pollution, the limited effects of new housing and the number of dwellings that might be expected to come forward on any development site prior to 2030. It is structured as follows:

- **Section 2** sets out the context to the issue of nutrient neutrality by evidencing the importance of the house building industry, the key causes of nutrient pollution, and summarising the Government's proposed solution.
- **Section 3** provides more detail regarding the purpose and scope of this report by introducing the likely development scenarios that form the basis of the analysis.
- **Section 4** provides analysis regarding the number of dwellings that are expected to be delivered by 2030 in each location and the net additional population of those homes.
- **Section 5** summarises the results of Stantec's assessment of the nutrient load of each development scenario, based on the following three tests:

  a. Nutrient load and mitigation requirements arising from the total development with the population based on the Natural England calculator (average household size of 2.4). This represents the baseline in terms of the level of nutrient mitigation that would be required without the new statutory duty or any challenge to the Natural England calculator;

  b. Nutrient load and mitigation requirements arising from the expected delivery by 2030 with population based on the Natural England calculator; and,

  c. Nutrient load and mitigation requirements arising from the homes to be completed by 2030 with population based on our assessment of the net additional average household size.

- **Section 6** considers the importance of housing delivery in the three catchments and the implications of the alternative tests in terms of the quantum of land required for mitigation and the implications on development viability.
- **Section 7** sets out our conclusions and recommendations.

# 2.0 Context

## The Issue

2.1 In November 2018 the European Court of Justice (ECJ) ruled[1] that any additional nutrient loading to designated sites – including Special Areas of Conservation (SAC), Ramsar, Special Protection Areas (SPA) and potential SPA sites – that were already in an unfavourable condition would be unlawful. The issue is that high levels of nitrogen and phosphorus input to the water environment can cause a process known as eutrophication whereby dense mats of green algae form and then reduce the oxygen content in the water. This makes it difficult for aquatic insects and fish to survive.

2.2 The key to addressing this problem is to address the causes of eutrophication by reducing the input of nutrients into designated catchments. In response to this, a requirement has been introduced for certain developments in affected catchments to demonstrate *"nutrient neutrality"*. This means that such developments would not add to the nutrient load in the catchment. In order to satisfy this requirement, the sum of additional nutrients from all surface water runoff and wastewater generated by the development must be equal to or less than the nutrients generated by the existing land use. On or off-site mitigation can be used to help achieve nutrient neutrality; this can reduce the export of nutrients from the development site or achieve offsets through reductions elsewhere in the catchment.

## The role of house building

2.3 Although the Government has now acknowledged that *"the impact of new housing is a small proportion of overall nutrient pollution"*[2], the current moratorium on the granting of planning permission for new residential development in affected catchments unless nutrient neutrality can be demonstrated is having a considerable impact on the house building industry. The weight of sanctions has been made more severe by the immediacy of their introduction with no transitional arrangements put in place.

2.4 It is evident that the approach to date, which has been focused on the wrong sector, is having a significantly adverse effect.

2.5 The Home Builders Federation has calculated that 100,000 new homes are currently being delayed across England[3] as a result of the requirement for nutrient neutrality. Lichfields estimates that this could result in the loss of almost £30 billion of (direct and indirect) economic output and jeopardise close to half a million person years of construction employment. It could also result in the loss of £550 million of first occupation expenditure and £1.4 billion of expenditure by residents each year, not to mention the loss of income to local authorities through payments each year and the New Homes Bonus.

[1] Judgment of the Court (Second Chamber) of 7 November 2018 (requests for a preliminary ruling from the Raad van State — Netherlands) — Coöperatie Mobilisation for the Environment UA, Vereniging Leefmilieu v College van gedeputeerde staten van Limburg, College van gedeputeerde staten van Gelderland (C-293/17), Stichting Werkgroep Behoud de Peel v College van gedeputeerde staten van Noord-Brabant (C-294/17) (Joined Cases C-293/17 and C-294/17).

[2] https://questions-statements.parliament.uk/written-statements/detail/2022-07-20/hcws258

[3] Figure based on research undertaken by HBF based on figures that are included in local authority documents or public statements, and a survey undertaken by the HBF of members' schemes delayed following the extension of the problem on the 16 March 2022. The HBF represents housebuilders responsible for 80% of the homes constructed in England and Wales, so there will be companies with delayed schemes that have not been picked-up by the HBF's survey. The figure could be higher, but it is difficult to quantify precisely.

# 2.0 Context

**Table 2.1** Estimate of economic impact of non-delivery of 100,000 new homes across England

| **Construction Impacts** | |
|---|---|
| Construction value | £13,810,156,000 |
| Total construction jobs (direct and indirect jobs; person years) | 490,500 |
| Economic outputs (Construction GVA + Supply Chain GVA) | £29,923,948,000 |
| **Expenditure Impacts** | |
| First occupation expenditure | £550,000,000 |
| Jobs (via first occupation expenditure) | 4,900 |
| Resident expenditure p.a. | £1,418,338,000 |
| Jobs (via resident expenditure) | 18,400 |

**Source:** Analysis based on Lichfields' evaluate framework[4]. All figures rounded

2.6 At a time of acute economic challenge, the realisation of these impacts would be particularly beneficial whilst the delivery of new homes is central to being able to address the ongoing housing crisis.

2.7 The very limited contribution of new housing to nutrient pollution is reflected in the fact that it equates to a very small proportion of the existing stock – the average level of housing delivery in England between 2016/17 and 2020/21 (228,139dpa) equates to just 0.92% of the housing stock 2021 (24.9 million dwellings) whilst achieving the Government's target of 300,000dpa would increase that figure to 1.2% of total stock. Critically, however, not all new homes are occupied by people that move into an area from elsewhere and so the additional nutrient load is not directly correlated to increase in the number of new homes.

2.8 Advice issued by Natural England has indicated that its focus is solely on developments that would result in a net increase in population. It does not seek to apply any mitigation requirements on other commercial development not involving overnight accommodation. This is because it is assumed that *"anyone living in the catchment also works and uses facilities in the catchment, and therefore wastewater generated by that person can be calculated using population increase from new homes and other accommodation"* (Natural England Advice on achieving nutrient neutrality for new development in the Solent region, Version 5 – June 2020 , paragraph 4.13). This again highlights the extent to which the house building industry has been forced to bear a disproportionate level of responsibility for the problem of nutrient pollution.

2.9 An association is made by Natural England between housebuilding and nutrient pollution in river catchments because of new residents moving to an area and increasing the sewerage load within a catchment. In addition to the points set out above regarding the scale of new house building and its impact on nutrient pollution, it is important to note that sewerage only enters the watercourses directly in exceptional circumstances, i.e. as a result of surges in water volumes that can result in overflows from wastewater treatment works. Such events are intended to occur only in exceptional circumstances as *"safety valves"* to the system. The increase in the number of events can be attributed to climate change and the continued reliance on aging combined sewers that handle both foul water and surface water runoff. An increase in the number of storm/flood events is resulting in a greater level of nutrient discharge into rivers. However, the moratorium on house building will not have any significant effect on this as:

1. New housing schemes are not generally permitted to connect to combined sewers but instead have separate systems for surface water and foul water. New residential development should therefore not increase the overflows described above.

2. Preventing housebuilding would not address the problems arising from the continued reliance on aging infrastructure. Rather, this requires continued investment by the water industry. By contrast, new housing may assist in accelerating improvements to local infrastructure deficiencies to ensure sufficient capacity for new homes.

2.10 Although the issue of nutrient pollution has not arisen because of new house building, the industry is nevertheless acting positively through measures such as reducing water consumption in new dwellings, incorporating on- and off-site wetland creation, as well as exploring other off-site nature-based solutions. It has engaged with trial mitigation measures and schemes across the country, but it is evident that too often the level of mitigation that is sought is beyond what can reasonably be expected on site and is based on an erroneous assessment of the potential nutrient load arising from new residential development. This is a challenge particularly for SME house builders. Going forwards, the water industry must work collaboratively with stakeholders such as the house building industry to address these problems.

[4] Lichfields' evaluate framework draws on a range of up-to-date data sets and research including BCIS for construction value, Labour coefficients from the HCA Calculating Cost per Job Best Practice Note for direct construction employment, CEBR/National Housing Federation for indirect/induced construction employment, Experian Business Strategies for GVA, Onepoll research (on behalf of Barratt Homes) for first occupation expenditure, ONS family spending survey for ongoing expenditure, and Business Population Estimates for the UK and Regions for jobs associated with initial and ongoing expenditure by residents.

[5] https://www.push.gov.uk/wp-content/uploads/2020/06/Natural-England%E2%80%99s-latest-guidance-on-achieving-nutrient-neutrality-for-new-housing-development-June-2020.pdf

# 2.0 Context

## The causes of the problem
### Agriculture

2.11 The key sources of nutrients include agriculture and wastewater. Whilst housebuilding has faced the most immediate measures to reduce its impact on nutrient input, the Environment Agency (EA) has recognised that agriculture and rural land management has now overtaken water industry wastewater treatment works as the most common cause of water bodies not achieving good status for nutrients.

2.12 The EA Summary Document, Phosphorus and Freshwater Eutrophication Pressure Narrative[6] noted that *"this is a significant change from second cycle of the river basin management plans when water industry sewage works were the most common cause."* In the light of the continued reductions in nutrients that are planned by the water industry by 2027, the document anticipated that the contribution of agriculture will be increasingly significant:

> *"Our latest analysis suggests that, without further agricultural P load reductions, the agricultural contribution to national river P loadings will increase from around 25-30% at present to over 50% by 2027."*
>
> **(Page 4).**

2.13 The House of Commons Environmental Audit Committee report on water quality in rivers (January 2022)[7] noted that:

1. Reduction in fertiliser use over the past 30 years has helped to reduce phosphorus loadings from agricultural sources but there remains an annual phosphorus surplus in UK agriculture with greater inputs of phosphates (in fertilisers and manures) than that removed via crop and fodder production. This has resulted in a continued accumulation in soils. The resultant build-up of *"legacy phosphate"* within catchment soils means that even if agricultural activities were to cease, the discharge of nutrients into protected watercourses would continue for a considerable period of time.

2. *"Intensive livestock and poultry farming appears to be putting enormous pressure on particular catchments... The potential impact of intensive agricultural practices on river water quality must be fully acknowledged and the risks mitigated."* (paragraph 106).

3. The report recommended that *"planning authorities in England establish a presumption against granting planning permission for new intensive poultry or other intensive livestock units in catchments where the proposed development would exceed the catchment's nutrient budget, unless evidence is presented of robust mitigation plans in place..."* (paragraph 108). However, this was rejected by the Government which responded by stating that *"the Government does not agree that planning authorities should adopt a broad policy against farming infrastructure."*

[6] Source: Phosphorus and Freshwater Eutrophication Pressure Narrative (October 2019) https://consult.environment-agency.gov.uk/environment-and-business/challenges-and-choices/user_uploads/phosphorus-pressure-rbmp-2021.pdf

[7] https://committees.parliament.uk/work/891/water-quality-in-rivers/publications/

# 2.0 Context

2.14 Whilst the Government has recognised the importance of tackling the underlying causes of nutrient pollution (i.e. intensive agriculture and deficiencies in wastewater management infrastructure) and is taking steps to improve the state of habitats sites, its approach to intensive agricultural development has been accommodating of the farming industry's needs. The proposed strategies for intensive agriculture involve a transition period and are open to working with farmers, e.g. *"increasing compliance with regulations" and "providing increased advice and support to farmers."* This is in direct contrast to the moratorium on housebuilding in affected catchment areas unless individual schemes can demonstrate nutrient neutrality.

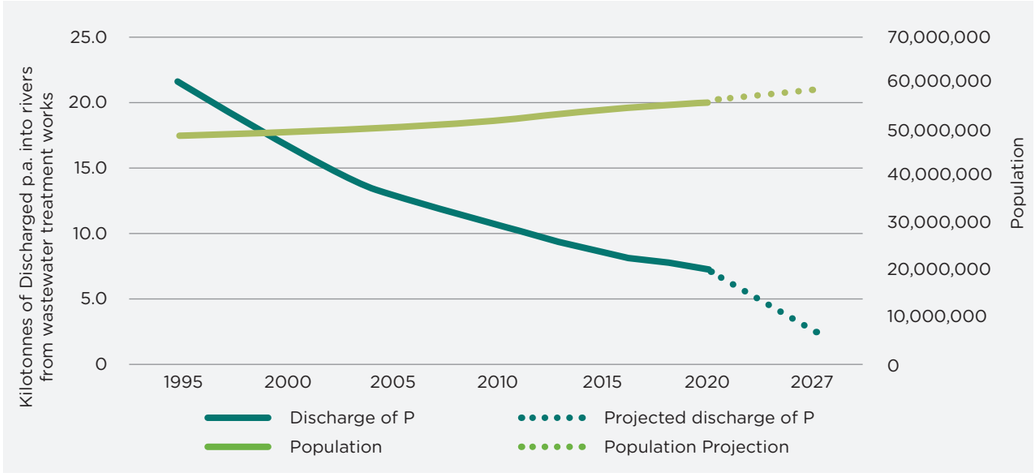
2.15 As a result of agriculture being recognised as the leading contributor to the discharge of nutrients into rivers, the removal of land from agricultural production is a valid mitigation measure to assist in the delivery of residential development. However, questions are being raised about the logic of taking land in perpetuity from agricultural use at a time when ensuring national food security is a priority.

## The water industry

2.16 There is a closer relationship between housebuilding and the water industry in terms of infrastructure delivery and capacity. Environment Agency data indicates that there was a 66% reduction in the discharge of phosphates from wastewater treatment works into rivers between 1995 and 2020. Over the same period, there has been a 16.9% increase in England's population and 20.2% in its housing stock. This reduction has been achieved because of on-going investment by the water industry to infrastructure.

2.17 The moratorium against new house building was introduced at a time when the discharge of phosphates had already been very dramatically reduced. Restrictions on house building have arisen as a result of tightening standards rather than reductions in water quality. The EA data in Figure 2.1 demonstrates that water quality was already expected to continue improve between 2020 and 2027, even without a moratorium.

**Figure 2.1** Past and projected future reduction in P discharge from wastewater treatment works and population levels in England




**Source:** Phosphorus and freshwater eutrophication: challenges for the water environment, Environment Agency, October 2021; ONS Mid-Year Population Estimates; 2018-based Sub National Population Projections

2.18 The ongoing reduction in nutrient discharge highlighted above provides scope for an alternative catchment wide approach (rather than scheme-by-scheme) to allow for some level of housebuilding against the improved water quality that is being delivered by infrastructure investment. If properly managed this would allow both continuity in housebuilding and a planned improvement towards meeting water quality standards.

## Written Ministerial Statement, July 2022

2.19 The Government expressed its concern about the stalling effect of nutrient neutrality on housing delivery in its response to EA Audit Committee report on water quality in rivers (16 May 2022). This was followed in July 2022 by a Written Ministerial Statement and subsequent letter from the Chief Planner which sought to provide an update on progress in relation to the issue of nutrient pollution. Crucially, the Written Ministerial Statement recognised that:

> *"We know the **impact of new housing is a small proportion of overall nutrient pollution, but mitigation requirements have a significant impact on overall house building.** This amendment will improve water quality and in doing so will support housebuilding to continue in areas affected by nutrient pollution."*
>
> **(Lichfields emphasis).**

2.20 This is an important acknowledgement which reflects the evidence summarised above and indicates a divergent approach to that which has been applied to date. Reflecting this, and drawing on from an appreciation of "the concerns that some Local Planning Authorities have around the impact of nutrient neutrality on their ability to demonstrate they have a sufficient and deliverable housing land supply" the Written Ministerial Statement included the announcement that, in order to drive down pollution from all development in the relevant catchments, the Government would table an amendment to the Levelling Up and Regeneration Bill:

> *"This will place a new statutory duty on water and sewerage companies in England to **upgrade wastewater treatment works to the highest technically achievable limits by 2030 in nutrient neutrality areas.** Water companies will be required to undertake these upgrades in a way that tackles the dominant nutrient(s) causing pollution at a protected site. We are also using feedback from the recent 'call for evidence' to water companies to identify where these upgrades could be accelerated and delivered sooner."*
>
> **(Lichfields emphasis).**

# 2.0 Context

2.21 The implication of this was detailed by the Chief Planner in her letter to chief planning officers of local authorities:

*"The performance of WWTW is therefore the central factor in the level of nutrient pollution associated with existing homes and new development. It is therefore logical that effort on reducing nutrient pollution associated with housing focusses on upgrading WWTW.*

*The statutory obligation for upgrading WWTW, which will be introduced into the LURB, will ensure that WWTW in nutrient neutrality catchments are operating at the highest level of performance, rectifying nutrient pollution at source.*

*This will reduce the pollution from not only new development coming forward, but also from the majority of existing dwellings in affected catchments, representing a significant decrease in overall pollution from housing."*

2.22 This raises the following relevant points:

1. Recognition that the source of nutrient pollution is wastewater treatment works, and not new homes; and,

2. Acknowledgement that a much more significant level of nutrient discharge from wastewater treatment works is associated with the existing dwelling stock rather than from newly constructed homes.

2.23 The Chief Planner's letter went on to quantify the level of improvements that will be sought from 2030 before explaining the implications for residential development.

*"For developments this means that the current high level of mitigation will only be required up to the end of 2030. **After 2030, the pollution levels via WWTW will be much reduced and so a lower level of mitigation will be required. This reduces the overall mitigation burden on housing developments coming forward in nutrient neutrality catchments."***

**(Lichfields emphasis).**

2.24 The clear expectation of government is that the improvements that are to be implemented to ensure conformity with the amendment to the Levelling Up and Regeneration Bill will reduce the requirement for housebuilders to implement mitigation measures to achieve nutrient neutrality.

2.25 The Chief Planner's letter of 21 July 2022 stated:

*"The amendment to the LURB will seek to enable decision-makers to be confident the upgrades will be in place by 2030, enabling them to treat as certain the lower levels of pollution after 2030 as part of a HRA. **Reducing the mitigation requirements for the in perpetuity period, as the current (higher) levels of pollution need only be mitigated until 2030 (or earlier if the upgrades take place sooner), with the lower pollution levels of TAL needing to be mitigated thereafter."***

**(Lichfields emphasis).**

2.26 The amendment was one of a number that were tabled by the Government on 18 November 2022. The Government's press release stated that the amendment will:

*"Improve our environment and enshrine in law an obligation on water companies to clean up our rivers by upgrading wastewater treatment works. Considering all catchments covered by the amendment, our initial estimates indicate that there will be around a 75% reduction in phosphorus loads and around a 55% reduction in nitrogen loads in total from wastewater treatment works, although this will vary between individual catchments.*

*These upgrades will enable house building to be unlocked by reducing the amount of mitigation developers must provide to offset nutrient pollution.*

*This will be accompanied by a Nutrient Mitigation Scheme that will make it easier for developers to discharge their mitigation obligations."*

2.27 It is noted with some concern that the amendment specifies that wastewater treatment works with a capacity of less than 2,000 population equivalent would not be required to upgrade to technically achievable limits unless the Secretary of State specifically designates them. This creates a risk in respect of housing delivery in the catchments of such small treatment works. This is likely to affect SMEs house builders proportionally more, as it is they who will tend to build in more rural locations, such as small market towns and villages, which will be served by small wastewater treatment works. The Government will need to consider measures to support SMEs and rural local authorities who will benefit less from the planned statutory upgrades.

2.28 The Levelling-up and Regeneration Bill is still going through Parliament and so the final form of the proposed new obligation on water companies is not currently known.

# 3.0 Purpose and scope

3.1 Lichfields and Stantec have been advising the Home Builders Federation in respect of the issue of nutrient neutrality. Our joint work has comprised the preparation of a number of research documents which have sought to highlight:

1. The contribution of new housing to nutrient pollution;
2. The impact of the nutrient issue on the delivery of new residential development; and,
3. The wider economic and social implications arising from the current moratorium.

3.2 The statutory duty on water companies which is to be brought forward by the Levelling Up and Regeneration Bill represents an important and most welcome means by which a medium-term resolution might be achieved. However, there are a number of unanswered questions relating to the extent to which the proposed statutory duty on water companies will facilitate the delivery of housing. In particular:

1. How can we boost the delivery of housing when it is most needed – i.e. now?
2. What does the 2030 cut-off mean for longer term sites, the construction period of which will extend across that point?
3. What is meant by "highest technically achievable limits" in the context of ever-evolving technology and solutions?
4. Will water companies be required to continually upgrade their facilities to the latest highest technically achievable limits?
5. How will the required improvements be funded?
6. What happens if water companies fail to fulfil their statutory duty?

# 3.0 Purpose and scope

3.3 These are all important questions that will need careful examination as the Levelling Up and Regeneration Bill progresses through Parliament and it is not the purpose of this document to address them all. It is important, however, that the Government ensures that the identified improvements do occur within its defined timeframe and that any failure on the part of water companies does not continue to adversely affect the delivery of new housing.

3.4 The focus of this report is on the implications of the statutory duty on the delivery of new housing over the short to medium term – i.e. by 2030. Although it is possible that mitigation measures will still be required to some degree after 2030, the Government has been clear that this will be very much reduced. It is not yet possible to quantify the extent to which pollution levels from wastewater treatment works will be reduced following their upgrading and so we cannot begin to consider any post-2030 mitigation requirements at this time. Moreover, as discussed above, we know that certain areas, especially rural areas where small wastewater treatment works are more common, will not benefit at all.

3.5 Particular considerable should, however, be given to the proposed exemption of wastewater treatment works serving small catchments from the requirement to achieve the highest technically achievable limits. This would render housing sites in these (predominantly rural) catchments subject to the current restrictions after 2030. It is likely that SME builders would be disproportionately affected and that the ability to meet identified local housing need would be undermined.

3.6 Through the application of six likely development scenarios in three catchments, this research considers the implication of the new statutory duty. It does so by analysing the following overarching principles:

1. The number of dwellings that are likely to be completed by 2030.

2. The net additional population that will reside within those dwellings.

3. The nutrient load and associated mitigation requirements associated with the development schemes, based on the following tests:

    a. Total development, using the Natural England calculator which applies an average household size of 2.4 as the basis for its calculation of future population (and nutrient load);

    b. The number of new homes that are to be completed by 2030, using the Natural England calculator; and,

    c. The number of new homes that are to be completed by 2030 but basing the nutrient load on an assessment of the net increase in the local population that will arise as a result of those new dwellings.

3.7 The report sets out examples on how the use of alternative robust data sets and acceptable methodologies can be used to present significantly different results in relation to potential nutrient loads and impacts. The report does not endorse one particular approach and acknowledges that alternative locally derived methods, such as those looking at past trends, have been agreed between Natural England and competent authorities are currently subject to review.

## Overview of development schemes

3.8 Table 3.1 provides an overview of the six sample development schemes that have informed the analysis contained in this report. They have been selected to provide a wide range of different developments in a number of locations across the country. In March 2022, Natural England released generic nutrient neutrality guidance. This guidance was to be used alongside the creation of a generic nutrient neutrality budget calculator. The Natural England calculator follows the same approach across all regions and thus the following three catchments have been selected for the purpose of illustrating this investigation.

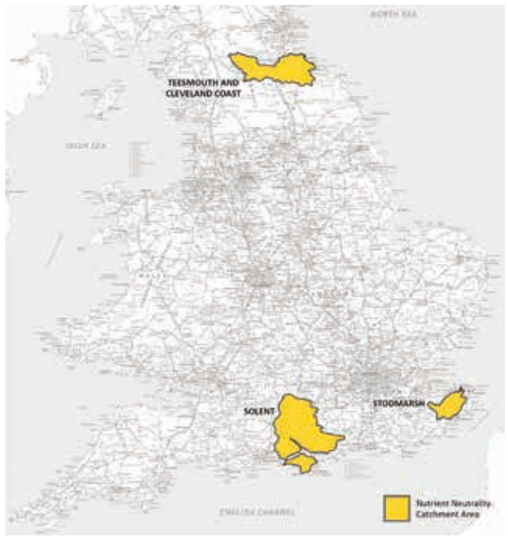
1. Stodmarsh, Kent;

2. Teesmouth and Cleveland Coast; and,

3. Solent.

3.9 Figure 3.1 illustrates the location and geographical extent of these catchments.

**Table 2.1** Catchment areas considered by this analysis

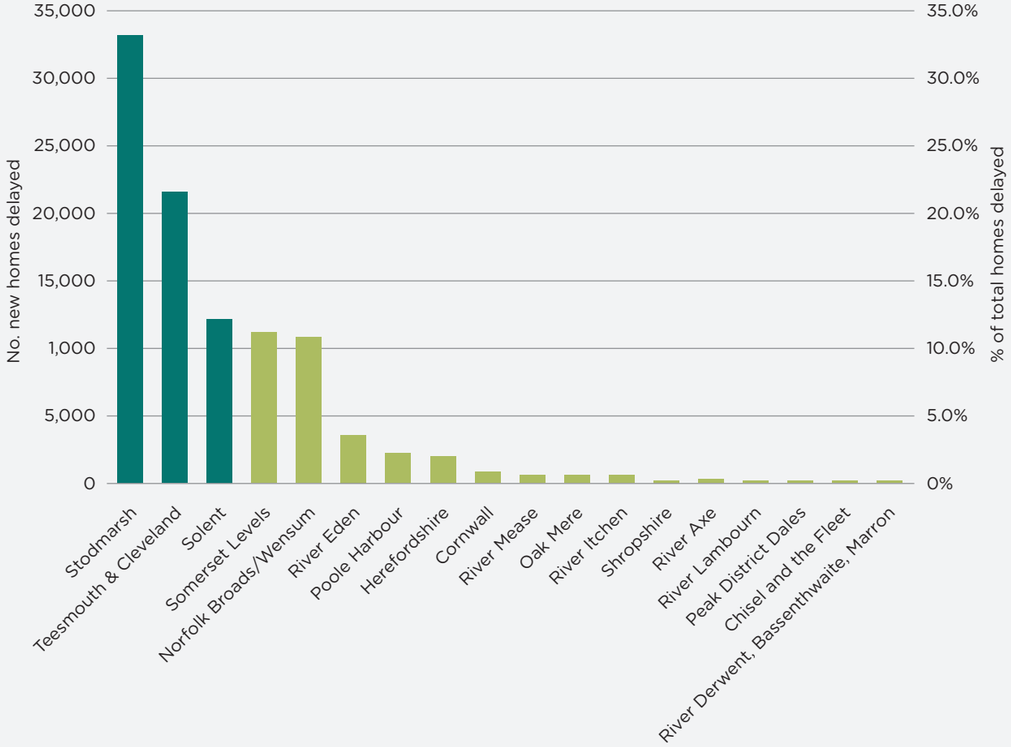



**Source:** Lichfields Analysis

3.10 These catchments are the worst affected nationally in terms of the number of homes that HBF estimate as being delayed, accounting in total for c.66,500 homes that are being delayed – two-thirds of the total nationally (Figure 3.2). Of these, one (Teesmouth and Cleveland Coast) was issued with nutrient neutrality advice in March 2022 while the other two (Solent and Stodmarsh) were already affected by the advice at that time. All three have undertaken a considerable amount of work in seeking to identify a resolution to this issue. However, the potential impacts in other catchments are likely to be similar and so the key issues and conclusions drawn out in this report could equally apply to other affected catchments.

# 3.0 Purpose and scope

**Figure 3.2** Estimated number of new homes delayed by nutrient issue by catchment



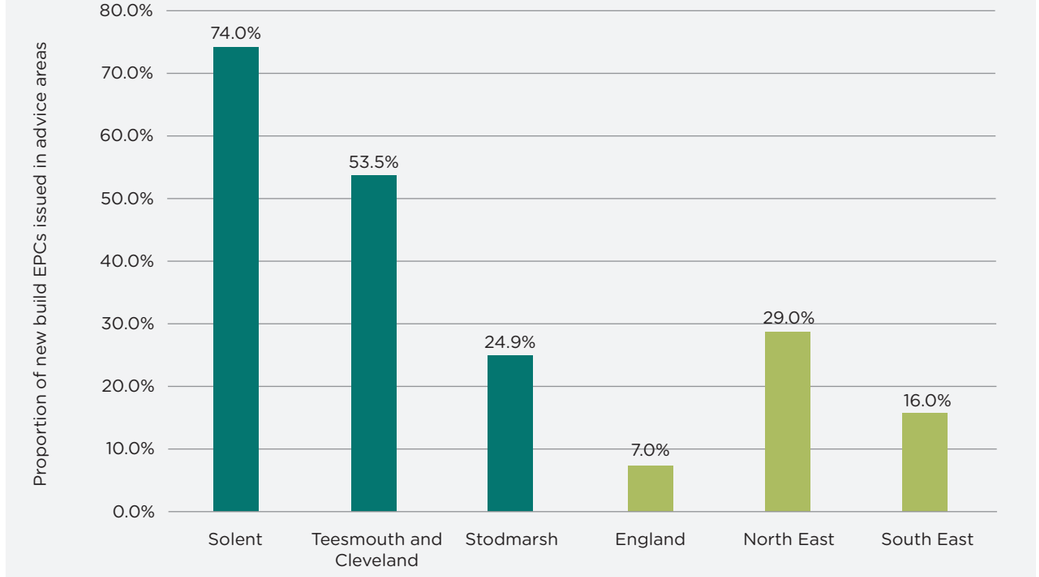

**Source:** HBF research

3.11 The extent to which these three catchments have been affected by the issue of nutrient neutrality is further highlighted by research undertaken by the Local Government Association[8]. Based on an analysis of the number of Energy Performance Certificates (EPCs) for new build properties that were issued between 2019 and 2021 it sought to identify the proportion of new housing delivery within advice areas. Nationally, it found that c.7% of new build EPCs have been issued in areas that are covered by Natural England nutrient neutrality advice with the regional picture ranging from 0% in London, to 16% in the South East and 29% in the North East.

3.12 We have generally focused on larger-scale sites given that a primary consideration of this research is the impact of the new statutory duty on mitigation requirements for those developments served by wastewater treatment works within the scope of the legislation (small housing sites will benefit much less as we have discussed above). Those developments that are expected to be delivered in full before 2030 would be unaffected by the change that will occur at that point. However, our consideration of the net additional population associated with new residential development is relevant to large and small schemes.

[8] https://www.local.gov.uk/publications/nutrient-and-water-neutrality-impact-environmental-protections-housing-supply

**Figure 3.3** Proportion of new build EPCs issued in advice areas




**Source:** Lichfields analysis of LGA research

# 3.0 Purpose and scope

3.13 It is anticipated that the scenarios that we have identified would vary in terms of:

1. Time taken to achieve planning permission;
2. Construction start date;
3. Construction period;
4. Expected number of dwellings that are likely to come forward by 2030;
5. Expected net increase in population associated with the new homes;
6. Existing land uses and underlying geomorphology;
7. Permit levels of existing watewater treatment works;
8. Annual rainfall rates; and, hence,
9. Anticipated nutrient load associated with the delivery of new homes by 2030.

3.14 We have generally focused on larger-scale sites given that a primary consideration of this research is the impact of the new statutory duty on mitigation requirements for those developments served by wastewater treatment works within the scope of the legislation (small housing sites will benefit much less as we have discussed above). Those developments that are expected to be delivered in full before 2030 would be unaffected by the change that will occur at that point. However, our consideration of the net additional population associated with new residential development is relevant to large and small schemes.

3.15 Reflecting the larger size of the developments, we have furthermore assumed that most will be greenfield, although we have tested one brownfield scenario in order to consider the impact of the remediation of a site on the development timetable.

3.16 Section 4 provides further details about the proposed development scenarios that have informed this research, taking account of the number of dwellings that would be expected to come forward by 2030 and the net additional population that would reside within those homes. This provides the basis for the analysis undertaken by Stantec which is set out in Section 5. The implications arising from this analysis are summarised in Section 6.

**Table 3.1** Overview of development schemes

| Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Dwellings** | 500 | 1,000 | 350 | 200 | 150 | 750 |
| **Site** | Greenfield | Greenfield | Greenfield | Greenfield | Brownfield | Greenfield |
| **Catchment** | Stodmarsh (Kent) | Solent | Stodmarsh | Solent | Teesmouth and Cleveland Coast | Teesmouth / Cleveland |

# 4.0 Analysis

4.1 This section sets out the approach that has been taken to the calculation of the number of dwellings that are likely to be completed by 2030 and the net additional population that will reside within those properties. These matters are important because:

1. The nutrient impact of new properties will only arise upon first occupation and so an understanding of when the dwellings will be constructed and completed will inform any assessment of the potential nutrient load.

2. Given the statutory obligation that is to be placed on water companies to improve wastewater treatment works by 2030, and the expectation that mitigation requirements after that date will be reduced substantially, it is reasonable to differentiate completions that are likely to arise before 2030 from those expected thereafter.

3. The occupation of new dwellings by people already living within the catchment area will not give rise to any additional nutrient impacts. Natural England acknowledged in case of R (Wyatt) v Fareham Borough Council[9] that it *"had assumed '100% inward migration', whereas in reality 'some occupants of new dwellings will be moving within the affected catchments, so do not represent an entirely new burden'."* Calculation of the net additional population is therefore important as a means by which to assess the actual nutrient impact arising from new development.

4.2 Each of these issues are considered in turn below.

## Number of dwellings to be completed by 2030

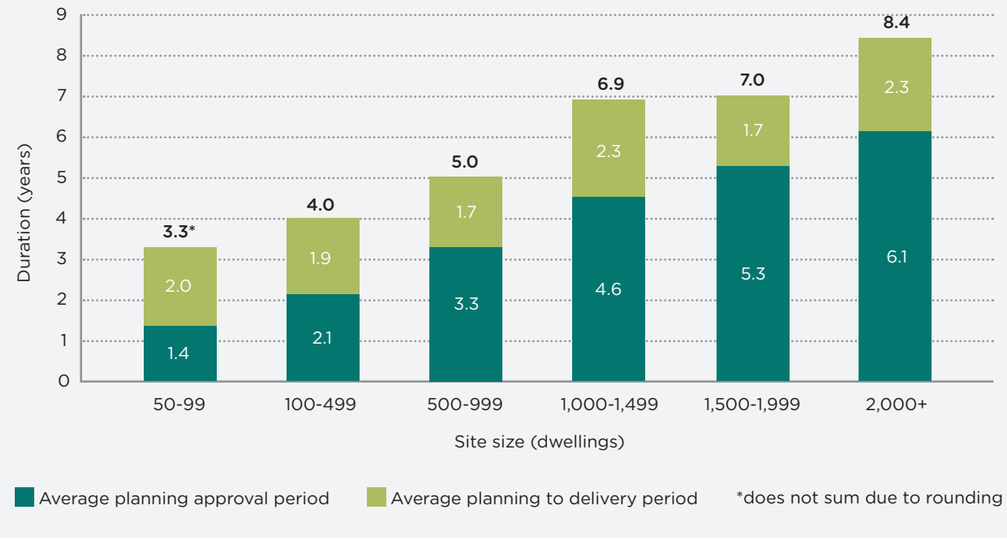
4.3 The nutrient load associated from new development does not arise at the point when planning permission is granted, nor when construction commences. It will arise when the homes are first occupied. As such, there is no justifiable basis to prevent the construction of new dwellings on the grounds of nutrient neutrality – although there are very clear commercial reasons why housebuilders would not wish to construct new homes that cannot be immediately sold and occupied.

4.4 However, given that any nutrient load arising from new homes will only come forward upon their occupation and (as acknowledged by the Government) mitigation requirements will be significantly reduced after 2030, we consider that there is a need only to apply the current approach to mitigation to homes completed and occupied during the 2020s. This means that on large sites, for which construction can reasonably be expected to continue into the 2030s, the current level of mitigation should only be applied to the homes that are delivered before 2030 and not to those that are completed and occupied after that date. This conclusion reflects that of the Chief Planner in her letter of July 2022 which stated that ***"the current (higher) levels of pollution need only be mitigated until 2030 (or earlier if the upgrades take place sooner)".***

4.5 For the purposes of this analysis, it is assumed that the upgrades will become operational in January 2030 – i.e. slightly ahead of the April 2030 deadline that was set out in the amendment to the Levelling Up and Regeneration Bill.

4.6 Lichfields' Start to Finish[10] research provided an authoritative guide to the average period taken to secure planning permission and commence delivery on a wide range of sites across England and Wales, as follows:

**Figure 4.1** Average timeframes from validation of first application to commencement of development




**Source:** Lichfields Start to Finish

[9] 2022 EWCA Civ 983
[10] https://lichfields.uk/content/insights/start-to-finish

# 4.0 Analysis

4.7 Start to Finish was based on a robust evidence base of ~100 development sites across England and Wales and its findings have informed numerous local plan examinations, Section 78 inquiries and five-year housing land supply position statements. In applying that analysis to this research, we acknowledge that it would point towards a large number of the proposed dwellings in each scenario not being completed until after 2030. This may well be the case, but it was agreed by the consortium to adopt a worst case scenario which assumed an accelerated programme from submission of a planning application to completion of the first dwelling. Such an approach would result in an earlier date for the commencement of work on site and therefore the delivery of a greater number of dwellings by 2030. It therefore assumes that a greater level of nutrient mitigation would be required.

4.8 It was therefore agreed to apply the following adjustments to the timeframes established in Start to Finish:

1. A discount of 33% to the planning period figures for each of the scenarios; and,

2. A discount of 50% to the post planning (to delivery) period for each of the greenfield scenarios. We have not applied any discount to the brownfield site on the assumption that mitigation work may be required prior to the commencement of development of the first houses[11].

4.9 The implication of this is illustrated below for the size categories that are subject to consideration by this study:

**Table 4.1** Assumed planning and pre-commencement timescales applied to this study (years)

| | Assumed planning approval period | Assumed planning to delivery period | Total |
|---|---|---|---|
| **100-499 Greenfield** | 1.39 | 0.95 | 2.34 |
| **100-499 Brownfield** | 1.39 | 1.9 | 3.29 |
| **500-999** | 2.2 | 0.85 | 3.05 |
| **1,000-1,500** | 3.04 | 1.15 | 4.19 |

**Source:** Lichfields assumptions

[11] Note that the time period to the commencement of development would include any remediation, opening up and site preparation works

4.10 It has been assumed that a planning application would be submitted in January 2023 for all of the scenarios, other than Scenario 5 for which it is assumed that a planning application would be submitted in January 2025 following adoption of the new Local Plan for the area. Based on the assumptions set out above, Table 4.2 provides an overview of the expected timescales for planning and post-planning activities, leading to the assumed date of the commencement of construction which are identified.

**Table 4.2** Assumed timescales for submission of planning application and commencement of construction

| Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Dwellings** | 500 | 1,000 | 350 | 200 | 150 | 750 |
| **Site** | Greenfield | Greenfield | Greenfield | Greenfield | Brownfield | Greenfield |
| **Application date** | January 2023 | January 2023 | January 2023 | January 2025 | January 2023 | January 2023 |
| **Planning/pre-commencement period** | 3 years | 4 years 2 months | 2 years 4 months | 2 years 4 months | 3 years 3 months | 3 years |
| **Start of build** | January 2026 | March 2027 | May 2025 | May 2027 | April 2026 | January 2026 |

**Source:** Lichfields assumptions

# 4.0 Analysis

4.11 The following average annual build rate has been applied as per Start to Finish:

**Figure 4.2** Build out rate by size of site


**Source:** Lichfields Start to Finish

4.12 Table 4.3 identifies the number of dwellings that are likely to be delivered under each scenario based on the application of these average build rates to the period of time between the identified commencement of construction and 2030. It shows that only one development Scenario (5) is expected to be complete by 2030. It is anticipated that between 30% and 73% of the total number of dwellings on the other sites would have been completed by that date, leaving between 54 (Scenario 4) and 700 (Scenario 2) dwellings to be delivered after 2030.

4.13 The implication from this analysis is that any nutrient mitigation that is required should only be applied to the dwellings that are to be delivered by 2030 (i.e. between 146 under Scenario 4 and 300 under Scenario 2). It follows that small housing schemes that could be built-out faster and before 2030 will not benefit from the potential improvements to wastewater treatment works.

**Table 4.2** Assumed number of dwellings completed by 2030

| Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Dwellings** | 500 | 1,000 | 350 | 200 | 150 | 750 |
| **Site** | Greenfield | Greenfield | Greenfield | Greenfield | Brownfield | Greenfield |
| **Start of build** | January 2026 | March 2027 | May 2025 | May 2027 | April 2026 | January 2026 |
| **Time to January 2030 (years)** | 4.00 | 2.80 | 4.66 | 2.66 | 3.70 | 4.00 |
| **Build rate (dph)** | 68 | 107 | 55 | 55 | 55 | 68 |
| **No. built by 2030** | 272 | 300 | 256 | 146 | 150 | 272 |
| **% of total completions** | 54% | 30% | 73% | 73% | 100% | 36% |
| **No. built during or after 2030** | 228 | 700 | 94 | 54 | 0 | 478 |

**Source:** Lichfields

# 4.0 Analysis

## Net additional population of dwellings completed by 2030

4.14 The issue of nutrient neutrality is – or should be – centred upon population. Were a local population to remain the same size, the nutrient load associated from that population would also remain the same, irrespective of how that population divides itself into households and the number of houses that are required to accommodate them. Consequently, a static overall population has no role in generating additional nutrients. It is only net additional people, moving into the catchment from outside, who will need to be catered for by providing mitigation.

4.15 The use of a calculator for the assessment of the nutrient load of new development pre-supposes that population growth and associated nutrient outputs will be controlled by restricting new housing delivery. This is not a direct relationship as those people unable to access new housing might simply decide to house share leading to higher average occupancy levels, particularly in areas of high demand.

4.16 The relationship between population and household growth is complex and application of an average household size figure therefore fails to reflect the dynamics of change within an existing population. Any mitigation measures should be proportionate to the impact arising from development – the actual increase in population that will occur. Work undertaken by Lichfields for the HBF in March 2022[12] demonstrated how basing mitigation on the Natural England calculator will overestimate significantly the likely increase in population associated with new development and result in a requirement for mitigation that is neither needed nor compliant with the Section 106 tests.

4.17 Taking account of the seven catchments that were subject to Natural England's advice prior to March 2022, the research noted that:

> *"Analysis of the application of the Natural England figure of 2.4 persons per household to the Standard Methodology assessment of local housing need shows that if applied across the seven catchment areas, it would suggest an annual increase in population that is over double the change in household population indicted by the official population and household projections (c.73,500p.a. compared to 35,250p.a.)."*

> *"The significant difference between the household population and calculator-based figures can be attributed to changes in household formation within the existing population. The scale of the difference can be understood by reference to the fact that over the period from 2022 to 2032:*
>
> **a)** *The change in total household population across the seven catchments (35,250 p.a.) equates to 0.6% of the existing household population level (5,897,000)*
>
> **b)** *The Standard Methodology assessment of local housing need (30,650 p.a.) equates to 1.1% of the existing housing stock (2,705,700 at 2020)"*

[12] https://www.hbf.co.uk/documents/11858/Lichfields-HBF_-_Demographics_Report_-_31_Mar_2022.pdf



# 4.0 Analysis

4.18 In the light of this conclusion, the report advocated:

1. Taking account of the reality that a level of housing need will be arise from a static population; followed by,

2. A focus on the net additional population that is likely to reside within a new development rather than the total population. This can be calculated by applying the net additional average household size figure. This will be lower than average household size to take account of the fact that the resident population in the existing stock will be falling going forward.

4.19 Such an approach is much more accurate than that applied by Natural England and provides a more appropriate basis for the assessment of mitigation, which balances the actual level of expected impact of new development against the importance of maintaining the future delivery of housing.

4.20 In the light of this, Figure 4.3 compares:

1. The projected increase in the household population for each of the three study catchments between 2022 and 2030 as set out in the 2014-based Sub National Household Projections – this represents the total number of people that live within households and not in residential institutions[13] and is therefore lower than the total population (blue column).

2. The assumed population associated with the application of the average household size of 2.4[14]to the projected increase in the number of households in each of the three study catchments between 2022 and 2030 as set out increase in the in the 2014-based Sub National Household Projections (green column).

4.21 In each catchment, the level of population change derived from Natural England's calculator is between 37% and 57% higher than the projected household population change identified by the Sub National Household Projections. The percentage deviation is indicated by the red dot and the secondary vertical axis.

**Figure 4.3** Comparison of projected household population change and the population based on application of the Natural England nutrient calculator in each catchment (annualised, 2022-30)


**Source:** Lichfields analysis of MHCLG Live Table 406, Natural England nutrient calculator

4.22 This analysis demonstrates that the Natural England calculator overestimates the net additional population that would reside in newly forming households. If translated to the level of an individual residential development it would similarly overestimate the expected population and thereby overstate the nutrient load and the requirement for mitigation.

4.23 It should be further noted that the projected increase in population and households is small in the context of the existing position (in terms of the current population and housing stock). This adds weight to the point set out in the Written Ministerial Statement regarding the limited effect of housebuilding on nutrient discharges.

[13] Household population is defined as those people living in households and not those that live in residential institutions
[14] As per the Natural England calculator

# 4.0 Analysis

**Table 4.4** Projected change in household population and number of households by 2030

| | Household population | | Households | |
|---|---|---|---|---|
| | Annualised change 2022-2030 | % of 2022 household population | Annualised change 2022-2030 | % of 2022 households |
| **Teesmouth and Cleveland Coast** | 3,558 | 0.32% | 2,332 | 0.45% |
| **Stodmarsh** | 6,507 | 0.89% | 3,709 | 1.2% |
| **Solent** | 11,464 | 0.60% | 6,881 | 0.82 |

**Source:** Lichfields analysis of 2014-based Sub National Household Projections

4.24 The net additional average household size that can be expected to reside within any development (or across an authority area or market area more generally) can be calculated by dividing the net population change by the net household change, as summarised below:

**Table 4.5** Net additional average household size in each catchment

| | Annualised household population change | Annualised household change | Net additional average household size |
|---|---|---|---|
| **Teesmouth and Cleveland Coast** | 3,558 | 2,332 | 1.52 |
| **Stodmarsh** | 6,507 | 3,709 | 1.75 |
| **Solent** | 11,464 | 6,881 | 1.67 |

**Source:** Lichfields analysis of 2014-based Sub National Household Projections

4.25 It should be noted that the figure for the Teesmouth and Cleveland Coast catchment adopts a worst case scenario approach by excluding those authorities that are projected to experience a declining household population between 2022 and 2030 (Redcar & Cleveland, Eden and Richmondshire). Inclusion of these authorities would have resulted in a lower net additional average household size figure of 1.4.

4.26 It is further noted that Middlesborough Council has recently prepared an assessment which has identified a net additional average household size figure of 0.8. In comparing that with the figure set out in Table 4.5 above, it should be noted that this assessment covers a wider area (six local authority areas) and is specifically intended to reflect a worst case scenario.

4.27 These net additional average household size figures have been applied in respect of the third model run that has been applied by Stantec in order to identify what we consider to be the most reliable basis for the assessment of the net additional population that would be expected as a result of any new development within each catchment.

# 5.0 Results

5.1 Stantec has assessed the nutrient load and mitigation requirements associated with the six likely development proposals identified above, by applying the following tests:

a) Nutrient load and mitigation requirements arising from the total development with population based on the Natural England calculator (average household size of 2.4). This represents the baseline in terms of the nutrient mitigation that would be required without the new statutory duty on water companies and without any challenge to the Natural England calculator.

b) Nutrient load and mitigation requirements arising from the homes to be completed by 2030 with population based on the Natural England calculator.

c) Nutrient load and mitigation requirements arising from the homes to be completed by 2030 with population based on the net additional average household size set out in Table 4.5.

# 5.0 Results

5.2 The population level that has been considered by each test for the different development scenarios is summarised below:

**Table 5.1** Population applied to each test

| Test | Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| A | **Total number of dwellings[15]** | 500 | 1,000 | 350 | 200 | 150 | 750 |
| | **NE av household size** | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| | **Total population whole site** | **1,200** | **2,400** | **840** | **480** | **360** | **1,800** |
| B | **Dwellings to be delivered by 2030[16]** | 272 | 300 | 256 | 146 | 150 | 272 |
| | **NE av household size** | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| | **Total population by 2030** | **653** | **719** | **615** | **351** | **360** | **653** |
| C | **Dwellings to be delivered by 2030** | 272 | 300 | 256 | 146 | 150 | 272 |
| | **Net additional average household size [17]** | 1.75 | 1.67 | 1.75 | 1.67 | 1.52 | 1.52 |
| | **Net additional population by 2030** | **476** | **500** | **448** | **244** | **228** | **413** |

**Source:** Lichfields analysis. Net additional population figures based on dwellings x average household size

[15] Source: Table 2.2
[16] Source: Table 3.3
[17] Source: Table 3.5

5.3 The Natural England generic methodology (March 2022) was applied to quantify the nutrient loading as a result of the development scenarios identified above. It comprises the following four stages to demonstrate if there is additional loading resulting in the development proposals:

- **Stage 1** nutrient loading from additional wastewater resulting from the development proposals;
- **Stage 2** nutrient loading from the pre-development land use;
- **Stage 3** nutrient loading from post-development land use; and,
- **Stage 4** resulting nutrient budget.

5.4 The nutrient budget is calculated as the additional wastewater loading (Stage 1) plus the net change in land use loading (Stage 3 minus Stage 2). In accordance with the Natural England methodology, a precautionary buffer of 20% is applied to the nutrient budget within Stage 4. This is used to recognise the uncertainty with the data and ensures the approach is precautionary.

5.5 Depending on the catchment, the nutrient budget will relate to:

1. Nitrogen and phosphorus;
2. Nitrogen independently; or,
3. Phosphorus independently.

5.6 The three tests that have been applied to each of the six identified development scenarios will have an influence on the annual wastewater nutrient load (Stage 1) and the post-development nutrient export (Stage 3). The outcomes for each scenario and test are summarised below and set out in full in Appendix 1. Where the proposed development creates additional loading into the system, mitigation would be required to offset these excess nutrients and achieve nutrient neutrality.

5.7 There are many mitigation solutions which can be used by development to mitigate the nutrient load. These include (but are not limited to):

1. Taking land out of agricultural use;
2. Wetland creation;
3. Use of SuDS; and,
4. Third-party credit schemes.

# 5.0 Results

5.8 Dependant on the characteristics of the proposed development site, mitigation solutions could be provided on-site and/or off-site, so long as neutrality can be demonstrated. Although mitigation design is location specific, large scale development sites are more likely to have at least some ability to include on-site mitigation (for example through the provision of an effective SuDS treatment train, wetlands or open greenspace) when design codes and place making are implemented effectively. Conversely, SME house builders trying to develop smaller sites, including brownfield sites, will struggle to mitigate on-site and will depend more on purchasing costly off-site solutions, if these exist (and often they do not). Viability, consequently, is more precarious for SMEs.

5.9 The choice of effective mitigation strategies is always location specific. The most frequently applied mitigation methods include wetland creation and taking land out of agricultural production. This is because of their transferability and effectiveness. Furthermore, there are numerous examples of both of these methods having been accepted as mitigation strategies and they have thereby assisted in securing planning permission for residential development in affected catchments. Where the budget calculation results indicate that mitigation would be required, indicative mitigation sizes have been calculated (presented in Appendix 1) using agricultural loadings for cereals provided in the Natural England methodology for the catchments and generic removal rates for wetlands based on Land et al (2016) of 12 kg-TP/ha/yr and 930 kg-TN/ha/yr. With arable reversion it is understood that there will likely be a nutrient legacy, in both a soluble form and bound to soil particles when land is taken out of production; nevertheless, this method of mitigation is still considered acceptable for demonstrating nutrient neutrality.

5.10 The application of these rates allows for the scale of mitigation to be understood although it would be accepted that site specific rates would be provided as part of a planning application in order to support mitigation design and provide further certainty. For the purpose of these calculations it has been assumed that cereals land, with the same base parameters of the site, will be taken out of production and converted to greenspace which has a much lower nutrient loading.

5.11 The Natural England calculator is based on a series of parameters associated with the hydrological setting, pre-development characteristics, and development proposals. The base parameters are summarised below and presented in Appendix 1. These base parameters are location dependant and fundamental to the resulting nutrient budget for the development proposals. This highlights the variations that can be seen within the hydrological catchments for Stodmarsh, Solent, and Teesmouth and Cleveland Coast, meaning there can be no universal outcome and sites lying within the same catchment should not be compared. The analysis set out in this report reflects these variations within each catchment in order to fully articulate the complexity of the assessment and the effects of different factors on the resultant nutrient load and mitigation requirements.

5.12 The base parameters have been set following a review of commonly occurring characteristics in the hydrological catchments in the regions. Site areas have been calculated based on 25 dwelling per ha gross; this is equivalent to 35 dwelling per ha net. The post-development land use assumes 70% developable area which would cover dwellings, roads, sports areas, play spaces, verges and 30% green infrastructure including open green space and SuDS features.

**Table 5.2** Summary of baseline parameters

| Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Catchment** | Stodmarsh | Solent | Stodmarsh | Solent | Teesmouth and Cleveland Coast | Teesmouth and Cleveland Coast |
| | Upper Stour | Test and Upper Middle | Lower Stour | Itchen | Tees Lower Estuary | Tees Middle |
| **WWTW permit level/ generic value** | 8mgTP/l | Greenfield | Greenfield | Greenfield | Brownfield | Greenfield |
| **Soil drainage type** | Impeded | Freely draining | Freely draining | Freely draining | Impeded | Impeded |
| **Seasonally adjusted annual rainfall (mm)** | 700-725 | 750-800 | 650-675 | 850-900 | 600-625 | 625-650 |
| **Nutrient Vulnerable Zone** | Yes | Yes | No | Yes | No | Yes |
| **Pre-development land use** | Lowland grazing | Cereals | Cereals | Lowland grazing | Urban | Cereals |

**Source:** Stantec. Note that Scenario 1 does not have a permit for phosphorous so generic value of 8mg/l defined by NE applied. There are no nitrogen permits in any of the scenarios so generic values of 27mg/l defined by NE have been applied.

5.13 For all scenarios, except Scenario 5, Tests B and C (as defined) indicate that only a proportion of the development would be constructed and occupied by 2030. The assumption has been made that the entire site area would cease its pre-development use upon the commencement of construction, therefore becoming fallowed land. As only a proportion of the developable area would be constructed, the remaining portion would still be fallowed, and is thus considered as greenspace within the calculations.

5.14 The fallowed land is classed as arable reversion and acts as temporary mitigation for the development as it is constructed. For new applications it is expected that nutrient neutrality would need to be demonstrated at outline planning for the entire site and so this assumption is considered appropriate for this study. Within the calculation outcomes, indicative mitigation sizes should be considered additional to any fallowed land which remains undeveloped in the red line area of the site.

# 5.0 Results

## Outcomes

5.15 The analysis contained within this report demonstrates the effect that the net additional average household size and the expected level of delivery by 2030 has on the nutrient budget. The indicative mitigation sizes follow similar trends to the decreasing budgets across all of the scenarios.

5.16 When scenarios within the same catchment are compared the influence of the base parameters becomes apparent. The assessment utilised the nutrient permit level of the specific wastewater treatment works that would serve the site. The permit level is location specific and can vary significantly across catchments. This is the determining parameter within Stage 1, which can result in significantly high nutrient budgets where permits are not presently active. For Scenario 1, where there is no permit at the wastewater treatment works a value of 8mgTP/l is used in accordance with guidance, the resulting nutrient budget is approximately 5 times greater than Scenario 3 where there is a permit of 2mgTP/l despite the additional population differing only marginally. For Scenario 1, the Stage 1 outcomes account for ~80% of the Stage 4 nutrient budget demonstrating the influence the water companies permits have on the mitigation required, which is out the control of house builders. This underlines the importance of the upgrades outlined in the July 2022 Written Ministerial Statement. This analysis is looking at a site-specific level and the overall impact of the wastewater permits at catchment scales could be considered further to demonstrate the proportion of nutrient loading that is a direct result of the housing construction.

5.17 Stage 2 is based upon the pre-development land use where, for example, lowland grazing has significantly lower nutrient leaching rates than cereals, resulting in lower Stage 2 outcomes and ultimately a greater nutrient budget. The pre-development land use leaching rates are bespoke to the base parameters and are influenced by the river catchment, soil drainage type, rainfall (SAAR), and presence in a nitrate vulnerability zone (NVZ). Therefore, Stage 2 parameters are location specific and make the comparison of developments within the same nutrient neutrality catchment more difficult as it is not necessarily a like-for-like comparison. Leaching rates for post-development land uses applied in Stage 3 are influenced similarly.

## Scenario 1

5.18 Scenario 1 considers a 500 unit scheme on a 20ha greenfield site in the Stodmarsh catchment. Base parameters show the site to have a pre-development use of lowland grazing, with impeded soil drainage within a nitrate vulnerable zone and foul water discharging to wastewater treatments without a permit for phosphorous.

5.19 The Stage 4 nutrient budgets for each test are calculated to be:

a) 513.12kgTP/yr and 1725.55kgTN/yr;

b) 271.91kgTP/yr and 867.98kgTN/yr; and,

c) 191.80kgTP/yr and 597.59kgTN/yr.

5.20 A comparison of the outcomes from tests A and B shows that the nutrient budget halves. This can be attributed to only 54% of dwellings being constructed/occupied resulting in a reduction in the Stage 1 outcomes, as well as having 32% of the site area as fallowed land which reduces the Stage 3 outcomes.

5.21 When comparing Tests B and C, the impacts are seen in the Stage 1 calculation and the resulting nutrient budget (Stage 4). The application of a lower net additional average household size figure accounts for a 30% reduction in additional population when compared to the figure of 2.4 that is assumed by the Natural England calculator. A similar reduction in the nutrient budget is therefore visible. This demonstrates the influence of occupancy rates on the calculations.

## Scenario 2

5.22 Scenario 2 considers a 1,000 unit scheme on a 40ha greenfield site in the Solent catchment. Base parameters show the site to have a pre-development use of cereals, with freely draining soils within a nitrate vulnerable zone.

5.23 The nutrient budgets are calculated to be:

a) 2596.11kgTN/yr;

b) 0kgTN/yr; and,

c) 0kgTN/yr.

5.24 If all test outcomes are compared there is a significant difference as parameters used result in nutrient neutrality. This stark difference is a result of only 30% of the dwellings being consulted/occupied, combined with 49% of the site area being fallowed acting as temporary mitigation within Stage 3.

5.25 Ultimately, a site of this scale would have a phased build out, but for the full 1,000 unit proposal to achieve outline consent the application would need to demonstrate neutrality as a whole. Each phase would then have its own reserved matters application that would present the necessary detail for the nutrient mitigation.

# 5.0 Results

## Scenario 3

5.26 Scenario 3 considers a 350 unit scheme on a 14ha greenfield site in the Stodmarsh catchment. Base parameters show the site to have a pre-development use of cereals, with freely draining soils and foul water discharging to wastewater treatments with an existing permit for phosphorous.

5.27 The nutrient budgets are calculated to be:

a) 94.50kgTP/yr and 916.10kgTN/yr;

b) 68.84kgTP/yr and 566.34kgTN/yr; and,

c) 51.87TP/yr and 311.86kgTN/yr.

5.28 When comparing the outcomes from Tests A and B there is a reduction in the nutrient budget which results from 73% of the dwellings being constructed/occupied before 2030 and minimising the Stage 1 outcomes as well as having 18% of the site area as fallowed land which reduces the Stage 3 outcomes. When comparing Tests B and C, the impacts are seen in Stage 1 and the resultant nutrient budget (Stage 4). The application of the net additional average household size figure results in a 30% reduction in additional population and a similar reduction in the nutrient budget.

## Scenario 4

5.29 Scenario 4 considers a 200 unit scheme on a 8ha greenfield site in the Solent catchment. Base parameters show the site to have a pre-development use of lowland grazing, with freely draining soils within a nitrate vulnerable zone.

5.30 The nutrient budgets are calculated to be:

a) 673.84kgTN/yr;

b) 465.64kgTN/yr; and,

c) 314.29kgTN/yr.

5.31 When comparing the outcomes from Tests A and B the nutrient budget reduces, which can be attributed to 73% of dwelling being constructed/occupied before 2030 reducing the Stage 1 outcomes as well as having 19% of the site area as fallowed land which reduces the Stage 3 outcomes.

5.32 When comparing Tests B and C, the impacts are seen in Stage 1 and the resulting nutrient budget (Stage 4). The application of the net additional average household size figure accounts for a 30% reduction in additional population and a similar reduction in the nutrient budget is again visible.

## Scenario 5

5.33 Scenario 5 considers a 150 unit scheme on a 6ha brownfield site in the Teesmouth and Cleveland Coast catchment. Base parameters show the site has a pre-development use of commercial/industrial with impeded soil drainage.

5.34 The nutrient budgets are calculated to be:

a) 529.93kgTN/yr;

b) 529.93kgTN/yr; and,

c) 344.61kgTN/yr.

5.35 For Scenario 5, the outcomes for Test A and B are the same as result of the whole development being deliverable by 2030.

5.36 When compared with the outcomes of C, the impacts are seen as a result of changes in Stage 1 and the resulting nutrient budget (Stage 4). The application of the net additional average household size accounts for a 35% reduction in additional population when compared to the figure of 2.4 assumed by the Natural England calculator. A similar reduction in the nutrient budget is visible.

5.37 As the site is brownfield there is less offset from the pre-development loading (Stage 2) within the nutrient budget than would be expected from a greenfield site. This inevitably impacts the scale of mitigation required comparative to the size of the site.

## Scenario 6

5.38 Scenario 6 considers a 750 unit scheme on a 30ha greenfield site in the Teesmouth and Cleveland Coast catchment. Base parameters show that the site has a pre-development use of cereals, with impeded soil drainage within a nitrate vulnerability zone.

5.39 The nutrient budgets are calculated to be:

a) 2147.36kgTN/yr;

b) 376.63kgTN/yr; and,

c) 40.58kgTN/yr.

5.40 When comparing the outcomes from Tests A and B there is a reduction in the nutrient budget. This is a result of only 36% of the dwellings being constructed/occupied before 2030 thus minimising the Stage 1 outcomes, as well as having 45% of the site area as fallowed land which reduces the Stage 3 outcomes.

5.41 When comparing Tests B and C, the impacts are seen in Stage 1 and the resulting nutrient budget (Stage 4). The application of a lower rate of the net additional average household size accounts for a 45% reduction in additional population, which results in a reduction in the nutrient budget and demonstrates the influence of occupancy rates on the calculations.

# 5.0 Results

## Summary

5.42 Overall, these outcomes demonstrate the significance that the net additional average household size has on the nutrient budget as well as the implication of considering the number of dwellings that are deliverable ahead of 2030. The indicative mitigation sizes follow similar trends to the decreasing budgets across the tests.

With the exception of Scenario 5 – which is assumed to be completed prior to 2030 – the development scenarios that have been tested will continue to come forward after the introduction of the statutory duty on water companies to improve their wastewater treatment works to the highest technically achievable limits. It is expected that this will dramatically impact on the level of nutrient discharge and the resultant mitigation requirements arising from new development. This is because any such mitigation should only be required in respect of new homes completed prior to 2030.

Over time, the number of dwellings that can be expected to come forward before the introduction of the statutory duty will reduce and so the difference between Tests A and B – i.e. the mitigation requirement associated with the development as a whole and with the dwellings to be delivered prior to 2030 – will be likely to increase even further. It is noted that no allowance has been given to mitigation after 2030 in this analysis.

That is because it is not yet known what the highest technically achievable limits will mean and what level of residual mitigation would still be required. Whilst it is accepted that some further mitigation may still be required, this analysis is based on an assessment of conditions that are known at this time.

**Table 5.3** Summary of the Nutrient Budgets of all Scenarios Conducted

| Scenario | | Test | | |
|---|---|---|---|---|
| | | A – Baseline | B – Homes to be completed by 2030 | C – Reduced Dwellings and Reduced Occupancy Rate |
| 1 | TP (kg/yr) | 513.12 | 271.91 | 191.80 |
| | TN (kg/yr) | 1725.55 | 867.98 | 597.59 |
| 2 | TN (kg/yr) | 2596.11 | 0 | 0 |
| 3 | TP (kg/yr) | 94.30 | 68.84 | 51.87 |
| | TN (kg/yr) | 916.10 | 566.34 | 311.86 |
| 4 | TN (kg/yr) | 673.84 | 465.64 | 314.29 |
| 5 | TN (kg/yr) | 529.93 | 529.93 | 344.61 |
| 6 | TN (kg/yr) | 2147.36 | 376.63 | 40.58 |

**Source:** Stantec

5.43 The effect of the application of a net additional average household size rather than Natural England's recommended size of 2.4 people per household (gross) is also significant in shaping the mitigation requirements that would arise from each scenario. As set out previously in this report, this is an important consideration which reflects the fact that not all future residents of a proposed development will be new to an area; instead many will already reside within the locality and would therefore not be expected to generate an additional nutrient load that would require mitigation. The scale of the effect of this test varies between the three catchments based on the analysis of net additional household size.

## Mitigation solutions

5.44 Where the outcomes of the scenarios indicate that mitigation would be necessary, the scale of that mitigation has been estimated for both taking land out of agricultural production and the creation of new wetlands. The outcomes of this indicate that the land take required for mitigation for each scenario for wetland is far lower than the area required for arable reversion, although variation is dependent on the specific scenario. For example, in Scenario 1A, arable reversion has been estimated to take over 13 times the land to offset the phosphorous budget, whereas in Scenario 3A, the land take of arable reversion is nearly 400 times the land take compared to wetland to offset the phosphorous budget. This variance reflects the parameters within the Natural England methodology.

5.45 If the removal rates for both mitigation types are considered, in Scenario 1A each hectare of agricultural reversion results in a 0.91kg/TP removal, whilst the generic banking coefficient of wetland creation is 12kgTP/ha. This explains the large difference in nutrient offset land requirements.

5.46 Due to the land take requirements of arable reversion normally exceeding the site boundary area, on-site arable reversion will generally not achieve nutrient neutrality. Larger site boundaries do allow for more land to be fallowed and converted to a low nutrient export land use such as woodland. This will act as a means of reducing the nutrient budget of the development site. Arable reversion is usually an off-site mitigation method. Wetland area requirements are lower than arable reversion land use requirements. As such, some sites with suitable watercourses can use on-site wetland creation in order to achieve nutrient neutrality. However, this is highly dependent on the hydrological setting of the site and not just the area available within the red line boundary. Many sites will not contain a suitable watercourse to construct a wetland that can achieve nutrient neutrality on-site and so off-site wetlands are typically required to be constructed.

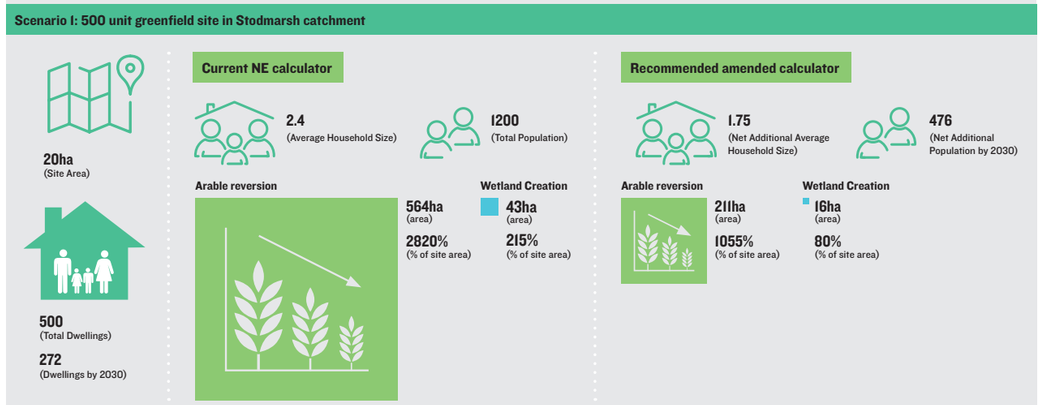
# 5.0 Results

## Scenario 1

5.47 The land requirements for arable reversion and wetland are the highest for Test A and the lowest for Test C. The biggest fall in nutrient offset land requirement is from Test A to Test B in line with the relative fall in the nutrient budgets (a 47% reduction).

Arable reversion provides 0.91 kgTP/ha and 19.01kgTN/ha offset when converting cereals to greenspace land use assuming the same environmental conditions as found at the development site. This results in an arable reversion (564ha) land take much larger than the site area (20ha) itself.

**Figure 5.1** Summary of Scenario 1



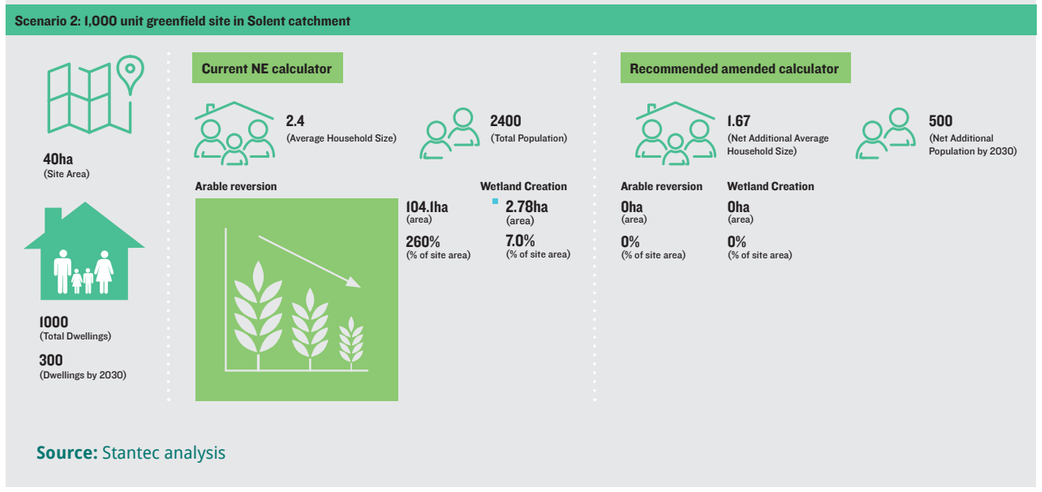

**Source:** Stantec analysis

## Scenario 2

5.48 Some large sites do have the ability to provide on-site nutrient offset/mitigation. A large site with a suitable watercourse might have the land available to contain a wetland. A large site could also contain land previously used for agriculture that can be taken out of production at the start of the first phase of build out and hence act as a means of short-term nutrient offset for the early stages of the development. There is no guarantee that large sites have large enough areas of land for arable reversion or wetland creation to provide sufficient nutrient offset to make the development nutrient neutral.

5.49 There is only a land requirement for arable reversion or wetland in Test A. Tests B and C are both neutral and hence mitigation is not required. Usually, phosphorous is the dominant nutrient determining offset land requirements because nitrogen offset from arable reversion and wetland per ha is greater in relation to the relative size of the nitrogen budget compared to the phosphorous budget. The offset land requirements are hence low (2.79ha of wetland or 104.14ha of arable reversion) because phosphorous neutrality is not required in this region. Arable reversion can achieve an offset of 24.93kgTN/ha when converting cereals to greenspace land use assuming the same environmental conditions as found at the development site. This still results in an area (104ha) greater than the site area (40ha) being required for arable reversion.

**Figure 5.2** Summary of Scenario 2




**Source:** Stantec analysis

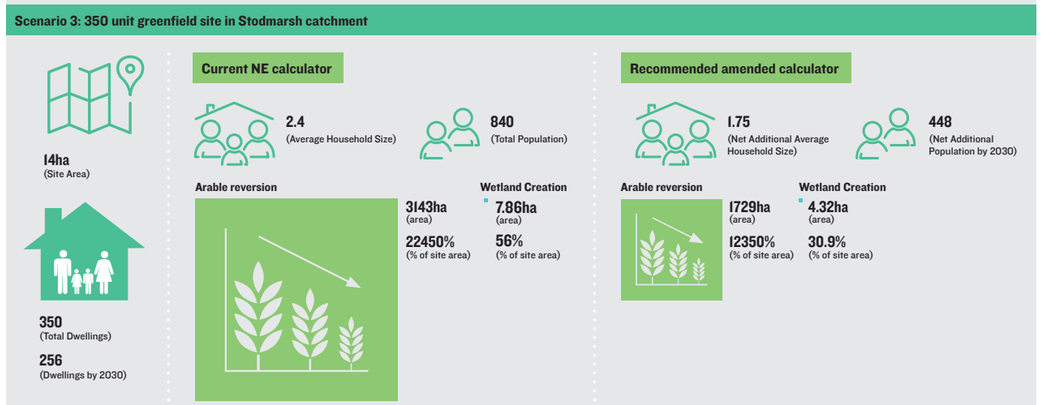
# 5.0 Results

## Scenario 3

5.50 The land requirements for arable reversion and wetland are again the highest for Test A and the lowest for Test C. The biggest fall in offset land requirement is from Test A to Test B in line with the relative fall in the nutrient budgets (a 27% reduction).

Arable reversion can achieve an offset rate of 0.03kgTP/ha and 22.99kgTN/ha when converting cereal to greenspace land use assuming the same environmental conditions as found at the development site. The land required for arable reversion (3,144ha) is very significant, when compared to the area of the development (14ha).

**Figure 5.3** Summary of Scenario 3



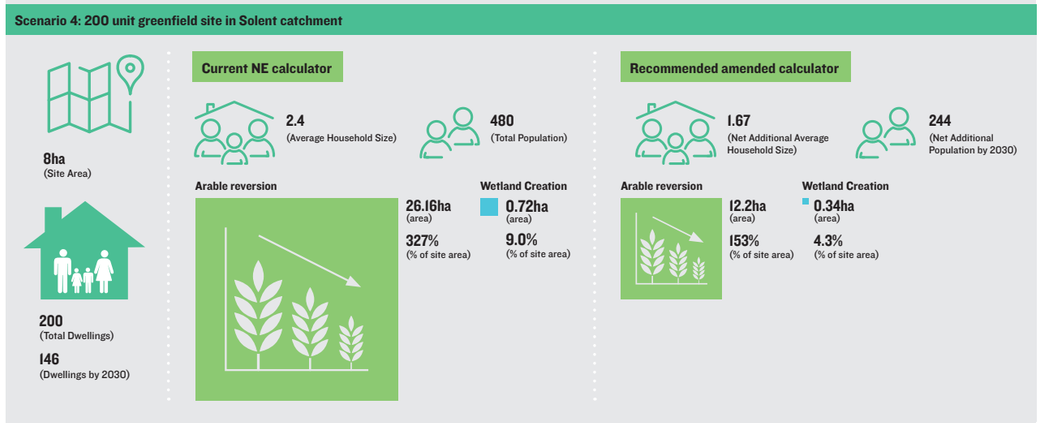

**Source:** Stantec analysis

## Scenario 4

5.51 Test A has the highest nutrient offset land area requirement and Test C has the lowest nutrient offset land area requirement. The biggest fall in nutrient offset land use requirement is between Tests A and B. This is associated with the largest fall in nutrient budget between Tests A and B (a 31% reduction). Arable reversion can achieve an offset of 25.76kgTP/ha when converting cereal to greenspace land use assuming the same environmental conditions as found at the development site. Only nitrogen has an offset land requirement in this region.

Usually, phosphorous is the dominant nutrient determining offset land requirements because nitrogen offset from arable reversion and wetland/ha is greater in relation to the relative size of the nitrogen budget compared to the phosphorous budget. The nutrient offset land requirements are hence low (0.34-0.72ha of wetland and 12.20-26.16ha arable reversion across the 3 tests) but still large in comparison to the site area (8ha).

**Figure 5.4** Summary of Scenario 4




**Source:** Stantec analysis

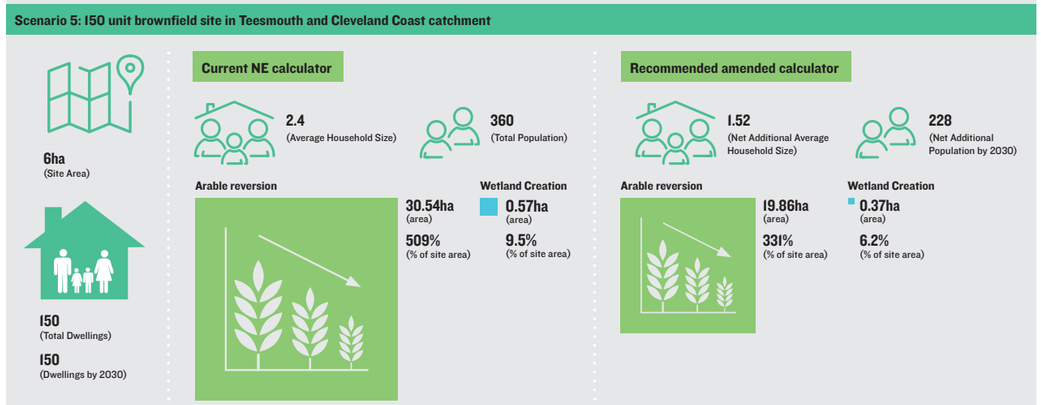
# 5.0 Results

## Scenario 5

5.52 Tests A and B have the same nutrient offset land requirement because all dwellings would be completed before 2030. Test C has the lowest nutrient offset land requirement. This is relative to the fall in the nutrient budget from Tests A and B to Test C (a 35% reduction). Arable reversion of cereal land use to greenspace can achieve an offset of 17.35 kgTN/ha assuming the same environmental conditions as found at the development site. Only nitrogen has an offset land requirement in this region.

Usually, phosphorous is the dominant nutrient determining mitigation land requirements because nitrogen offset from arable reversion and wetland/ha is greater in relation to the relative size of the nitrogen budget compared to the phosphorous budget. The nutrient offset land requirements are hence low (0.37-0.57ha of wetland and 19.86-30.54ha arable reversion across the 3 tests). This area of land required for arable reversion (31ha) is greater than the site area(6ha).

**Figure 5.5** Summary of Scenario 5



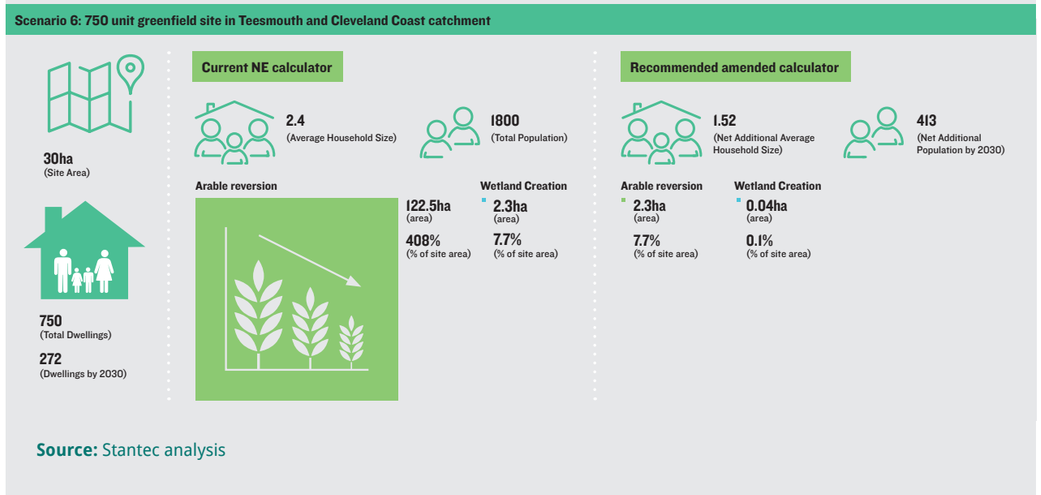

**Source:** Stantec analysis

## Scenario 6

5.53 Test A has the highest nutrient offset land requirement and Test C has the lowest. The biggest fall in offset land take is between Tests A and B. This is relative to the fall in the nutrient budget (an 83% reduction). Arable reversion can achieve an offset rate of 17.53 kgTN/ha. Only nitrogen has an offset land requirement in this region. Usually, phosphorous is the dominant nutrient determining nutrient offset land requirements because nitrogen offset from arable reversion and wetland/ha is greater in relation to the relative size of the nitrogen budget compared to the phosphorous budget.

The nutrient offset land requirements are hence low (0.04-2.31ha wetland and 2.31-122.50ha arable reversion across the 3 scenarios). The area of land required for arable offset (123ha) is larger than the site (30ha).

**Figure 5.6** Summary of Scenario 6




**Source:** Stantec analysis

# 6.0 Implications

6.1 The importance of house building is recognised by the Government and has been underlined by the recently repeated commitment to the delivery of 300,000 dwellings each year and the June 2022 Written Ministerial Statement which sought to address the stalling effects of the nutrient neutrality requirement on housing delivery.

6.2 However, the proposed solution – to comprise the requirement for water companies to upgrade wastewater treatment works to the highest technically achievable limits in nutrient neutrality areas – does not apply until 2030. In the interim, there is a risk that the delivery of new housing might be severely affected with HBF estimating that 100,000 new homes currently being delayed across England, of which 66,420 are located in the three catchments that have been reviewed as part of this study. By way of context, when assessed against the current local plan requirements this equates to a supply of:

1. 8.5 years supply in the Stodmarsh catchment[18];
2. 5.1 years in the Teesmouth and Cleveland Coast catchment[19]; and,
3. 1.75 years in the Solent catchment[20].

6.3 By contrast, the national figure represents a supply of 0.33 years against the Government's target of 300,000dpa.

6.4 The economic implications of the delay have been set out in Section 2 but it is possible to quantify this impact by individual catchment:

# 6.0 Implications

**Table 6.1** Estimate of economic impact of non-delivery of housing by catchment

| Catchment | Stodmarsh | Teesmouth and Cleveland Coast | Solent |
|---|---|---|---|
| Dwellings affected | 33,000 | 21,420 | 12,000 |
| **Construction Impacts** | | | |
| Construction value | £4,557,351,500 | £2,958,135,500 | £1,657,218,500 |
| Total construction jobs (direct and indirect jobs; person years) | 162,000 | 105,000 | 59,000 |
| Economic outputs (Construction GVA + Supply Chain GVA) | £9,874,903,000 | £6,409,709,500 | £3,590,873,500 |
| **Expenditure Impacts** | | | |
| First occupation expenditure | £181,500,000 | £117,810,000 | £66,000,000 |
| Resident expenditure p.a. | £468,051,500 | £303,808,000 | £170,200,500 |
| Jobs (via resident expenditure) | 6,100 | 3,900 | 2,200 |

**Source:** Lichfields analysis. See footnote 3 for data sources. All figures rounded

6.5 This demonstrates that there are clear economic and social reasons to ensure that housing delivery can be maintained in the interim. In areas affected by the nutrient neutrality requirement, this should involve adopting an appropriate approach to the assessment of the nutrient load associated with new housing. As demonstrated in this report, the appropriate approach should:

1. Be based on the number of dwellings that are expected to come forward prior to the introduction of the statutory duty in 2030; and,

2. Apply the net additional average household size (rather than a gross figure for the development as a whole) as a basis for the calculation of the nutrient load arising from any development.

6.6 These factors have been shown to have a very significant impact on the nutrient load and mitigation requirements for each scenario. A failure to have due regard to them could result in an over-estimation of mitigation requirement to the extent that could render the scheme undeliverable.

[18] 33,000 dwellings affected; combined local plan requirement of 3,902dpa
[19] 21,420 dwellings affected; combined local plan requirement of 4,216dpa
[20] 12,000 dwellings affected; combined local plan requirement of 6,854dpa

# 6.0 Implications

## Mitigation land requirements

6.7 As explained in Section 5, the quantum of land required for mitigation depends on a range of factors including the scale of development, expected net additional population, existing land use, soil characteristics and level of capacity within the wastewater treatment works that would serve the site. This demonstrates the range of factors that have a bearing on the nutrient load arising from any development and highlights the reality that the nutrient load and the potential mitigation options cannot be compared between the different sites/development scenarios.

6.8 As explained in Section 2, agriculture is the most significant cause of nutrient pollution. As such, the removal of land from agricultural use is viewed as an effective mitigation approach. However, the issue of food security is a matter of increasing concern for the UK Government. The House of Commons debate pack relating to Global food security[21] noted that in 2020 the UK imported 46% of the food it consumes, with 28% of the UK's food imports coming from the EU. The debate pack quoted the 2021 UK Food Security Report which stated that since 2010 the UK's food system has been affected by the departure from the EU, the Covid-19 pandemic and greater impacts of climate change. The war in Ukraine has since added to these challenges.

6.9 In June 2022, the Government published a food strategy for England. This identified a number of actions that had or would be taken in response to the Ukraine war:

1. Measures to help farmers and food producers manage increased input costs, including a package on fertilisers;

2 Help businesses to manage vegetable oil substitution and access more diverse supply chains where there are shortages of ingredients; and,

3 Work with industry to develop plans to bolster resilience of critical inputs such as carbon dioxide and fertiliser.

6.10 Against this context, the potential removal of large amounts of land from agricultural production to act as mitigation for residential development – despite it now being accepted by the Government that house building makes a small contribution to the problem of nutrient pollution – is a matter of considerable concern.

[21] 20 October 2022. CDP-0177 (2022)



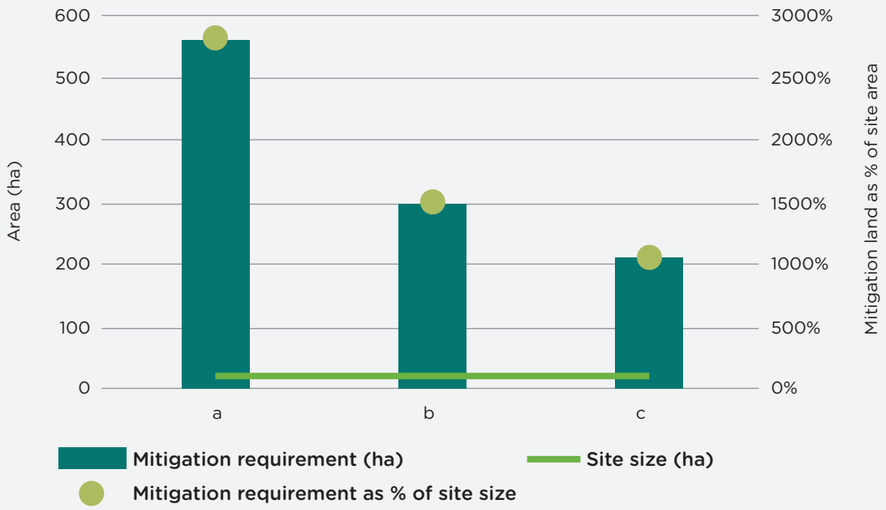
6.11 The analysis undertaken by Stantec has quantified the amount of land that is required for mitigation, based on arable reversion and the creation of wetlands. A review of these figures, and a comparison with the site size, highlights the magnitude of the required land take. This is summarised in Figures 6.1 to 6.6. Although the individual figures vary and for the reasons explained in Section 5, it is not possible to compare the results of different scenarios, there are a number of common trends:

1. In each case, test A generates a requirement for mitigation that far exceeds the size of the site – ranging from 330% (i.e. three times the site area) in Scenario 4 to 22,500% (i.e. 225 times the site size) in Scenario 3. By way of context, the area of land required for mitigation under Scenario 3 (Test A) equates to 10% of the total administrative area of Canterbury City Council.

2. Whilst the mitigation requirements associated with Tests B and C are substantially lower, with the exception of Scenarios 2 and 6, they continue to require an area of land that far exceeds the size of the site for which they are to provide mitigation – ranging from 2.25 times (Scenario 4) to 165 times (Scenario 3) for Test B and between 1.5 times (Scenario 4) to 125 times (Scenario 3) for Test C. This again raises very significant questions about how best to ensure that the demand for nutrient mitigation does not have a harmful effect on food security or the delivery of housing.

# 6.0 Implications

**Figure 6.1** Mitigation requirement (arable reversion) in relation to site size - Scenario 1

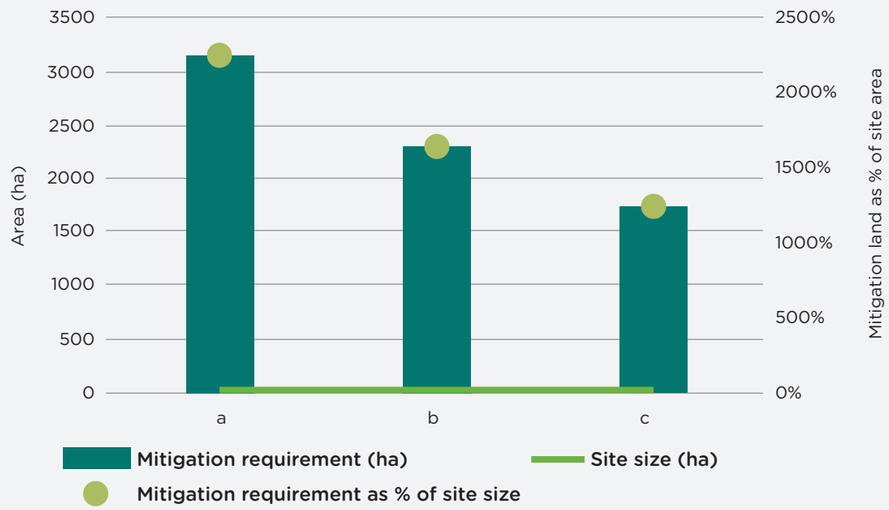



**Source:** Stantec / Lichfields

**Figure 6.2** Mitigation requirement (arable reversion) in relation to site size - Scenario 2


**Source:** Stantec / Lichfields

**Figure 6.3** Mitigation requirement (arable reversion) in relation to site size - Scenario 3




**Source:** Stantec / Lichfields

**Figure 6.4** Mitigation requirement (arable reversion) in relation to site size - Scenario 4


**Source:** Stantec / Lichfields

# 6.0 Implications

**Figure 6.5** Mitigation requirement (arable reversion) in relation to site size - Scenario 5

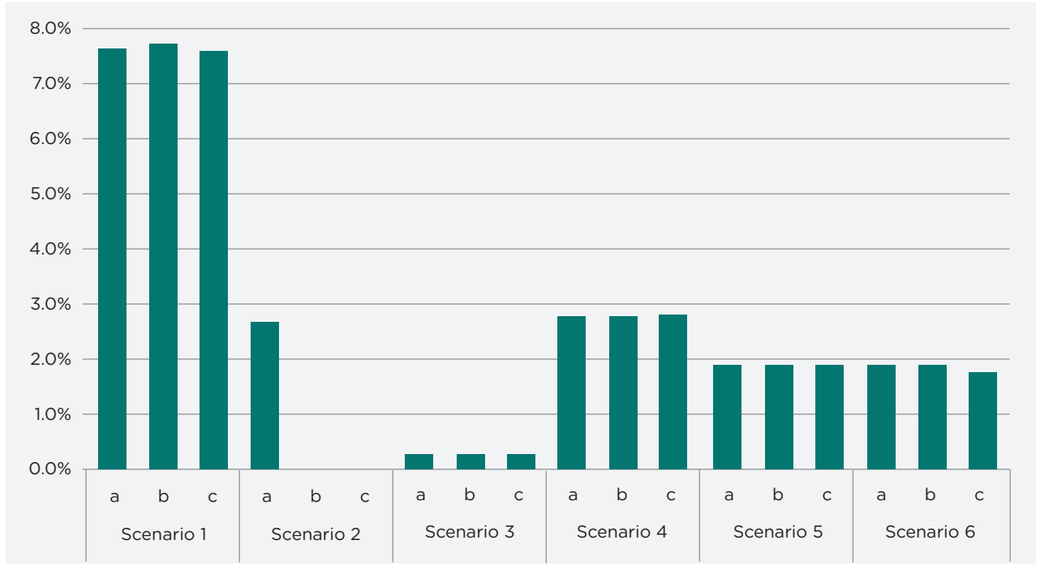

**Source:** Stantec / Lichfields

**Figure 6.6** Mitigation requirement (arable reversion) in relation to site size - Scenario 6


**Source:** Stantec / Lichfields

6.12 The quantum of land required for wetland creation is much lower. As illustrated in Figure 6.7, the land take with this alternative mitigation option ranges from ~0.3% (Scenario 3) to ~7.7% (Scenario 1) of the land required for arable conversion. This will be important in responding to the issue of food security and it might be possible to provide on-site mitigation through the creation of wetlands as part of larger schemes. However, this approach may not be appropriate in all locations and it will generate ongoing maintenance and monitoring requirements.

**Figure 6.7** Land required for wetland creation as % of land required for arable reversion




**Source:** Stantec / Lichfields

# 6.0 Implications

## Cost implications

6.13 The provision of appropriate mitigation raises a secondary point relating to the costs arising and the potential implication on development viability and, hence, the delivery of new housing.

6.14 The level of mitigation that is required will give rise to differing costs that would need to be borne by the developer. The cost of arable reversion would be limited to the purchase of land to be taken out of agricultural use, although there is substantial evidence of the price of such land being inflated above agricultural land value and so an uplift should be anticipated. The delivery of new areas of wetland is more complicated and potentially more expensive even though the area of land required is less than that associated with the arable reversion option. It will involve a more complex process including design, consenting, construction and ongoing maintenance and monitoring.

6.15 We have sought to quantify the potential costs associated with the mitigation options associated with each scenario in order to consider the potential impacts on development viability and the delivery of much-needed new housing in each area. In each case, it is recognised that the costs incurred represents an effect of the need for and quantum of land that is required for mitigation.

### Arable reversion

6.16 As set out above, the key cost associated with this mitigation option represents the purchase of land that would be taken out of agricultural use. Based on information provided by the client group, the following agricultural land values have been applied to the scenarios within each catchment:

**Table 6.2** Agricultural land values in Stodmarsh, Solent and Teesmouth & Cleveland Coast catchments

| | Stodmarsh | Solent | Teesmouth and Cleveland Coast |
|---|---|---|---|
| Agricultural land value (£/acre) | £12,000 - £15,000 | £15,000 - £20,000 | £8,000- £12,000 |
| Agricultural land value (£/ha) | £30,000 - £37,000 | £37,000 - £49,000 | £20,000- £30,000 |

**Source:** Housebuilder consortium

6.17 However, it is understood that potential mitigation land is being sold at a significant uplift, commonly in the order of three times the agricultural land value. Taking the midpoint of the values identified above, this would result in the following costs of land for arable reversion:

**Table 6.3** Cost of mitigation Stodmarsh, Solent and Teesmouth & Cleveland Coast catchments

| Stodmarsh | Solent | Teesmouth and Cleveland Coast |
|---|---|---|
| £100,500 | £129,000 | £75,000 |

**Source:** Land required for arable reversion and associated costs

6.18 Applying these figures to the mitigation requirements identified by Stantec, it is possible to quantify the total cost of mitigation associated with each scenario and test and the resultant cost per dwelling, as summarised below:

**Table 6.4** Population applied to each test

| Test | Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| A | Land required (ha) | 564.87 | 104.14 | 3143.33 | 26.16 | 30.54 | 122.5 |
| | **Cost** | **£56,769,435** | **£13,434,060** | **£315,904,665** | **£3,374,640** | **£2,290,500** | **£9,187,500** |
| B | Land required (ha) | 298.8 | 0 | 2294.67 | 18.08 | 30.54 | 21.48 |
| | **Cost** | **£30,029,400** | **£-** | **£230,614,335** | **£2,332,320** | **£2,290,500** | **£1,611,000** |
| C | Land required (ha) | 210.77 | 0 | 1729.0 | 12.2 | 19.86 | 2.31 |
| | **Cost** | **£21,182,385** | **£-** | **£173,764,500** | **£1,573,800** | **£1,489,500** | **£173,250** |

**Source:** Lichfields analysis. Net additional population figures based on dwellings x average household size

6.19 This analysis shows that under each scenario, the costs of mitigation associated with the assessment of likely delivery before 2030 and the expected net additional population is substantially lower than that associated with the full site and the average household size that has been put forward by Natural England.

6.20 The costs associated with each scenario can be further understood by reference to a cost per dwelling and as a proportion of the average cost of a new build dwelling in each catchment, based on the following median costs:

**Table 6.5** Median new build house price

| | Stodmarsh | Solent | Teesmouth and Cleveland Coast |
|---|---|---|---|
| Median new build house | £394,973 | £363,483 | £269,950 |
| Relevant LEP area | South East LEP | Blended average of Enterprise M3 and Solent LEPs | Tees Valley LEP |

**Source:** HPSSA dataset 25: House prices based on best fit of LEP areas

# 6.0 Implications

**Table 6.6** Land required for arable reversion and associated costs

| Test | Scenario | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| A | **No. dwgs** | 500 | 1,000 | 350 | 200 | 150 | 750 |
| | **Cost/dwg** | £113,539 | £13,434 | 902,585 | £16,873 | £15,270 | £12,250 |
| | **% dwg price** | **28.7%** | **3.7%** | **228.5%** | **4.6%** | **5.7%** | **4.5%** |
| B | **No. dwgs** | 272 | 300 | 256 | 146 | 150 | 272 |
| | **Cost/dwg** | £110,402 | £- | £900,837 | £15,975 | £15,270 | £5,923 |
| | **% dwg price** | **28.0%** | **-** | **228.1%** | **4.4%** | **5.7%** | **2.2%** |
| C | **No. dwgs** | 272 | 300 | 256 | 146 | 150 | 272 |
| | **Cost/dwg** | £77,879 | £- | £678,768 | £10,779 | £9,930 | £637 |
| | **% dwg price** | **19.7%** | **-** | **171.9%** | **3.0%** | **3.7%** | **0.2%** |

**Source:** Lichfields analysis

6.21 The land costs that would need to be borne by each development scenario is a function of the different land requirements required for mitigation. This analysis shows that in each case, the cost per dwelling is very similar for Tests A and B. This is because both apply the same average household size figure. Therefore, whilst less land is required for mitigation under Test B and the total cost would be commensurately lower, the implications on viability is likely to be largely similar. By contrast, the application of a net additional average household size figure would give rise to a lower cost per dwelling and would reduce the viability burden on the developments.

6.22 Given the multiplicity of factors that influence the potential nutrient load and the resultant mitigation requirements, the total cost that must be borne by any development and the implications on the viability of development will vary substantially. For example, Scenario 3 will clearly be unviable under all three tests, as would Scenario 1 albeit to a lesser extent. The viability of Scenarios 4, 5 and 6 would be much more favourable under Test C although the specific impact would depend on other development and policy costs associated with each scheme.

# 6.0 Implications

## Wetland creation

6.23 Wetland costings are high level estimations including land purchase, consenting & design, construction, maintenance (desilting, upkeep etc) and monitoring. The costings presented are interpolated from the estimated costs contained within the Somerset and Camel  Solution Reports. It should be noted that the costings are highly dependent on location, extent, physical environment, and other parameters, and assume that wetland(s) would be constructed on impeded ground and not require lining. The costs exclude any permits which could necessary such as abstraction licenses and land drainage consent.

6.24 Although the wetland area for the scenarios to achieve neutrality under the baseline scenarios range from 1 to 43ha, there are technical design limits to ensure the wetlands remain effective for nutrient removal. Based on this, it recommended that wetlands are no greater than 10ha. In instances where a greater area is required to achieve neutrality it would be expected that multiple wetlands would be designed, consented, constructed, and monitored. Thus, costs are based upon additions of cost per 10ha or less rather than scaling.

**Table 6.7** Estimated wetland costings

| Scenario | Test | Wetland Area (ha)[24] | Estimated wetland costs |
|---|---|---|---|
| 1 | A | 43 | £2,800,000 to £3,355,000 |
| | B | 23 | £1,600,000 to £1,900,000 |
| | C | 16 | £1,100,000 to £1,300,000 |
| 2 | A | 3 | £340,000 to £410,000 |
| | B | 0 | - |
| | C | 0 | - |
| 3 | A | 8 | £525,000 to £630,000 |
| | B | 6 | £440,000 to £525,000 |
| | C | 4 | £360,000 to £435,000 |
| 4 | A | 1 | £300,000 to £360,000 |
| | B | 1 | £300,000 to £360,000 |
| | C | 0 | - |
| 5 | A | 1 | £300,000 to £360,000 |
| | B | 1 | £300,000 to £360,000 |
| | C | 0 | - |
| 6 | A | 2 | £320,000 to £385,000 |
| | B | 0 | - |
| | C | 0 | - |

**Source:** Stantec

[22] Somerset Levels and Moors Phosphate Mitigation Solutions (somersetwestandtaunton.gov.uk)
[23] River Camel Phosphate Mitigation Solutions Report Final Draft (cornwall.gov.uk)
[24] Rounded to the nearest ha

6.25 When comparing the costs presented for arable reversion with those estimated for wetlands, they are significantly lower which can be attributed partly to much less land being required to achieve neutrality via wetlands. All mitigation needs location specific consideration and there could be instances where the implementation of wetland is not an appropriate mitigation measure and thus other mitigation types become necessary.

6.26 Based on the scenarios applied, the consideration of delivery by 2030 and the reduced net additional average house size results in a reduced mitigation requirement and thus a lower cost. Given that, the provision for mitigation could be more achievable and need not have a significant impact of development viability.

# 7.0 Conclusion

7.1 Despite not being a major contributor to the problem of nutrient pollution, the house building industry has faced – and continues to face – a disproportionate weight of sanctions which are resulting in a significant nationally under-delivery of much needed housing with associated economic and social harm.

7.2 It is acting positively through measures such as reducing water consumption in new dwellings, incorporating on-site and off-site wetland creation, as well as exploring other off-site nature-based solutions. It has engaged with trial mitigation measures and schemes across the country, but it is evident that too often the level of mitigation that is sought is beyond what can reasonably be expected on site and is based on an erroneous assessment of the potential nutrient load arising from new residential development. Going forwards, the water industry must work collaboratively with stakeholders such as the house building industry to address these problems.

7.3 In spite of these efforts, the industry has been subject to a weight of sanctions with an effective moratorium on new housebuilding in affected catchments unless nutrient neutrality can be demonstrated. As this report has shown, based on the current Natural England calculator, this is a very high bar to pass particularly as the calculator over-estimates significantly mitigation requirements.

7.4 The Government has now acknowledged that "the impact of new housing is a small proportion of overall nutrient pollution, but mitigation requirements have a significant impact on overall house building." It has responded by tabling an amendment to the Levelling Up and Regeneration Bill which will place a new statutory duty on water and sewerage companies in England to upgrade wastewater treatment works to the highest technically achievable limits by 2030 in nutrient neutrality areas.

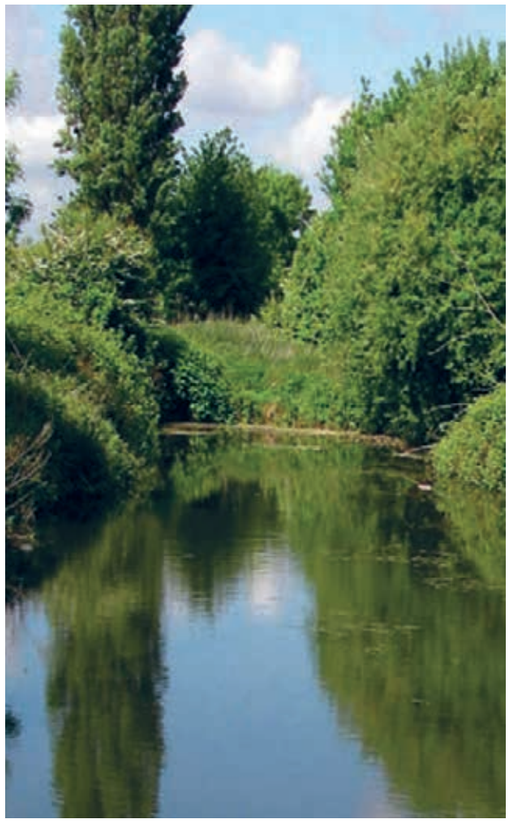
7.5 Whilst a relatively lengthy timescale is necessary to enable water companies to undertake the necessary improvements to wastewater treatment works, no proposals have been put forward to ease the burden on housebuilders in the interim. This raises questions regarding the delivery of new housing prior to 2030. Based on the local plan housing requirements in the affected local authority areas, over 100,000 new homes are required within the three catchments that have been assessed in this report between 2023 and 2030 but 66,420 are currently at risk of delay due to the issue of nutrient neutrality.

# 7.0 Conclusion

7.6 This report has demonstrated the importance of maintaining housing delivery. It has presented evidence to show how a focus on:

1. The level of development on any individual site that is likely to be delivered by 2030; and,

2. The net additional population that will reside within those new homes provides a mechanism by which a proportionate and precautionary approach can be taken to the identification of the nutrient load associated with new development and the mitigation of any such impact.



7.7 Drawing on the evidence set out in this report, we would conclude by proposing the following requests of government, Natural England and other relevant public bodies:

1. Amend the Natural England nutrient calculator through the adoption of the two-stage approach set out in this report.

2. Avoid pressure for the dilution of the statutory duty on water companies to achieve the highest technically achievable limits by 2030 as the Leveling Up and Regeneration Bill passes through the various stages of Parliament.

3. Ensure that the required upgrades to wastewater treatment works do take place by 2030 and that the house building industry is not penalised as a result of any delay on the part of individual water companies.

4. Remove the exemption for wastewater treatment works serving small catchments on the basis that this will have a disproportionately disadvantageous impact on SME developers. The Government should additionally consider other ways in which to unlock stalled sites in rural areas.

5. Maintain a focus on the location of the outflow from wastewater treatment works which may not be in an affected catchment, irrespective of the location of the proposed development site.

6. Provide clarity as to what is meant by "highest technically achievable limits" in the context of ever-evolving technology and solutions, whether water companies will be required to continually upgrade their facilities to the latest highest technically achievable limits, and how the required improvements will be funded;

7. Move towards an alternative catchment wide approach (rather than scheme-by-scheme) that allows for some level of house building against the improved water quality that is being delivered by infrastructure investment. If properly managed this would allow both continuity in house building and a planned improvement towards meeting water quality standards.

8. Encourage on-site mitigation on larger sites through the integration of wetlands. Make use of design coding and placemaking to incorporate these into high quality new places.

9. Consider measures to support SME house builders who may struggle to mitigate on site and may not benefit from the improvements to the performance of wastewater treatment works.

10. Ensure that the preparation and review of local plans is maintained and that the issue of nutrient neutrality does not cause further delay to this process and recognise the potential of the plan-led system to identify solutions – particularly on large sites that can accommodate wetland mitigation.

11. Include reference in the updated NPPF to the long and short-term mechanisms for the delivery of new housing in affected catchments so that a firm policy basis can be established. Alongside this it would also be important to ensure that that nature-based proposals for mitigation solutions, such as planning applications for wetland creation, are seen as favourable proposals under the NPPF and are given considerable weight in the planning process, even in areas typically restricted from built development given the natural environment nature of the applications.

12. Ensure a collaborative approach with, and assistance from, the Government and Natural England to establish a workable approach for the identification of nutrient impacts and the calculation of mitigation options so as to ensure the continued delivery of new housing.

13. Place a greater focus on those industries that have the largest level of impact on nutrient pollution, especially agriculture – notwithstanding its importance to food security.

7.8 The issue of nutrient neutrality is not expected to be resolved quickly but the measures contained in the Written Ministerial Statement of July 2022 provides the firm basis by which progress can be made. This is very much welcomed although a pragmatic and proportionate approach must be taken to facilitate the delivery of new homes in affected areas in the interim. The analysis provided within this report provides a basis by which this can be achieved without creating any risk to the future health of affected river catchments.

# Appendix 1:
# Summary of Stantec analysis

## Scenario 1: 500 unit scheme on greenfield site. Stodmarsh catchment.

Table 0.1 Scenario 1 Base Parameters

| WwTW | Catchment | Soil drainage type | SAAR | NVZ | Site Area | Pre-Development Land use | Post-Development land use | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Urban | Green space |
| Westwell | Upper Stour | Impeded | 700-725 | Yes | 20ha | Lowland grazing | 14 ha | 6ha |

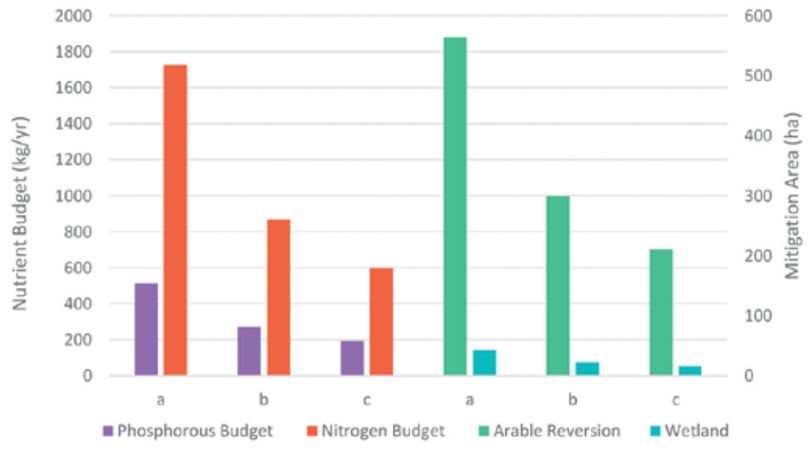
Source: Stantec analysis

Table 0.2 Scenario 1 Outcomes

| Test | 1a | | 1b | | 1c | |
|---|---|---|---|---|---|---|
| Nutrient Budget | TP | TN | TP | TN | TP | TN |
| Stage 1 | 420.77 | 1420.09 | 228.90 | 772.53 | 162.14 | 547.21 |
| Stage 2 | 13.60 | 189.25 | 13.60 | 189.25 | 13.60 | 189.25 |
| Stage 3 | 20.43 | 207.12 | 11.29 | 140.03 | 11.29 | 140.03 |
| Stage 4 | 513.12 | 1725.55 | 271.91 | 867.98 | 191.80 | 597.59 |
| Mitigation Size | | | | | | |
| Arable reversion from Cereals (ha) | 564 | 91 | 299 | 46 | 211 | 31 |
| Wetland (ha) | 43 | 2 | 23 | 1 | 16 | 0.6 |

Source: Stantec analysis

Figure 0.1 Scenario 1 nutrient budget and mitigation size




Source: Stantec analysis

## Scenario 2: 1,000 unit urban extension scheme on greenfield site. Solent Catchment

Table 0.3 Scenario 2 Base Parameters

| WwTW | Catchment | Soil drainage type | SAAR | NVZ | Site Area | Pre-Development Land use | Post-Development land use | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Urban | Green space |
| Stockbridge | Test Upper and Middle | Freely Draining | 750-800 | Yes | 40 | Cereals | 28 | 12 |

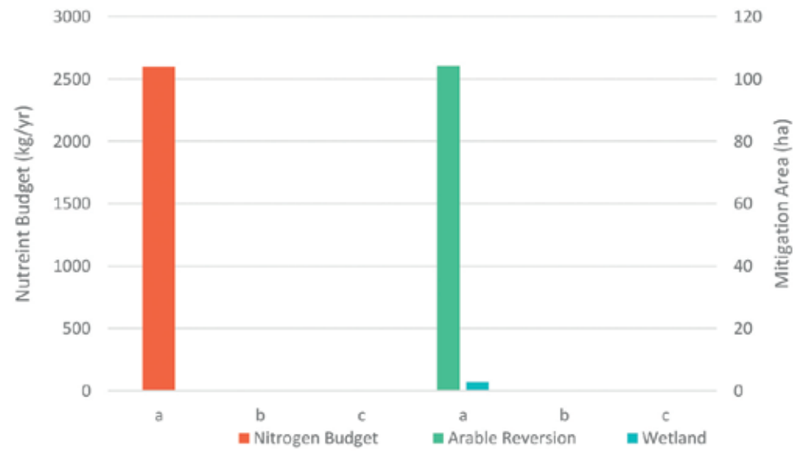
Source: Stantec analysis

Table 0.4 Scenario 2 Outcomes

| Scenario | 2a | 2b | 2c |
|---|---|---|---|
| Nutrient Budget | TN | TN | TN |
| Stage 1 | 2840.18 | 852.06 | 592.89 |
| Stage 2 | 1117.24 | 1117.24 | 1117.24 |
| Stage 3 | 440.48 | 216.14 | 216.14 |
| Stage 4 | 2596.11 | 0.00 | 0.00 |
| Mitigation Size | | | |
| Arable reversion from Cereals (ha) | 104.14 | 0.00 | 0.00 |
| Wetland (ha) | 2.79 | 0.00 | 0.00 |

Source: Stantec analysis

Figure 0.2 Scenario 2 nutrient budget and mitigation size




Source: Stantec analysis

# Appendix 1:
# Summary of Stantec analysis

## Scenario 3: 350 unit scheme on greenfield site. Stodmarsh Catchment

Table 0.5 Scenario 3 Base Parameters

| WwTW | Catchment | Soil drainage type | SAAR | NVZ | Site Area | Pre-Development Land use | Post-Development land use | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Urban | Green space |
| Canterbury | Lower Stour | Freely Draining | 650-675 | No | 14 | Cereals | 9.8 | 4.2 |

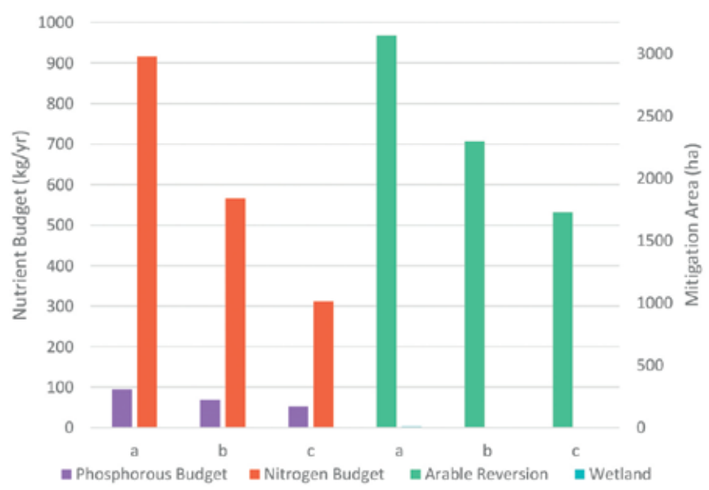
Source: Stantec analysis

Table 0.6 Scenario 3 Outcomes

| Scenario | 3a | | 3b | | 3c | |
|---|---|---|---|---|---|---|
| Nutrient Budget | TP | TN | TP | TN | TP | TN |
| Stage 1 | 66.27 | 994.06 | 48.47 | 727.09 | 34.33 | 515.02 |
| Stage 2 | 0.70 | 363.84 | 0.70 | 363.84 | 0.70 | 363.84 |
| Stage 3 | 13.02 | 133.20 | 9.60 | 108.70 | 9.60 | 108.70 |
| Stage 4 | 94.30 | 916.10 | 68.84 | 566.34 | 51.87 | 311.86 |
| Mitigation Size | | | | | | |
| Arable reversion from Cereals (ha) | 3143.33 | 39.85 | 2294.67 | 24.63 | 1729.00 | 13.57 |
| Wetland (ha) | 7.86 | 0.99 | 5.74 | 0.61 | 4.32 | 0.34 |

Source: Stantec analysis

Figure 0.3 Scenario 3 nutrient budget and mitigation size




Source: Stantec analysis

## Scenario 4: 200 unit scheme on greenfield site being promoted for allocation in an emerging Local Plan. Solent Catchment

Table 0.7 Scenario 4 Base Parameters

| WwTW | Catchment | Soil drainage type | SAAR | NVZ | Site Area | Pre-Development Land use | Post-Development land use | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Urban | Green space |
| Morestead | Itchen | Freely Draining | 850-900 | Yes | 8 | Lowland Grazing | 5.6 | 2.4 |

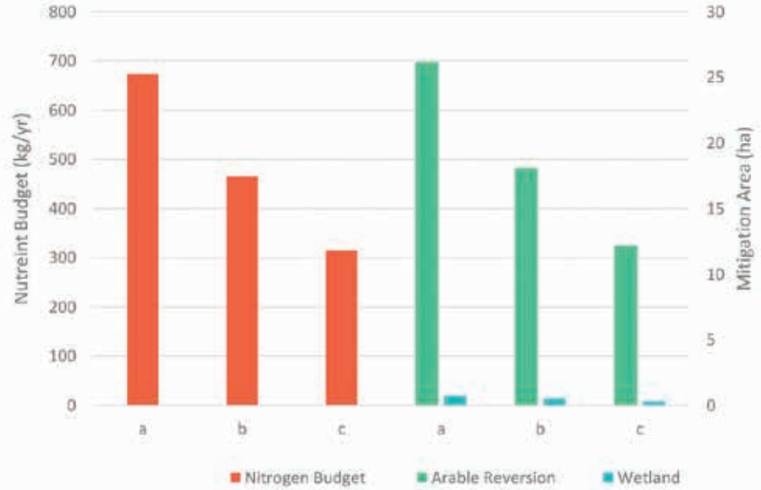
Source: Stantec analysis

Table 0.8 Scenario 4 Outcomes

| Scenario | 4a | 4b | 4c |
|---|---|---|---|
| Nutrient Budget | TN | TN | TN |
| Stage 1 | 568.04 | 414.67 | 288.54 |
| Stage 2 | 105.04 | 105.04 | 105.04 |
| Stage 3 | 98.53 | 78.41 | 78.41 |
| Stage 4 | 673.84 | 465.64 | 314.29 |
| Mitigation Size | | | |
| Arable reversion from Cereals (ha) | 26.16 | 18.08 | 12.20 |
| Wetland (ha) | 0.72 | 0.50 | 0.34 |

Source: Stantec analysis

Figure 0.4 Scenario 4 nutrient budget and mitigation size




Source: Stantec analysis

# Appendix 1:
# Summary of Stantec analysis

## Scenario 5: 150 unit scheme on brownfield site. Teesmouth & Cleveland Coast Catchment

Table 1: Scenario 5 Base Parameters

Table 0.9 Scenario 5 Base Parameters

| WwTW | Catchment | Soil drainage type | SAAR | NVZ | Site Area | Pre-Development Land use | | Post-Development land use | |
|---|---|---|---|---|---|---|---|---|---|
| Bran Sands | Tees Lower and Estuary | Impeded Drainage | 600-625 | No | 6 | Commercial Urban | Open Urban | Urban | Green space |
| | | | | | | 4.2 | 1.8 | 4.2 | 1.8 |

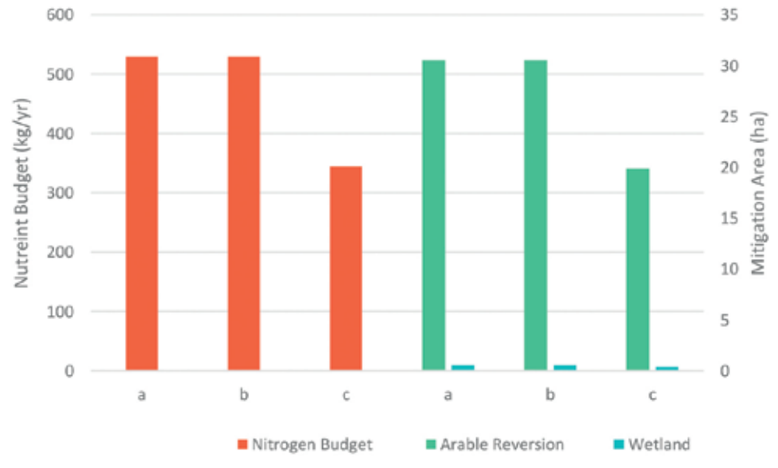
Source: Stantec analysis

Table 0.10 Scenario 5 Outcomes

| Scenario | 5a | 5b | 5c |
|---|---|---|---|
| Nutrient Budget | TN | TN | TN |
| Stage 1 | 426.03 | 426.03 | 271.59 |
| Stage 2 | 37.38 | 37.38 | 37.38 |
| Stage 3 | 52.96 | 52.96 | 52.96 |
| Stage 4 | 529.93 | 529.93 | 344.61 |
| Mitigation Size | | | |
| Arable reversion from Cereals (ha) | 30.54 | 30.54 | 19.86 |
| Wetland (ha) | 0.57 | 0.57 | 0.37 |

Source: Stantec analysis

Figure 0.5 Scenario 5 nutrient budget and mitigation size




Source: Stantec analysis

## Scenario 6: 750 unit scheme on greenfield site. Teemouth & Cleveland Coast Catchment

Table 1: Scenario 6 Base Parameters

Table 0.11 Scenario 6 Base Parameters

| WwTW | Catchment | Soil drainage type | SAAR | NVZ | Site Area | Pre-Development Land use | Post-Development land use | |
|---|---|---|---|---|---|---|---|---|
| Stressholme | Tees Middle | Impeded | 625-650 | Yes | 30 | Cereals | Urban | Green space |
| | | | | | | | 21 | 9 |

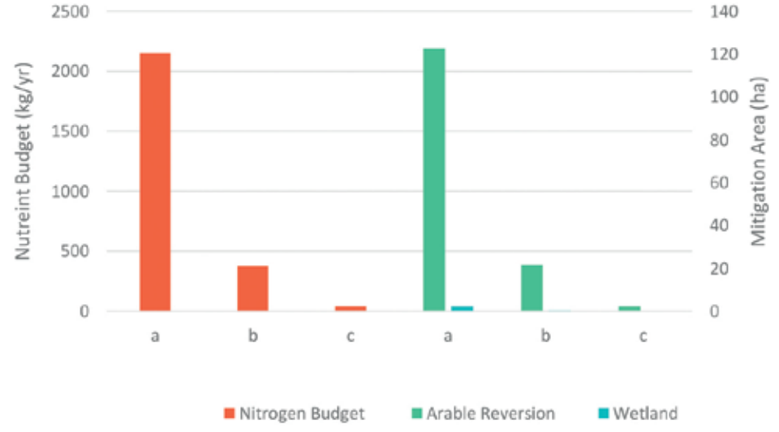
Source: Stantec analysis

Table 0.12 Scenario 6 Outcomes

| Scenario | 6a | 6b | 6c |
|---|---|---|---|
| Nutrient Budget | TN | TN | TN |
| Stage 1 | 2130.14 | 772.53 | 492.49 |
| Stage 2 | 615.82 | 615.82 | 615.82 |
| Stage 3 | 275.15 | 157.15 | 157.15 |
| Stage 4 | 2147.36 | 376.63 | 40.58 |
| Mitigation Size | | | |
| Arable reversion from Cereals (ha) | 122.50 | 21.48 | 2.31 |
| Wetland (ha) | 2.31 | 0.40 | 0.04 |

Source: Stantec analysis

Figure 0.6 Scenario 6 nutrient budget and mitigation size




Source: Stantec analysis