SUMMARY ADVICE ON ACHIEVING NUTRIENT NEUTRALITY FOR NEW DEVELOPMENT IN THE SOLENT REGION

SECTION 1 INTRODUCTION

1.1 The water environment within the Solent region is one of the most important for wildlife in the United Kingdom. There are high levels of nitrogen and phosphorus (FAQ7) input to this water environment with sound evidence that these nutrients are polluting protected sites.

1.2 Through their wastewater effluent; future developments have the potential to make these impacts worse. Nutrient neutrality is one way of ensuring that development does not add to the existing nutrient load and this provides the certainty needed to meet the legal framework (FAQ1).

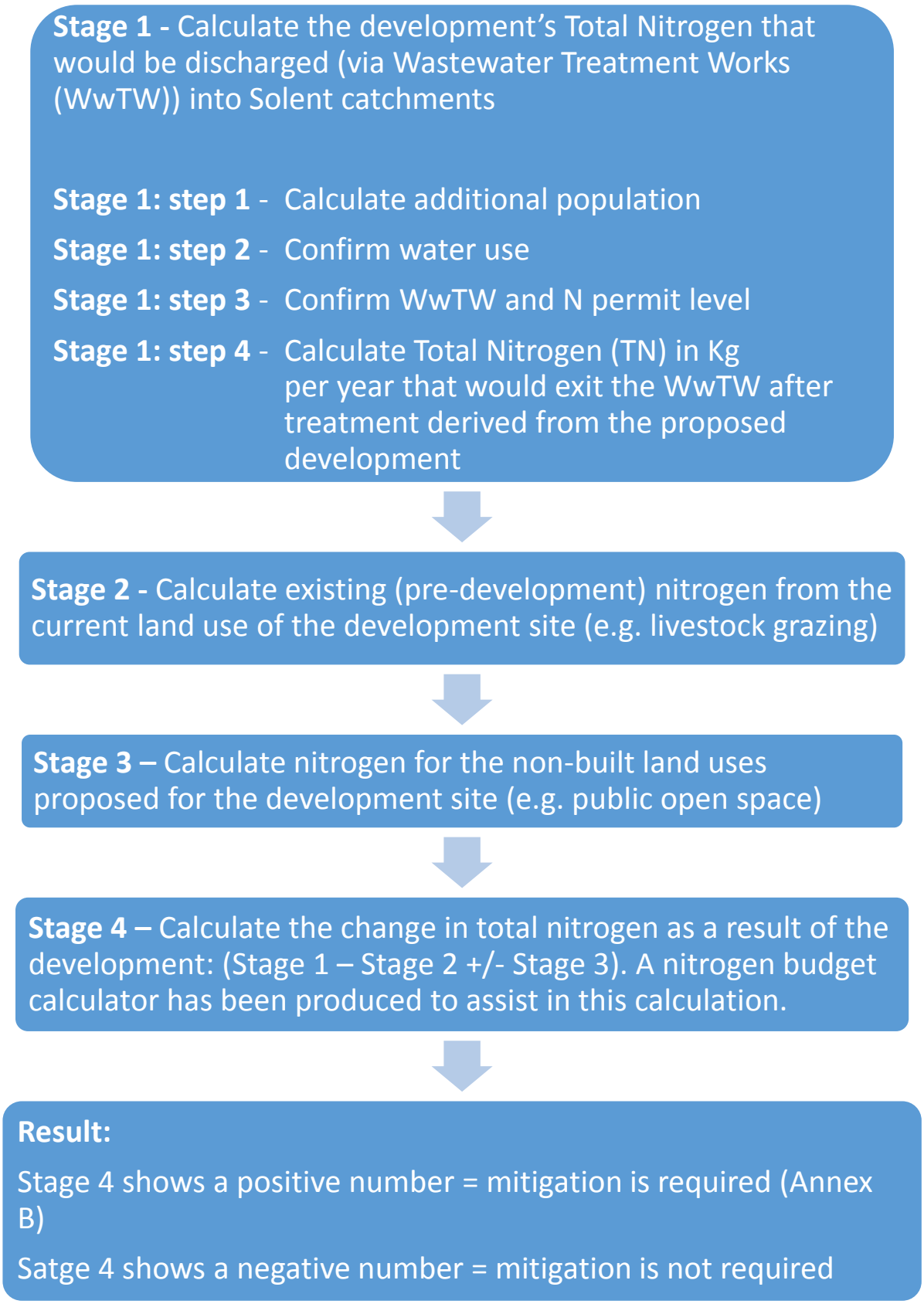
1.3 This summary report sets out how to calculate nutrient neutrality for developments within Solent catchments. It is accompanied by a Frequently Asked Questions (Annex A) and links to these questions are included throughout this report.

1.4 The type and location of each development will confirm whether nutrient neutrality is needed (FAQ2). If nutrient neutrality is required, a 4 stage process can be completed, as summarised below in Figure 1. This approach focusses on developments that drain to the mains network. If the development drains to non-mains systems e.g. Package Treatment Plants (PTP) then a bespoke calculation for Stage 1 is required (FAQ3).

1.5 This methodology is based on best available scientific knowledge, and will be subject to revision as further evidence is obtained. It has been developed as a pragmatic tool however for each aspect there is a degree of uncertainty. It is our advice to local planning authorities to take a precautionary approach in line with existing legislation and case-law when addressing uncertainty and calculating nutrient budgets.

1.6 The full methodology - *Advice on achieving nutrient neutrality for new development in the Solent region* – and a digital tool to help calculate the budget is available from the Partnership for South Hampshire (PfSH) website.

Figure 1: A flow chart to show how to calculate nutrient budget for development draining to the mains network.



SECTION 2 METHODOLOGY

2.1 Each of the four stages of the methodology is briefly summarised below and a worked example is included in Annex B.

Stage 1: Calculate the development's Total Nitrogen that would be discharged (via Wastewater Treatment Works) into Solent catchments.

Stage1 ***Step 1:*** *Calculate additional population*

2.2 New housing and overnight accommodation can increase the population as well as the housing stock within the catchment. This can cause an increase in nitrogen discharges. To calculate the additional population from the new development, Natural England recommends that the average national occupancy rate of 2.4 per dwelling is used (FAQ4).

Stage 1 ***Step 2:*** *Confirm water use*

2.3 The nitrogen load is calculated from the scale of water use used by the development. It is recommended that the maximum water use rate of 110 litres per person per day is used in the calculation and that this water use rate is secured by condition with any planning permission (FAQ5 FAQ6).

Stage 1 ***Step 3:*** *Confirm WwTW and permit level*

2.4 The wastewater treatment works (WwTW) that the development will drain to should be identified and whether it has a Total Nitrogen (TN) permit (FAQ8). The digital tool lists the most common WwTWs and includes the relevant TN permit, where applicable.

2.5 Where there is a permit limit for TN, the load calculation will use a worst case scenario that the WwTW operates at 90% of its permitted limit. This level is the closest the water company can reasonably operate the works without risk of breaching the consent limit.

2.6 For developments that discharge to WwTWs with no TN permit level, best available evidence must be used for the calculation. In the first instance, Southern Water or other wastewater provider should be contacted for details of the nitrogen effluent levels for the specific WwTW. However, if this data is not available, an average figure of 27mg/l can be used.

Stage 1 ***Step 4:*** *Calculate Total Nitrogen (TN) in Kg per annum that would exit the WwTW after treatment derived from the proposed development*

2.7 The TN load is calculated by multiplying the water use of the proposed development by the appropriate concentration of TN after treatment at the WwTW. This concentration is determined by the TN permit, or average figure, with a deduction of

2 mg/l. It has been determined that 2mg/l is an acceptable level of nitrogen in river and groundwater (FAQ9).

Stage 2: Calculate existing (pre-development) nitrogen from the current land use of the development site (e.g. livestock grazing).

2.8 This next stage is to calculate the existing nitrogen losses from the current land use within the redline boundary of the scheme. If the site is currently in agricultural use, new development will discontinue this use and the application of agricultural fertilisers or farm animal waste will stop. This will decrease the nutrient inputs at the site and this can be taken into account in the nitrogen budget.

2.9 The farm type rates that can be used in the calculation are shown in Figure 2. An average figure has also been included if the farm type covers several unfixed farm types. The average figure would also be appropriate for allotments. For maize farms, it is recommended that the general cropping rate is used. Evidence should be provided by the applicant to support the farm type used in the calculation (FAQ10).

Figure 2: Nutrient losses from different farm types in the Solent catchments.

AVERAGE NITRATE-NITROGEN LOSS PER FARM TYPE IN THE SOLENT CATCHMENT AREA (kg/ha/yr)	
Cereals	31.2
Dairy	36.2
General Cropping	25.4
Horticulture	29.2
Pig	70.4
Lowland Grazing	13.0
Mixed	28.3
Poultry	70.7
Average for catchment area	**26.9**

2.10 Some greenfield sites may not currently be in agricultural use. As there is no nitrogen input, a baseline rate of 5 kg/ha/yr should be used. Where development sites include wildlife areas, woodlands, hedgerows, ponds and lakes that are to be retained, these areas can be included with the same nitrogen rate (5 kg/ha/yr) in stage 2 and 3.

2.11 A similar approach can also be taken for the redevelopment of urban land as the nitrogen leaching rate would be 14.3 kg/ha/yr in stage 2 and 14.3 kg/ha/yr in stage 3.

Stage 3: Calculate nitrogen for the future land uses proposed for the development site (e.g. urban land, open space, allotments).

2.12 The next stage is for the calculation to include the nitrogen inputs from the new land use, e.g. urban development, open space or green infrastructure, nature reserve etc. within the redline boundary. This is separate to the nitrogen within the wastewater generated by the development.

Urban development

2.13 The nitrogen load from the new urban development results from sewer overflows and from drainage that picks up nitrogen sources on the urban land. Urban development includes the built form, gardens, road verges and small areas of open space within the urban fabric. These nitrogen sources include atmospheric deposition, pet waste, fertilisation of lawns and gardens and inputs to surface water sewers. The nitrogen leaching from urban land equates to 14.3 kg/ha/yr.

Open Space and Green Infrastructure

2.14 Nitrogen loss draining from new designated open space or Suitable Alternative Natural Greenspace (SANG) should also be included. The nitrogen leaching from this land is likely to equate to 5 kg/ha/yr.

2.15 Small areas of open space within the urban fabric, such as road verges, gardens, children's play areas and other small amenity areas, should not be included within this category. The urban development figure is appropriate for these land uses.

Community food growing provision

2.16 For any areas of the site that are proposed for community food growing provision such as allotments, it is recommended that the average farm type rate is used (26.9 kg/ha/yr).

Stage 4: Calculate the change in total nitrogen as a result of the development: (Stage 1 – Stage 2 +/- Stage 3).

2.17 The last stage is to calculate the net change in the TN load to the Solent catchment resulting from the proposed development. This is worked out by calculating the difference between the TN load calculated for the proposed development (wastewater and future land uses e.g. urban area, open space etc.) and that for the existing land uses (e.g. agricultural use).

2.18 The calculation includes a 20% precautionary buffer (FAQ11). Whilst all the figures used in the calculation are based on best available evidence, a precautionary buffer is used to recognise the uncertainty with these figures. It is Natural England's view that by adopting this approach, there is reasonable certainty that there will be no adverse effect on the integrity of the Solent designated sites.

SECTION 3 MITIGATION

Introduction

3.1 If having undertaken the Nitrogen Budget Calculation there is a positive figure (Nitrogen surplus), then mitigation is required to achieve nitrogen neutrality. If the calculation identifies a negative figure (deficit) or zero, no mitigation is required.

3.2 The purpose of the mitigation measures is to avoid impacts to the designated sites, rather than compensating for the impacts once they have occurred. Avoiding impacts is achieved by neutralising the additional nutrient burden that will arise from the proposed development, achieving a net zero change at the designated sites in a timely manner.

3.3 To ensure it is effective mitigation, any scheme for offsetting nitrogen must meet the basic tests of certainty of delivery, enforceability and the need for securing the adopted measures for perpetuity, generally 80-125 years, or for the duration over which the development is causing the effects.

Strategic options available

3.4 It is recognised that achieving nutrient neutrality may be difficult for smaller developments, developments on brownfield land, or developments that are well-progressed in the planning system. Natural England is working closely with local planning authorities to progress Borough / District / City / Authority wide and more strategic options. A number of options are coming forward and discussions with the relevant local planning authorities are recommended.

3.5 The Hampshire and Isle of Wight Wildlife Trust (HIWWT) has developed a strategic-scale mitigation option that is available to developers. Direct contact should be made with HIWWT for further information.

3.6 Further information on other options will be available on the Partnership for South Hampshire website in due course.

Bespoke options

3.7 Applicants can also progress bespoke mitigation options and the following on-site and offsite options can be considered.

Conversion of agricultural land for community and wildlife benefits

3.8 Permanent land use change by converting agricultural land to alternative uses for local communities or wildlife is one way of offsetting nutrient burdens from development. However, it is important to retain the best and most versatile agricultural land in food production.

On-site options

3.9 One option is to increase the size of the open space provision for the development (assuming the site is currently agricultural land or existing urban development). This can be secured as designated open space or by other legal mechanisms.

Off-site options

3.10 Another option is to acquire, or support others in acquiring, agricultural land elsewhere within an appropriate river catchment area and permanently change the land use to woodland, heathland, saltmarsh, wetland or conservation grassland.

3.11 Mitigation land should be appropriately secured to ensure that it is certain that the benefits will be delivered in the long term. Natural England advises that this can be achieved through an appropriate change of ownership to a local planning authority or non-government organisation. However, other legal mechanisms may be available.

3.12 Small scale developments are encouraged to consider opportunities for providing local small scale options e.g. the creation of local ponds, wetlands, local nature reserves, community orchards (without nitrogen inputs), or copse. Another example is to turn a strip (in excess of 10m width) of agricultural land immediately adjacent to a public footpath into a greenway. This could be marked by hedges or woodland planting.

Woodland planting

3.13 Woodland planting on agricultural land is a means of securing permanent land use change without necessitating land purchase. It can be evidenced easily by aerial photography and site visits. The level of woodland planting required to achieve nutrient neutrality is 20% canopy cover at maturity. In very broad terms, this equates to 100 trees per hectare. It is our preference that native broadleaf species are selected where possible, to secure wider biodiversity gains. A nitrogen leaching rate from woodland planting is likely to equate to 5 kg/ha/yr.

Wetlands

3.14 Wetlands receiving nitrogen-rich water can remove a proportion of this nitrogen through processes such as denitrification and sedimentation. Wetlands can be designed as part of a sustainable urban drainage system (SuDS), taking urban runoff/storm water; alternatively discharges from WwTWs can be routed through wetlands; or the flow, or part of the flow, of existing streams or rivers can be diverted through wetlands.

Wastewater Treatment Work Upgrades

3.15 Offsetting options at WwTWs include the agreement with the wastewater treatment provider that will maintain an increase in nitrogen removal at the WwTW. This may include either upgrades to infrastructure (long term), or where the existing WwTW infrastructure has capacity an agreement to operate the WwTW at a higher standard than required by the discharge consent. Natural England, Environment Agency, Local Planning Authorities and water companies are working together to explore these options.

Location of mitigation

3.16 The location of the offsetting site for each development is an important consideration. It firstly depends on the catchment of the development and location of the WwTWs outfall. Consideration then needs to be given to site specific factors such as geology, hydrology and topography.

3.17 It is Natural England's view that mitigation land within the same catchment as the development location is appropriate. The following principles can also be applied. For further information, please see the full advice.

River catchments

3.18 For WwTWs that drain into the rivers, it is appropriate for the mitigation land to be within the same river catchment as the outfall location. This is the preferred solution in all cases.

3.19 If this is not possible, mitigation in close alternative catchments would be appropriate in the following cases, as shown in Figure 3.

Figure 3: River WwTWs

Location of WwTW outfall	Appropriate alternative catchments for mitigation
River Test	River Itchen
River Itchen	River Test
Bartley Water catchment (New Forest)	River Test or River Itchen
New Forest rivers that outfall to the south coast	River Beaulieu, River Lymington, Danes Stream, Dark Water, Sowley Stream and the coastal areas
River Meon	River Hamble and Portsmouth Harbour

3.20 Please note for development that drains to ground within the River Hamble catchment or to a WwTWs that drains to the River Hamble, e.g. Bishops Waltham WwTW, mitigation land is limited to within the River Hamble catchment.

3.21 Similarly, for development that drains to ground within the catchment of or direct to the each of the Isle of Wight rivers e.g. Eastern Yar, mitigation land is limited to within the same river catchment.

3.22 For the WwTWs that drains to each harbour (Portsmouth Harbour, Langstone Harbour and Chichester Harbour), priority locations for mitigation are the same river catchment as the WwTW outfall.

Coastal WwTWs

3.23 For WwTWs that drain into the Coastal WwTWs, further information on the location of mitigation areas is included in Figure 4.

Figure 4: Coastal WwTWs

Location of WwTW outfall	Appropriate alternative catchments for mitigation
Coastal WwTW (Portswood WwTW, Woolston WwTW, Millbrook WwTW) within the northern part of Southampton Water	River Test, River Itchen, Bartley Water
Other coastal WwTWs in Southampton Water e.g. Ashlett Creek WwTW	River Test, River Itchen, River Meon, River Hamble, eastern catchments of the New Forest
Peel Common WwTW	River Meon, Portsmouth Harbour, Medina Estuary, Wootton Creek, Newtown Harbour, Langstone Harbour
Budds Farm WwTW	River Meon, Portsmouth Harbour, Langstone Harbour, Chichester Harbour, Wootton Creek, Medina Estuary
Pennington WwTW	South coast of New Forest, Western Yar, Newtown Harbour

Drain to ground

3.24 For developments that drain to ground via a package treatment plant (PTP) or mains WwTWs, it is appropriate for mitigation land to be within the same catchment as the outfall location of the PTP or WwTW.

3.25 Within chalk geology where the nitrogen discharge is to ground and away from watercourses there is likely to be a considerable delay (it may take up to 1 year for ground water discharges to percolate through a meter of chalk) before the nitrogen discharged reaches the international designated sites. In such circumstances mitigation measures that take effect quickly may not need to be implemented immediately. Please discuss with the relevant local planning authority or authorities and Natural England in these cases.

3.26 Natural England can provide further advice on the methodology and mitigation options through our chargeable services (DAS).

ANNEX A – FREQUENTLY ASKED QUESTIONS

Question 1: What is the legal framework requiring nutrient neutrality?

The key piece of legislation is the Conservation of Habitats and Species Regulations 2017 (as amended).

All plans and projects (including planning applications) which are not directly connected with, or necessary for, the conservation management of a site, require consideration of whether the plan or project is likely to have significant effects on the designated sites. The Habitats Regulations Assessment (HRA) refers to the several distinct stages of Assessment which must be undertaken in accordance with this legislation. Where the potential for likely significant effects cannot be excluded, a competent authority must make an appropriate assessment of the implications of the plan or project for that site, in view the site's conservation objectives.

Nutrient neutrality is a means of ensuring that development does not add to the existing nutrient load. This provides certainty that the whole of the scheme is deliverable in line with the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended).

Question 2: How do I know if this applies to my development?

This depends on the type of development being proposed and its location.

Type of development

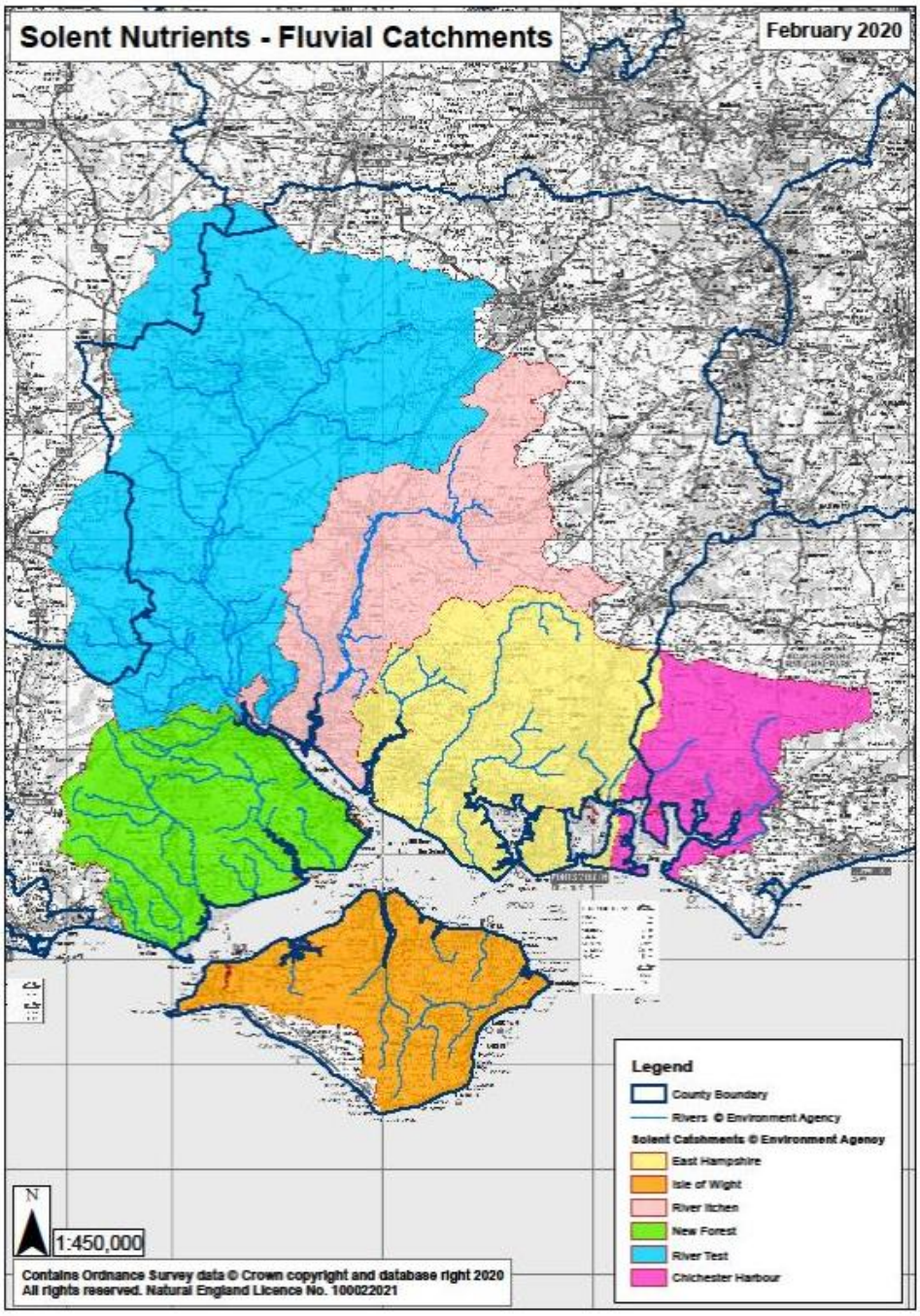
This methodology is for all types of development that would result in a net increase in population served by a wastewater system, including new homes, student accommodation, and tourist accommodation. This development will have inevitable wastewater implications. Other applications will be considered on their individual merits, for example new cruise ship facilities and tourism attractions etc.

Other commercial development not involving overnight accommodation will generally not be included. 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 the population increase from new homes and other accommodation. This removes the potential for double counting of human wastewater arising from different planning uses.

Location

The nutrient neutrality approach only applies to developments where the treated effluent discharges into any Solent international site (Solent Maritime Special Area of Conservation (SAC), Solent and Southampton Water Special Protection Area (SPA) and Ramsar, Portsmouth Harbour SPA and Ramsar, Chichester and Langstone Harbours SPA and Ramsar, Solent and Dorset Coast SPA and Solent and Isle of Wight Lagoon SAC), or any water body (surface or groundwater) that subsequently discharges into such a site. The catchment area is shown on Figure A1 below.

Figure A1: Solent fluvial catchments



Question 3: How do I calculate Stage 1 if the development drains to a non-mains system – e.g. package treatment plan (PTP)

If the development drains to a PTP rather than the mains network, an alternative approach for Stage 1 is required. Once the TN load from the revised Stage 1 has been determined, the calculation can then follow Stages 2, 3 and 4 in the same way as development draining to the mains network.

The Environment Agency has a presumption against private sewage treatment works in sewered areas and will always seek connection to the mains sewer where possible and

practicable. A principle concern relates to the failure rates of PTPs. There will be site specific factors (e.g. in proximity to watercourses, soil saturation levels, etc.) that would need to be considered when evaluating this risk.

Further advice from the Environmental Agency on the use of PTP may be found at - https://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits. Additional guidance may also be available via local planning authorities. For example, Chichester District Council has adopted a supplementary planning document for surface and foul drainage - https://www.chichester.gov.uk/article/29757/Supplementary-planning-documents-and-policy-guidance.

Where developments are proposing to use package treatment works, or similar, it is recommended that the TN level is calculated on a per person basis. On average each person produces sewage containing 3.5 kg of nitrogen per year. The TN prior to treatment = number of additional people x 3.5 kg = kg/TN/yr.

The percentage reduction of TN that may be applied as a result of treatment will depend on the efficiency of the treatment processes employed and must be assessed on a case by case basis.

Figure A2 sets out a worked example for Stage 1 for PTPs is on page 13. The same methodology as developments that drain to the mains network can be applied for Stages 2, 3 and 4. Please note the 20 % precautionary buffer is added at Stage 4.

Question 4: Why is an occupancy rate of 2.4 people per dwelling used in the calculation?

To determine the additional population that could arise from the proposed development for the lifetime of the development, it is necessary that sufficiently evidenced occupancy rates are used. Natural England recommends that, as a starting point, local planning authorities should consider using the average national occupancy rate of 2.4, as calculated by the Office for National Statistics (ONS), as this can be consistently applied across all affected areas.

However competent authorities may choose to adopt bespoke calculations tailored to the area or scheme, rather than using national population or occupancy assumptions, where they are satisfied that there is sufficient evidence to support this approach. Conclusions that inform the use of a bespoke calculation need to be capable of removing all reasonable scientific doubt as to the effect of the proposed development on the international sites concerned, based on complete, precise and definitive findings. The competent authority will need to explain clearly why the approach taken is considered to be appropriate. Calculations for occupancy rates will need to be consistent with others used in relation to the scheme (e.g. for calculating open space requirements), unless there is a clear justification for them to differ.

Question 5: Why does the methodology use the amount of water used by the development?

The water use figure is a proxy for the amount of wastewater that is generated by a household.

Figure A2: Alternative Stage 1 methodology for package treatment works (PTPs)

STAGE 1 - TOTAL NITROGEN (TN) LOAD FROM DEVELOPMENT WASTEWATER WITH AN ONSITE PTP (prior to treatment)				
Step	**Measurement**	**Value**	**Unit**	**Explanation**
Development proposal	Development types that would increase the population served by a wastewater system	100	Residential dwellings	
Step 1	Additional population	240	Persons	Based on average household size of 2.4
Step 2	TN prior to treatment Based on 3.5 Kg TN per person per year	840	Kg TN /yr	240 (step 1) x 3.5 Kg TN per person per yr
Step 3	Receiving PTP TN reduction efficiency	70	%	Efficiency of PTP used must be evidenced.
Step 4	TN discharged after PTP treatment	252	Kg TN /yr	30% of 840
Step 5	Acceptable N loading in waste water Based on 110 l per day per person	52,800	mg TN /day	Total waste water from development (110l x 240 persons) x Acceptable N loading of 2 mg/l
Step 6	Convert acceptable TN loading in waste water to TN Kg / Yr	19.3	Kg TN / Yr	Divide by 1000000 x by 365 days
Step 7	TN discharged - acceptable N loading (@ 2 mg/l)	232.7	Kg TN / Yr	252 (step 4) – 19.3 (step 6)
PTP TN load	**232.7 Kg TN / Yr**			

Question 6: Why do I need to use the 110 litres per person per day rate when the development is being built to tighter restrictions?

New residential development may be able to achieve tighter water use figures, with or without grey water recycling systems, and this approach is supported from a water resource perspective (for example in support of Southern Water's Target 100 litres per person per day). However, the key measurement is the amount of wastewater generated by the development that flows to the wastewater treatment works.

If tighter water use restrictions are used in the nutrient calculation – with or without grey water recycling systems – these restrictions should reflect the wastewater expected to be generated over the lifetime of the development. There is a risk that when kitchen and bathroom fittings are changed by occupants over the years, less water-efficient models could be installed. It is Natural England's view that it would be difficult to evidence and secure

delivery of tighter restrictions at this time. However, if sound evidence can be provided, this will be considered on a case-by-case basis.

It is Natural England's view that while new developments should be required to meet the 100 litres per person a day standard, the risk of standards slipping over time and the uncertainty inherent in the relationship between water use and sewage volume should be addressed by the use in the calculation of 110 litres per person per day figure.

Question 7: Should I consider the potential impacts of both phosphorous and nitrogen?

There is evidence that inputs of both phosphorus and nitrogen influence eutrophication of the water environment. However, the principal nutrient that tends to drive eutrophication in the marine environment is nitrogen and this is supported by modelling and evidence. Please see Annex 2 of the full guidance for further details.

The best available evidence is for focus in the Solent harbours to be on nitrogen reduction, and reduction in both nitrogen and phosphorus in the Medina catchment. However, this approach may be refined if greater understanding of the eutrophication issue is gained by thorough new research or updated modelling.

Question 8: What do I do if my WwTW provider is not confirmed or it is a new WwTW is being built?

For most planning applications, the WwTW provider is not confirmed until after planning permission is granted. The nutrient calculation should be based on the permit levels of the most likely WwTW. In any cases where the WwTW changes, a reassessment of the nutrient calculation will be required to ensure the development is nutrient neutral.

If a new WwTW is proposed, obtain a determination from the Environment Agency on the permit limit for Total Nitrogen that would apply to the works and when they are likely to be built.

If the WwTW will have a tightened permit concentration limit for Total Nitrogen under the company's Water Industry Asset Management Plan by 2024 then use this tightened value.

Question 9: How has it been determined that 2 mg/l is an acceptable level of nitrogen in river and groundwater?

The figure of 2 mg/l as an acceptable level of nitrogen in river and ground water is based on a review of available scientific literature and research.

Peer review research indicates that the mean natural river concentration would have been below 0.45 mg/l nitrate-nitrogen. Evidence also suggests that a nitrate concentration in rivers of 2 mg/l equates to the average concentrations in rivers before the 1960s, prior to the dramatic increase in N concentrations during the subsequent decades. This nitrate concentrations corresponds well with emerging evidence from the Poole Harbour catchment

where it is considered that restoration to a favourable conservation status would require a nitrogen load below 1000 tonnes of TN per year landward input. To achieve this, average TN levels in river water in the Poole Harbour catchment would need to be <2.75 mg/l TN.

The total annual nitrogen load reductions necessary to achieve a favourable conservation status for the international sites within the greater Solent area have yet to be determined. However, for the purpose of the methodology, a river and groundwater TN concentration of 2 mg/l is considered at this stage to be likely to meet the restoration objectives for the Solent international sites. We therefore recommend that a discounted figure of 2 mg/l is used to reflect the amount of N that would otherwise be present in river and groundwater.

Question 10: How much evidence is needed to support the existing farm use?

It is important that farm type classification is appropriately precautionary. It is recommended that evidence is provided of the farm type for the last 10 years and professional judgement is used as to what the land would revert to in the absence of a planning application. Examples of evidence could include land sale agreements, aerial photographs, basic farm payment information etc.

In many cases, the local planning authority, as competent authority, will have appropriate knowledge of existing land uses to help inform this process.

Question 11: Why do we need a precautionary buffer?

The nutrient neutrality calculation includes key inputs and assumptions which are based on the best-available scientific evidence and research. It has been developed as a pragmatic tool however for each aspect there is a degree of uncertainty. It is our advice to local planning authorities to take a precautionary approach in line with existing legislation and case-law when addressing uncertainty and calculating nutrient budgets.

For this reason the nutrient neutrality calculation includes a precautionary buffer. With the precautionary buffer, the competent authority may be satisfied that, while margins of error will inevitably vary for each development, this approach will ensure that new development in combination will avoid significant increases of nitrogen load to enter the internationally designated sites.

Question 12: Where can I find out more about the different roles of Natural England and the Environment Agency?

A joint position statement has been prepared by the Environment Agency and Natural England to clarify their respective roles in managing impacts on habitats sites through the Habitats Regulations, the Water Environment (Water Framework Directive) Regulations, and the Environmental Permitting Regulations.

Question 13: Where can I get help with the nutrient calculation?

If you have further questions on the methodology, these may be answered by reviewing the full methodology - *Advice on achieving nutrient neutrality for new development in the Solent region*. A digital tofaol has been created to help calculate the budget and is available here. Both of these tools are available on the Partnership for South Hampshire (PfSH) website. This also includes a page of website addresses for local planning authorities.

For enquires to Natural England, please use enquiries@naturalengland.org.uk

Natural England can also provide further advice on the methodology and mitigation options through our chargeable services (DAS).

For enquires to the Environment Agency, please use enquiries@environment-agency.gov.uk

For enquires to Southern Water, please use this link - https://www.southernwater.co.uk/help-advice/contact-us

Please see here for further information about the Hampshire and Isle of Wight Wildlife Trust scheme.

Further information will also be included on the Partnership for South Hampshire website.

ANNEX B

B.1 The following worked example calculates the Total Nitrogen load of a development of 1000 dwellings based on a WwTW with a consent limit for Total Nitrogen of 9 mg/l.

B.2 The 40 ha site is currently in agricultural use and covers several farm types. The average figure has been used in this example. The future development will comprise 38 ha of urban development and 2 ha of designated open space.

STAGE 1 - CALCULATE TOTAL NITROGEN LOAD FROM DEVELOPMENT WASTEWATER				
Step	**Measurement**	**Value**	**Unit**	**Explanation**
Development proposal	Development types that would increase the population served by a wastewater system	1000	Residential dwellings	
Step 1	Additional population	2400	Persons	Uses an average household size of 2.4 x 1000 dwgs (greenfield site).
Step 2	Wastewater volume generated by development	264,000	litres/day	2400 persons (step 1) x 110 litres.
Step 3	Receiving WwTW environmental TN permit limit. Assume discharge to be at 90% of consent limit.	8.1	mg/l TN	90% of the consent limit = 8.1 mg/l TN.
Step 4	Deduct acceptable TN loading in waste water (@ 2 mg/l TN)	6.1	mg/l TN	8.1 (step 3) – 2 mg/l TN
Step 5	TN discharged after WwTW treatment	1,610,400	mg/TN/day	264000 (step 2) x 6.1 (step 4) =1,610,400
Step 6	Convert mg/TN to kg/TN per day	1.6104	Kg/TN/day	Divide by 1,000,000
Step 7	Convert kg/TN per day to kg/TN per year	587.8	Kg/TN/yr	1.6104 x 365 days
Wastewater TN load	**587.8 kg/TN/yr**			

STAGE 2 - CALCULATE NITROGEN LOAD FROM CURRENT LAND USE				
Step	**Measurement**	**Value**	**Unit**	**Explanation**
1	Total area of existing agricultural land	40	Hectares	This is the area of agricultural land that will be lost due to development
2	Identify farm type and confirm nitrate loss.	26.9	Kg/ha/yr	The developable area covers several farm types therefore an average has been used.
3	Multiply area by nitrate loss	1,076	Kg/TN/yr	40 ha x 26.9 kg/N/yr
N load from current land use	1,076 Kg/TN/yr			

STAGE 3 - CALCULATE NITROGEN LOAD FROM FUTURE LAND USES				
Step	**Measurement**	**Value**	**Unit**	**Explanation**
1	New urban area	38	Hectares	Area of development that will change from agricultural land to urban land use
2	Nitrogen Load from future urban area	543.4	Kg/N/yr	38 ha x 14.3 Kg/N/yr
3	New SANG / open space	2	Hectares	Area of development that will change from agricultural land to SANG / open space
4	Nitrogen load from SANG / open space	10	Kg/N/yr	2 ha x 5.0 Kg/N/yr
5	Combine Nitrogen load from future land uses	553.4	Kg/N/yr	543.4 Kg/N/yr + 10 Kg/N/yr
N load from future land uses	553.4 Kg/TN/yr			

STAGE 4 - CALCUATE THE NET CHANGE IN NITROGEN LOAD FROM THE DEVELOPMENT				
Step	**Measurement**	**Value**	**Unit**	**Explanation**
1	Identify Nitrogen load from wastewater (stage 1)	587.8	Kg/TN/yr	See Table 1
2	Calculate the net change in Nitrogen from land use change - subtract existing land uses Nitrogen load (stage 2) from future land uses Nitrogen load (stage 3)	-522.6	Kg/TN/yr	553.4 (stage 3) - 1076 (stage 2) = -522.6 Kg/TN/yr
3	Determine Nitrogen Budget – the TN wastewater load for the proposed development plus the change in N load from land use change (the latter figure may be positive i.e. the change in land use will generate more nitrogen, or negative i.e. the change in land use will generate less N)	65.2	Kg/TN/yr	587.4 (step 1) + -522.6 (step 2) = 65.2 Kg/TN/yr
4	Where TN budget is positive add 20% precautionary buffer	78.24	Kg/TN /yr	64.8 + 20% = 77.8.
TN needing neutralising	**78.24 Kg/TN /yr**			