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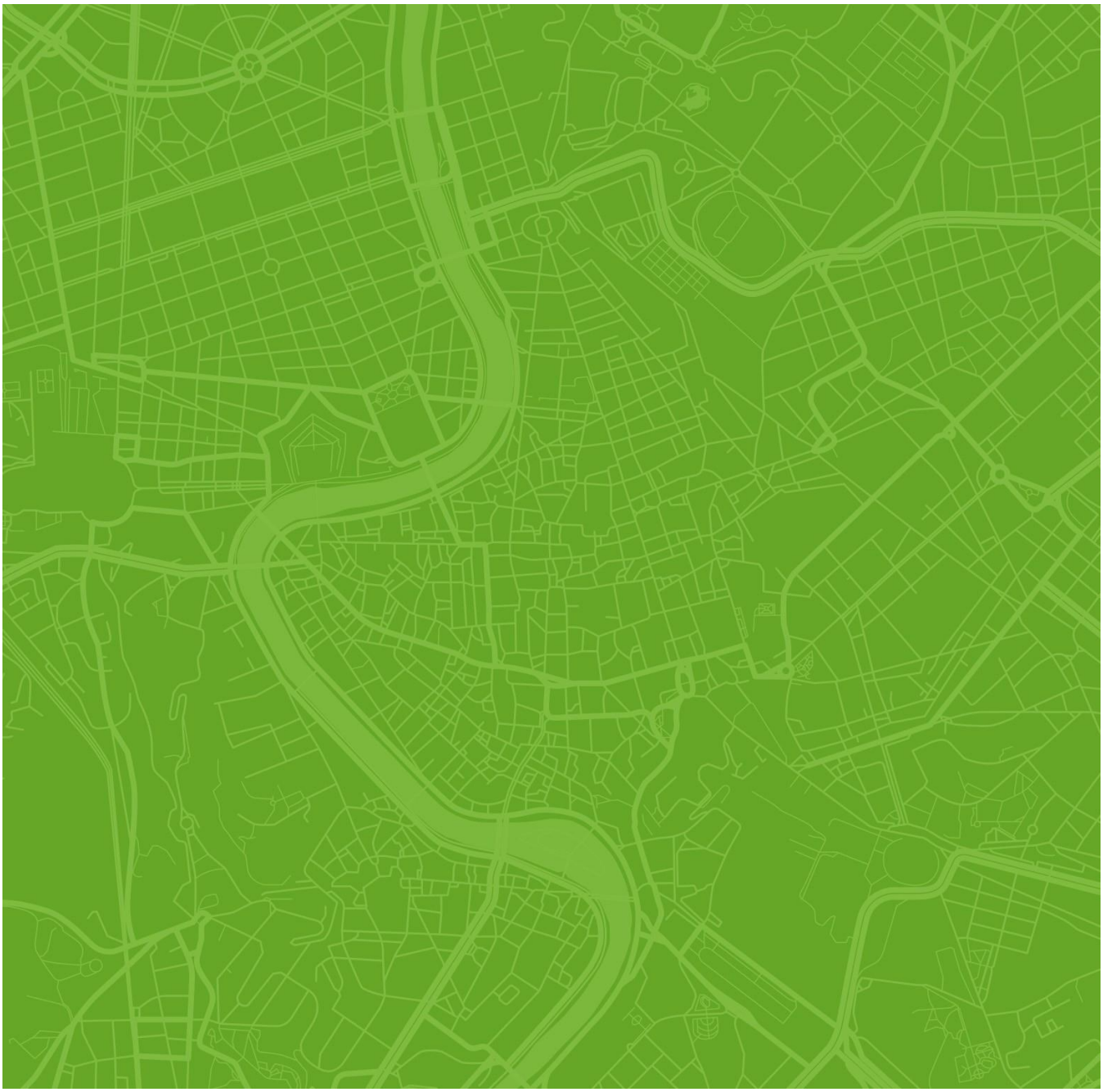
Folkestone and Hythe District Council

Core Strategy Review
HRA Addendum: Nutrient Neutrality

Final report
Prepared by LUC
December 2020



Folkestone and Hythe District Council

Core Strategy Review
HRA Addendum: Nutrient Neutrality

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Contents

Chapter 1
Introduction 1

Background 1
Proposed Approach 2
Screening Assessment 2
Appropriate Assessment 3

Appendix A
Folkestone & Hythe Local Plan Nutrient Budget A-1

Appendix B
Otterpool Park - Nutrient Neutrality Mitigation Analysis Update B-1

Chapter 1
Introduction

Background

1.1 This Habitat Regulations Assessment (HRA) addendum has been produced in response to advice provided by Natural England[1], which outlined the requirement for water quality impacts as a result of proposed development in the Folkestone and Hythe District Core Strategy Review in relation to the Stodmarsh SAC, SPA and Ramsar to be examined at the Appropriate Assessment.

1.2 The Stodmarsh SAC, SPA and Ramsar falls within the Stour catchment, which supports a water environment that is one of the most important for water dependant wildlife in the United Kingdom. These European sites are currently subject to high levels of nitrogen and phosphorous input to its water environment, for which there is sound evidence to show that these nutrient levels are causing eutrophication of habitats in these designated sites. A key contributor to these high levels of nutrients is from wastewater from existing housing and agricultural sources. Therefore, any increase in demand for wastewater treatment from proposed development at wastewater treatment works (WwTW) that discharge into the Stour catchment is likely to result in a significant effect to the European sites.

1.3 The Stodmarsh SAC, SPA and Ramsar is currently failing the agreed nutrient standards as set out in Natural England's published guidance on nutrient neutrality in relation to Stodmarsh[2]. Any development proposed, which may contribute to increased nutrient levels cannot be ruled out from having a likely significant effect and therefore needs to be examined through the Appropriate Assessment.

Relevant Case Law

1.4 This HRA addendum has been prepared in accordance with recent case law findings in relation to *'Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu (Dutch Nitrogen)'* judgement. This judgement states that "*May the positive effects of the autonomous decrease in the nitrogen deposition … be taken into account in the appropriate assessment…, it is important that the autonomous decrease in the nitrogen deposition be monitored and, if it transpires that the decrease is less favourable than had been assumed in the*

1

2

appropriate assessment, that adjustments, if required, be made"

1.5 The judgement states that according to previous case law "*…it is only when it is sufficiently certain that a measure will make an effective contribution to avoiding harm to the integrity of the site concerned, by guaranteeing beyond all reasonable doubt that the plan or project at issue will not adversely affect the integrity of that site, that such a measure may be taken into consideration in the 'appropriate assessment' within the meaning of Article 6(3) of the Habitats Directive*"

1.6 The HRA addendum will therefore only take into account avoidance and mitigation measures, where there is certainty that they will achieve the expected benefit of those measures. This will be shown through the provision of nutrient calculations to determine whether a proposed development can achieve nutrient neutrality.

Proposed Approach

1.7 To address the potential impacts to water quality in relation to the Stodmarsh SAC, SPA and Ramsar from proposed development in the Core Strategy Review, a nutrient budget was calculated in line with advice and methodology[3] recommended by Natural England. Further detail of this assessment is presented in **Appendix A** and **B** below and has been drawn on to determine the potential effects of proposed development in the Core Strategy Review at the Appropriate Assessment.

Screening Assessment

1.8 The Stodmarsh SAC, SPA and Ramsar support qualifying habitats and species, including wetland bird species, Desmoulins Whorl Snail and other invertebrates, which are reliant on wetland habitat. These habitats and species are therefore susceptible to changes in water quality as a result of increased demand for wastewater treatment as a result of proposed growth at WwTW that discharge into the River Stour.

1.9 Folkestone and Hythe District partially lies in the Stour Upper and Little Stour and Wingham Catchment area, which are hydrologically connected to the River Stour that flows into the wetland habitats of the Stodmarsh. Therefore, any proposed development that is proposed in this area of the district or that discharges into the Sellindge WwTW, which serves this area has the potential to contribute to an increase in nutrient levels, including nitrogen and phosphorous at the Stodmarsh SAC, SPA and Ramsar.

1.10 A review of Core Strategy Review identified the following proposed development as detailed in **Table 1.1** to have potential to contribute to increased nutrient levels at the Stodmarsh SAC, SPA and Ramsar as they either lie within the Stour catchment and/or effluent discharges via Sellindge WwTW into the catchment.

Table 1.1 Summary of proposed development, which have potential to contribute to increased nutrient levels in the Stour catchment.

Sub-catchment Area	Policy Number (Places and Policies Local Plan and Core Strategy Review)	Site Allocation
Little Stour and Wingham	Places and Policies Local Plan Policy ND4	Land east of Broad Street, Lyminge
Upper Stour	Places and Policies Local Plan Policy ND5	The Piggeries, Main Road, Sellindge
		Land West of Jubilee Cottage, Swan Lane, Sellindge
		Silver Spray
Little Stour and Wingham	Places and Policies Local Plan Policy ND8	Site 1: Land adjoining 385 Canterbury Road, Densole
		Site 2: Land adjoining 385 Canterbury Road, Densole
	Places and Policies Local Plan Policy ND9	Etchinghill Nursery, Etchinghill
	Places and Policies Local Plan Policy ND10	Land adjacent to the Golf Course, Etchinghill
Upper Stour	Core Strategy Review Policy CSD9	Sellindge: Second Phase –

[3] Natural England (2020): Advice on Nutrient Neutrality for New Development in the Stour Catchment in Relation to Stodmarsh Designated Sites - For Local Planning Authorities. July 2020.

Sub-catchment Area	Policy Number (Places and Policies Local Plan and Core Strategy Review)	Site Allocation
		Site A land to the west of phase 1
		Sellindge: Second Phase – Site B land east of phase 1
Upper Stour	Core Strategy Review Policies SS6-SS9	Otterpool Park / North Downs New Settlement

1.11 Regarding Table 1.1 it should be noted that the Places and Policies Local Plan was adopted by Folkestone and Hythe District Council on 16 September 2020. At the time of writing (December 2020) the Core Strategy Review is at examination and the issue of nutrient neutrality will be examined as part of this process.

1.12 The Stodmarsh SAC, SPA and Ramsar is currently exceeding nutrient standards and therefore any increase in nutrients to the wetland habitats as a result of development will adversely affect the qualifying features of the site through eutrophication. To determine the impact of these site allocations on the Stodmarsh European sites, nutrient budgets and recommended mitigation measures are considered in more detail at the appropriate assessment, which is provided below.

No likely significant effect can be concluded without nutrient budgets being calculated and the requirement for mitigation measures to achieve nutrient neutrality being identified, committed to and implemented. This will require further consideration at Appropriate Assessment.

Appropriate Assessment

1.13 The Stodmarsh SAC, SPA and Ramsar are currently not achieving the required nutrient standard to support their favourable condition and therefore any increase in nutrients to the wetland habitats has the potential to result in an adverse effect on the integrity of the Stodmarsh European sites. This will result in the promotion of algal growth, which can lead to reduced light and oxygen available for aquatic plants and animals and affect those qualifying bird species that feed on them. Increased nutrients can also promote changes in structure which make it unsuitable for wetland species, including the qualifying Desmoulins whorl snail.

1.14 Nitrogen and Phosphorous nutrient budgets were calculated by Urban Edge Environmental Consulting (UEEC) as detailed in **Appendix A** for proposed development in the Core Strategy Review with potential to contribute to increased nutrient levels to the Stodmarsh SAC, SPA and Ramsar. A summary of the findings is presented below.

Site Allocations

1.15 A review of nutrient budgets calculated for each site allocation proposed in the draft Core Strategy Review and adopted Places and Policies Local Plan identified all site allocations to result in a positive net increase in nitrogen and phosphorous levels with the exception of Places and Policies Local Plan Policy ND4: Land east of Broad Street, which would result in a net loss in nitrogen and phosphorous levels. Site allocations considered in this review included Places and Policies Local Plan Policies ND4, ND5, ND8, ND9 and ND10. Overall, there will be an increase in nutrient levels as a result of the adopted site allocations and these allocations will therefore require appropriate mitigation measures to ensure that the developments can achieve nutrient neutrality. The Core Strategy Review proposed new garden settlement (known as 'Otterpool Park') is dealt with below.

Windfall Sites

1.16 A nutrient budget was also calculated for windfall sites that would come forward over the Core Strategy Review plan period (to 2036/37), which showed a net increase in nitrogen and phosphorous levels. It will therefore be necessary for mitigation measures to be considered in relation to nitrogen and phosphorus to ensure that the proposed windfall development in the Core Strategy Review can achieve nutrient neutrality.

Otterpool Park

1.17 Nutrient calculations were undertaken for the proposed new garden settlement proposed in Core Strategy Review Policies SS6-SS9 (known as Otterpool Park). These calculations were based on 8,500 dwelling (Scenario 1) and 10,000 dwellings (Scenario 2). For each scenario, the impact of nutrients was considered in relation to three options. This included:

- **Option 1:** Development served by upgraded Sellindge WwTW
- **Option 2:** New on-site facility draining to East Stour
- **Option 3:** Development served by West Hythe WwTW

1.18 There was a significant difference between the three options in relation to nitrogen for both scenarios with Option 1 indicating the highest net gain in nitrogen and Option 2 with a

less marked net gain in nitrogen. There was a net loss in nitrogen for Option 3.

1.19 There was a less marked difference between the three options in relation to phosphorous with all three options showing a net increase in phosphorous for both scenarios.

1.20 It will therefore be necessary for mitigation measures to be considered in relation to nitrogen and phosphorus to ensure that the proposed development at Otterpool Park in the Core Strategy Review can achieve nutrient neutrality.

1.21 Following the completion of the nutrient calculations by UEEC, a nutrient budget undertaken by Arcadis was calculated for development proposed as part of the Otterpool Park Framework Masterplan and development proposed within the Core Strategy Review at Sellindge (Policy CSD9, sites A and B). A nutrient budget estimate was calculated for the preferred option to have a new onsite WwTW with Severn Trent Connect and included identification of specific mitigation measures, which would be implemented for this option to ensure that nutrient neutrality can be achieved. Full details of this are presented in **Appendix B**.

1.22 The nutrient calculations undertaken by Arcadis was based on the proposed development of up to 10,000 dwellings on 756.1 ha of land. The assessment excluded 142.7 ha of land, which comprised of 71 ha of existing community, 54.9 ha of retained farmland and 16.8 ha of retained buildings, waterbodies, woodland, hedgerows and other ecological features.

1.23 The nutrient budget calculations identified that there would be a net increase in nitrogen and phosphorous levels for Otterpool Park Framework Masterplan site allocation only and with site allocations at Sellindge (CSD9A and CSD9B) for potable water efficiency targets at 110l/person/day. Whilst the nutrient budget identified a surplus of phosphorous only for Otterpool Park Framework Masterplan site allocation only and with site allocations CSD9A and CSD9B for potable water efficiency targets at 90l/person/day.

1.24 Mitigation would be required for the Otterpool Park Framework Masterplan site allocation alone and with inclusion of site allocations CSD9A and CSD9B at both potable water efficiency targets. Specific mitigation measures are detailed below, which have been identified as part of the assessment and will be implemented to ensure nutrient neutrality for these proposed site allocations. In addition, these measures which target nutrient neutrality will ensure that small contributory effects from in-combination effects are avoided altogether and thereby there is no opportunity for in-combination effects.

Mitigation

Policy Wording

1.25 As part of further discussions with Natural England, Folkestone and Hythe District Council has proposed that the Core Strategy Review be modified to include the following additional to both the supporting text and Policy CSD5 to specially address the potential impacts to water quality from nutrient enrichment that may arise from proposed development in the plan.

1.26 This approach outlined in this wording has been approved and agreed with Natural England. If agreed by the Inspectors as main modifications to the Core Strategy Review, the following text would be added to the plan.

1.27 Additional **supporting text**:

> *"New development in the North Downs area of the district has the potential to increase nutrient flows into the River Stour, flowing into the Stodmarsh system of European designated sites (Special Area of Conservation, Special Protection Area and Ramsar site), north east of Canterbury. Damage to the water quality of these sites (eutrophication) has been caused by high nutrient levels, particularly phosphorus but also nitrogen …*
>
> *The council will work with Natural England to assess the likely impacts of development proposals, in line with the Conservation of Habitats and Species Regulations 2017. In assessing proposals, the council will have regard to Natural England's 'Advice on Nutrient Neutrality for New Development in the Stour Catchment in Relation to Stodmarsh Designated Sites' (July 2020, or subsequent updates) and applicants should follow this advice in developing their proposals. Developers will need to demonstrate, either that their proposals will not have a significant effect on the Stodmarsh sites, or that measures can be delivered whether on or off-site to avoid any impact, in line with Policy CSD5*."

1.28 Additional paragraph (d) to **Policy CSD5: Water and Coastal Environment Management:**

> *"Development will be permitted where the following criteria are met: ….*
>
> *d. Development which could have an impact on water quality in the Stodmarsh European-designated sites through increased nutrient levels from wastewater discharges into the River Stour catchment will be required to provide evidence of nutrient impacts through a nutrient budget*

approach. Planning permission will only be granted if:

(i) The applicant can demonstrate, subject to meeting the tests of the Habitat Regulations, that the development would not have a significant effect on the Stodmarsh European sites either alone or in combination with other plans and projects; and

(ii) The applicant can demonstrate that the development will provide all requisite mitigation measures to avoid adverse effects on the integrity of the Stodmarsh European sites as may be necessary for the life of the development through a design and implementation plan to be submitted to and approved by the Council."

Project-level HRA

1.29 In line with the policy wording detailed above, sites that will result in a net increase in nutrient levels mitigation measures will be required to achieve nutrient neutrality and to ensure no adverse effect on the integrity (AEoI) of the Stodmarsh SAC, SPA and Ramsar. This must be demonstrated through the provision of a project-level HRA and where there is an increase nutrient levels, appropriate mitigation measures implemented to ensure the scheme achieves nutrient neutrality. As recommended by Natural England, this should include consideration of the following measures:

- **Nature-based Solutions:**
  - Interceptor Wetlands – wetlands can be effective at uptake of nutrients through natural processes. They include storm interceptor wetlands and interceptor wetlands to take effluent from WwTWs before discharge into watercourses. Wetlands need to be appropriately designed and located to be effective and this would need to be assessed on a case by case basis.
  - Offsetting – through change in land use in the catchment area from land uses with high nutrient loads to conversion of less nutrient intensive land uses, for example converting agricultural land with high phosphorous and nitrogen inputs to woodland or semi-natural grassland such as chalk grassland with no additional nutrient inputs and low natural discharge.
- **Upgrade Existing WwTWs:**

  To increase nutrient removal capacity and therefore reduce the effluent nutrient loading. The upgrades needed for existing wastewater will be assessed in the WINEP investigation that will be finalised by 2022. The upgrade measures and the timetable over which upgrades to remove the adverse effect will be achieved is uncertain, or if these upgrades are achievable using conventional technologies. Natural England has encouraged the WINEP investigation to ensure that the proposed upgrades take account of future growth.
- **New Onsite WwTWs:**

  The developers would need to identify an inset provider or agree with the water company a new WwTW to make use of novel technology to treat waste water such as drinking water technologies. These would need to be permitted and regulated by the Environment Agency and would still need to meet the requirements of the Habitats Regulations, the Water Framework Directives and other environmental standards. This option would only be viable for larger developments.

Specific Mitigation Proposed for Otterpool Park Framework Masterplan Site Allocation and allocation at Sellindge (Policy CSD9, areas A and B)

1.30 To achieve nutrient neutrality for proposed development at Otterpool Park Masterplan site allocation, as well as at Sellindge (CSD9A and CSD9B), mitigation measures will include the following:

- Direct Mitigation Measures:
  - **Nature-based Solution: Interceptor Wetlands:**

    The proposed scheme will provide 24.8ha of new wetland habitat within the proposed site application boundary. These wetlands are proposed in locations which are strategically located in downstream sections of the contributing catchment. In addition, upstream of these proposed wetlands there will be a series of linked SuDS features that will work together to provide further source control and water quality treatment, prior to discharging to the wetlands. Proposed locations are summarised in Table 9 of the Nutrient Mitigation Analysis provided in **Appendix B**. This will remove a proportion of the nitrogen/ phosphorous in water through natural processes.
  - **Nature-based Solution: Offsetting**

    The proposed scheme would be able to provide up to 35 ha of new woodland planting within the proposed site application boundary, which would convert existing land uses with high nutrient loads to less intensive nutrient loads.
  - **New Onsite WwWT**

A new onsite WwTW with Severn Trent Connect is the preferred option and will be implemented as part of the site allocation to directly treat wastewater that is produced from development proposed. This will reduce nutrient outputs proposed from the development at Otterpool Park and at Sellindge by Policies CSD9A and CSD9B.

- Indirect Mitigation Measures:
  - The proposed scheme will also include the conversion of existing agricultural land use to land uses with lower nutrient use, such as stormwater, Sustainable Drainage Systems (SuDS), Suitable Alternative Natural Greenspace (SANG) and ecology and landscape mitigation.

1.31 The nutrient budget calculations provided by Arcadis demonstrate that nutrient neutrality can be achieved providing the mitigation measures that are detailed above are implemented.

1.32 It is understood that Arcadis and Folkestone and Hythe District Council in consultation with Natural England and Severn Trent Connect will continue to develop the onsite WwTW and wetland designs, maintenance and delivery programmes, including long term maintenance requirements.

1.33 Proposed modifications to Policy CSD5, highlighted above, would provide a firm policy basis to ensure mitigation is provided as part of the new garden settlement, development at Sellindge or any other qualifying development that may come forward within the affected part of the district.

Conclusion

Providing proposed development within the Core Strategy Review with potential to contribute to increased nutrient levels can demonstrate that nutrient neutrality can be achieved through securing and delivering appropriate mitigation measures as detailed above, it can be concluded that proposed development in the Core Strategy Review will not result in an adverse effect on the integrity of the Stodmarsh SAC, SPA and Ramsar either alone or in-combination with other plans and projects.

Appendix A

Folkestone & Hythe Local Plan Nutrient Budget

Technical Note

URBAN EDGE ENVIRONMENTAL CONSULTING

Project	Folkestone & Hythe Local Plan Nutrient Budget	**Date**	August 2020
Note	Nutrient Budget	**Ref**	
Author	[redacted]	**Page**	1 of 16
Status	DRAFT		

1. Introduction

There are high levels of nitrogen (N) and phosphorus (P) entering the Stour catchment with sound evidence of eutrophication within the Stodmarsh site. Stodmarsh is internationally designated as a Special Area of Conservation (SAC) and a Special Protection Area (SPA). The site is also designated at the national level as a Site of Special Scientific Interest (SSSI) and as a National Nature Reserve (NNR) in parts. These nutrient inputs are currently thought to derive from household waste water and agricultural sources, although recycling of nutrients within the lake habitats cannot be ruled out[1].

There is uncertainty as to whether new housing growth will further deteriorate the designated sites. Natural England has advised that one way to address this uncertainty is for new development to achieve nutrient neutrality. This provides certainty that new development is deliverable in line with the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations') and in light of recent case law and will not adversely affect the integrity of the Stodmarsh SAC/SPA.

UEEC has been instructed by Folkestone & Hythe District Council ('the Council') to complete a nutrient budget for the Folkestone & Hythe Local Plan (2020 to 2037), including all development conferred by the Plan which drains into the Stour catchment either directly via land use run off or indirectly via the effluent of a waste water treatment works (WWTW).

2. Methodology

A nutrient budget, including both N and P, has been calculated using the Natural England Stodmarsh methodology dated July 2020[2]. The budget takes account of nutrients from two sources:

[1] Natural England (2020): *Advice on Nutrient Neutrality for New Development in the Stour Catchment in Relation to Stodmarsh Designated Sites - For Local Planning Authorities*. July 2020

[2] *Ibid*

a. Net increase in population associated with development increasing the amount of nutrients discharged into the Stour catchment via WWTW; and
b. Changes in land use associated with development affecting the amount of nutrients leaching directly into the water environment.

The nutrient budget calculation presented in Annex 1 to this note includes all allocations in the Local Plan which would result in a net increase in population served by a wastewater system draining into the Stour catchment, including new homes and tourist accommodation. It also includes additional allocations which are located within the Stour catchment but are not served by a wastewater system draining into the Stour catchment. Figure A2.1 in Annex 2 shows all those allocations included in the nutrient budget in relation to the Stour operational catchment areas. Figure A2.2 in Annex 2 shows the location of the Stodmarsh designated sites.

Stage 1

Stage 1 of the methodology calculates the net additional population for each allocation site, the waste water volume associated with this additional population and the subsequent amount of N and P discharged from the WWTWs per year.

Population numbers

Proposed net dwellings numbers for each residential development site were provided by the Council as presented in the Core Strategy Review – Submission Draft (February 2020) and the Places and Policies Local Plan - Submission Draft (February 2018). The net additional population has been calculated by multiplying the dwelling numbers by 2.18 (average dwelling occupancy for the District provided by the Council).

With regard to Otterpool Park, the Council's housing trajectory for the plan period to 2037 assumes that housing will be delivered as part of the Outline Planning Application (ref) up to 5,925 dwellings[3]. However it is feasible that the full housing quota of the Outline Planning Application (8,500 dwellings) and a further 1,500 dwellings on residual land beyond the Outline Planning Application Boundary could come forward within the plan period. Therefore the following two Otterpool population scenarios have been included in the nutrient budget on a precautionary basis:

- Scenario 1 – 8,500 dwellings delivered within the Outline Planning Application Boundary; and
- Scenario 2 – 10,000 dwellings delivered within wider masterplan area.

Windfall development has also been accounted for in the nutrient budget. Windfall sites are defined in the National Planning Policy Framework (NPPF) as *"Sites which have not been specifically identified as available in the Local Plan process. They normally comprise previously-developed sites that have unexpectedly become available."*.

The Core Strategy Review puts forward an allowance for windfall development (sites of 1 to 9 homes) of 95 homes a year for the District. This figure has been based on the Council's analysis of historic windfall rates

[3] Recently updated the profiling for housing delivery generated a value of 6,097 occupations at Otterpool Park by 2037

from 2012-2018. Early years in the plan period have been discounted to avoid double-counting with sites with current planning permissions. For the remaining 15 years of the plan period this leaves a windfall delivery of 95 homes a year, leading to a total of 1,425 units for the plan period for the entire District.

An assessment has been undertaken of the historic windfall data against the Stour catchment areas supplied by Natural England (as shown in Figures A2.1 and A2.2 in Annex 2). The historic data show that an average of 8 homes a year have come forward from windfall development within the Stour catchment areas. If this is applied to the 15 year period of windfall delivery, it suggests that an additional 120 homes will come forward from windfall delivery within the plan period within the catchment area.

Waste water treatment works and permit levels

The only WWTW serving Folkestone & Hythe District which discharges into the Stour catchment is Sellindge WWTW. Sellindge has a Total P permit level of 1mg/l OSM annual mean with a tightened level of 0.5 mg/l by 2024 under the water company's water industry Asset Management Plan. This tightened value has been applied in the budget in line with the Natural England methodology. Sellindge has no Total N permit level. In the absence of a N permit level, the Natural England methodology advises that a proxy figure of 27mg/l should be applied.

At this stage three waste water treatment options are being considered for Otterpool Park:

- Option 1: Development served by upgraded Sellindge WWTW;
- Option 2: New on-site facility draining to East Stour; and
- Option 3: Development served by West Hythe WWTW.

All three options are included within the nutrient budget at Annex 1. Likely N and P permit levels for a new on-site facility in Option 2 have been provided by future operator Albion Water and are set at 0.3 mg/l for P and 9mg/l for N.

Stage 2

Stage 2 of the methodology adjusts the N / P load to offset existing nutrients from current land use. There are three main land use categories in the Natural England methodology: agricultural land, urban and non-agricultural greenfield land. The Natural England methodology provides different nitrogen loads for different farm types, where arable agriculture has a much higher nitrogen load than animal grazing for example.

The total area of each development site was taken from a GIS shapefile of all sites provided by the Council and cross-checked against the site areas noted in the Local Plan. In the few instances where the site areas provided in the Local Plan differed from the areas calculated from the shapefile, the shapefile area has been applied.

The total site area was then divided between the land use categories based on measurements made in ArcGIS supported by aerial photography and site descriptions provided in the Local Plan. Each area was multiplied by the average nitrate / phosphate load for that particular land use and then summed to provide the total annual N / P load from current land uses (kg/ha/yr).

For Otterpool scenario 1 (8,500 dwellings) existing land use types have been taken from the schedule of areas provided by Arcadis to the Council on 16 July 2020; however the 'mixed' land use category has been split into two: urban land and non-agricultural greenfield as these two land use types have different nutrient loading factors in the Natural England methodology. The split between urban and non-agricultural greenfield land was based on existing land use survey information provided by Arcadis in ArcGIS shapefile format.

For Otterpool scenario 2 (10,000 dwellings) existing land use types beyond the red line boundary for the outline planning application but within the wider masterplan area were taken from the existing land use survey information provided by Arcadis in ArcGIS shapefile format where available. For non-surveyed areas, existing land use assumptions were made based on aerial photography and ArcGIS measurements.

For allocation CSD9, total areas for Phase 2 Site A and B were taken from Council drawing 1038/SPO/JH dated 30 August 2019.

Allocation ND4 is located on the Etchinghill Golf Course; this has been categorised as urban land due to the higher nutrient loading associated with fertiliser use.

Site allocations ND5 (Land at Barrow Hill) and ND6 have been excluded from the budget to avoid double counting as they fall within the Otterpool wider masterplan area and outline planning application boundary respectively.

Windfall sites

In order to factor the windfall dwelling numbers into the calculations it was necessary to establish:

a. Whether these dwellings will come forward on greenfield or brownfield land; and
b. The area of land these developments will cover.

With regard to point a, an assessment of the greenfield/brownfield split in windfall delivery from the historic sites within the Stour catchment area has been undertaken. Approximately 68% of windfall development has been delivered on previously developed sites and 32% on greenfield sites within the Stour catchment area. Applying these percentages to the anticipated future delivery suggests that of the additional 120 homes to come forward from windfall development within the plan period, 82 would be delivered on previously developed land and 38 on greenfield land.

With regard to point b, an average population density of 1.637 was applied. This was derived from the 2018 mid-year population estimates published by Kent County Council[4]. Population figures for the wards of North Downs East and North Downs West, which align most closely to the Stour catchment areas in the District, were averaged and applied.

[4] https://www.kent.gov.uk/ data/assets/pdf_file/0018/8145/Mid-year-population-estimates-ward-level-population.pdf

Stage 3

Having calculated the nutrient load from current land use, Stage 3 goes on to calculate the nutrient load from proposed land use that will not be received by a WWTW. A number of assumptions have been made to inform this stage of the calculations as set out in the paragraphs below.

Open space provision

Open space provision has been calculated using the emerging Local Plan standard of 2.98ha per 1,000 people for developments over 20 dwellings. This equates to 0.00289 ha of open space per person. Because not all open provision is necessarily green space, 90% of 0.00289 ha per person has been applied (0.002601 ha/pp). The remaining 10% is assumed to be hardstanding and therefore falls into the urban land category. Given the nutrient load for urban land is higher than open space this approach ensures a precautionary scenario in terms of the nutrient budget.

For developments under 20 dwellings a precautionary assumption that no open space will be provided has been made. This includes windfall development as windfall sites typically provide between 1 and 9 dwellings.

Proposed urban area

New urban area is then calculated by subtracting the open space provision from the total site area. It is assumed that new urban area and new open space are mutually exclusive. There is a possibility that some developments may embed open space areas within the urban elements of the site for example a green amenity roof space on top of a residential block. However for the purpose of these calculations, we have assumed that in most cases open spaces and urban areas do not overlap in plan terms.

As for Stage 2, the area within each land use category is then multiplied by the average nitrate / phosphate load for that particular land use and then summed to provide the total annual nutrient load from proposed land uses (kg/ha/yr).

Allocation ND8 (Site 2: Land adjoining 385 Canterbury Road, Densole) provides for allotments if there is demand or to remain as agricultural land. Therefore an average farm type nutrient load has been applied for this allocation in line with Natural England's guidance.

Proposed land use areas for Otterpool scenarios 1 and 2 have been taken from the quantum of land use areas provided on pages 47 and 49 of the Design and Access Statement[5].

Stage 4

The final stage in the process is to calculate the net change in total nitrogen and phosphorus load to the Stour catchment resulting from the proposed development allocated in the emerging Local Plan. This has been derived by calculating the difference between the total nitrogen/ phosphorous load calculated for the

[5]https://service.folkestone-hythe.gov.uk/repository/2022-otterpool-park-ol-pa-(updated)/appendix-4.16-design-and-access-statement.pdf

proposed development (Stages 1 and 3) and that for the existing land uses (Stage 2). A 20% precautionary buffer has been applied for all allocations with a nutrient surplus in line with Natural England's guidance. This recognises that there is uncertainty in the figures input into the budget and, in Natural England's view, ensures reasonable certainty that there will be no adverse effects on site integrity.

3. Results

The total nutrient budgets for the Folkestone & Hythe Local Plan are presented in Table 3.1. For both nitrogen and phosphorus a positive indicates a surplus of that nutrient in the District and therefore mitigation will be required to achieve nutrient neutrality and avoid any impact to the Stodmarsh internationally designated sites.

Table 3.1: Folkestone & Hythe Nutrient Budget

Site	Nitrogen Budget (inc. 20% precautionary buffer) (kg/TN/yr)	Phosphorus Budget (inc. 20% precautionary buffer) (kg/TP/yr)
Site allocations	954.25	38.82
Windfall development	798.87	40.67
Otterpool Scenario 1: 8,500 dwellings		
Otterpool Option 1	17,208.66	527.61
Otterpool Option 2	335.20	366.91
Otterpool Option 3	-5,746.90	125.86
Otterpool Scenario 2: 10,000 dwellings		
Otterpool Option 1	22,197.93	632.49
Otterpool Option 2	2,346.60	443.43
Otterpool Option 3	-5,134.18	159.84
LOCAL PLAN TOTALS:		
With Otterpool Scenario 1: 8,500 dwellings		
Otterpool Option 1	18,961.78	607.11
Otterpool Option 2	2,088.33	446.41
Otterpool Option 3	-3,993.78	205.36
With Otterpool Scenario 2: 10,000 dwellings		
Otterpool Option 1	23,950.83	711.98
Otterpool Option 2	4,099.73	522.93
Otterpool Option 3	-3,381.06	239.34

Nitrogen

As shown in Table 3.1, there is a large difference in the nitrogen budget between the different Otterpool options. This is solely associated with the different waste water treatment options as the changes in land use remain the same across all three options.

Option 1 would see the development discharge to the Sellindge WWTW. Given that there is no nitrogen permit in place at the facility, and there is no indication that a nitrogen permit would be put in place in the future, the nitrogen surplus is 17,208.66 kg/TN/yr for the outline planning application development (Scenario 1: 8,500 dwellings) and 22,197.93 kg/TN/yr for the entire masterplan (Scenario 2: 10,000 dwellings).

Option 2 would see the development discharge to a new waste water treatment works within the Otterpool development. The future operators (Albion Water) have advised that a likely nitrogen permit of 9mg/l would be implemented. Applying this permit value significantly decreases the nitrogen surplus to 335.20 kg/TN/yr for the outline planning application development (Scenario 1: 8,500 dwellings) and 2,346.60 kg/TN/yr for the entire masterplan (Scenario 2: 10,000 dwellings).

In nitrogen budgeting terms Option 3 provides the best waste treatment solution. This option would see the development discharge to the Hythe WWTW which does not discharge into the Stour catchment and therefore there is a nitrogen deficit for the option overall associated with the change in land use, removing large areas of agricultural land with a high nitrogen loading to urban and non-agricultural greenfield land which has a significantly lower nitrogen loading. The deficit is equal to -5,746.90 for the outline planning application development (Scenario 1: 8,500 dwellings) and -5,134.18 kg/TN/yr for the entire masterplan (Scenario 2: 10,000 dwellings).

For the Local Plan as a whole, measures would be required to mitigate the nitrogen surplus in all scenarios, expect with the adoption of Otterpool Option 3. The nitrogen deficit associated with Otterpool Option 3 will more than balance the nitrogen surplus associated with the development of site allocations and windfall development, and in this case no mitigation would be required.

Phosphorus

There is a less marked difference in the phosphorus budget between the three Otterpool options as shown in Table 3.1. This is because the Sellindge WWTW (Option 1) has a phosphorus permit in place, which will be tightened to 0.5mg/l by 2024, thereby significantly reducing the phosphorus content of waste water discharged from the facility.

Provision of an on-site waste water treatment works at Otterpool (Option 2) would further reduce the phosphorus budget, given that a lower phosphorus budget of 0.3mg/l is expected to be in place. As for nitrogen, Option 3, discharge to Hythe WWTW, provides the best waste water treatment solution in phosphorus budgeting terms, although there is still a small phosphorus surplus associated with changes in land use at the Otterpool site.

The changes in land use at the Otterpool site do not confer such a significant reduction in phosphorus as they do for nitrogen, as the phosphorus loading associated with agricultural land is relatively lower for phosphorus than for nitrogen.

For the Local Plan as a whole, measures would be required to mitigate the phosphorus surplus in all scenarios.

4. Mitigation

There are a number of options which could be used to mitigate a nitrogen and phosphorus surplus in the District to demonstrate no adverse effect to the integrity of the Stodmarsh internationally designated sites. Mitigation can be through direct measures or indirect measures also known as offsetting.

Direct measures include:

- Creation of wetlands which act as interceptors and remove a proportion of the nitrogen/ phosphorous in water through natural processes.
- WWTW upgrades to increase nutrient removal capacity and thereby reduce the effluent nutrient loading.

Indirect measures, also known as 'offset' measures include:

- Removal of land within the catchment area from nitrogen/ phosphorous intensive uses, such as crops or intensive livestock systems that result in an excess of nitrogen or phosphorous lost to the water environment, and conversion to less nutrient intensive uses such as open space, SANGs, woodland.

Some of these measures can be delivered within individual development sites (on-site), for example creation of wetlands to remove nutrients from site run off, or increasing the open space provision on agricultural or urban land within the site boundary. Other measures will be off-site, for example the acquisition, or support to others in acquiring, agricultural land elsewhere within the Stour river catchment area and converting to less nutrient intensive uses, or the creation of wetlands to reduce nutrients in the effluent flowing from WWTWs.

At the Local Plan stage, it is more difficult to account for on-site options as detailed design proposals for individual site allocations are still unknown. Therefore the focus is on off-site measures.

For all options, the mitigation outcome needs to be 'in perpetuity': secured for the duration over which the development causing the impact will be operational, generally 80-120 years for housing. This could include monitoring by condition. However, the mitigation strategy itself may change over time and the Council may decide to implement a staged mitigation strategy, for example starting with the purchase of nutrient intensive agricultural land, before subsequently developing wetlands or alternative habitats on that land.

As an indication of the extent of mitigation required for the Folkestone & Hythe Local Plan, Table 4.1 sets out the amount of agricultural land which would need to be removed from agricultural use to mitigate the

nutrient surplus for each scenario / option. This land will need to be additional to the agricultural land allocated as part of the Local Plan and will need to fall within the Stour operational catchment

Table 4.1: Agricultural land mitigation

	Nitrogen Budget (kg/TN/yr)	Area of ag land required to mitigate Nitrogen budget (ha)*	Phosphorus Budget (kg/TP/yr)	Area of ag land required to mitigate Phosphorus budget (ha)*
Local Plan With Otterpool Scenario 1: 8,500 dwellings				
Otterpool Option 1	18,961.78	806.88	607.11	2,168.23
Otterpool Option 2	2,088.33	88.86	446.41	1,594.31
Otterpool Option 3	-3,993.78	N/A	205.36	733.42
Local Plan With Otterpool Scenario 2: 10,000 dwellings				
Otterpool Option 1	23,950.83	1,019.19	711.98	2,542.80
Otterpool Option 2	4,099.73	174.46	522.93	1,867.59
Otterpool Option 3	-3,381.06	N/A	239.34	854.78
Positive figures indicate surplus nutrients and hence mitigation is required. Negative figure indicates a nutrient deficit and so no mitigation required.				

**Assumes an average nitrogen load for the catchment area of 23.5 kg/ha and an average phosphorus load of 0.28kg/ha. These figures are purely indicative and are provided to give the Council a tangible measure of the nutrient surplus calculated.*

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Annex 1 – Nutrient Budget

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Allocation (site) information						Stage1 Calculate TN in kilograms per annum derived from the development that would exit the WWTW after treatment (Only applicable to WWTWs which drain into the Stour - Sellindge is only applicable facility for Folkestone & Hythe)							Stage 2 Adjust Nitrogen load to offset existing nitrogen from current land use								Stage 3 Adjust Nitrogen load to account for land uses with the proposed development										Stage 4 Calculate the net change in the Total Nitrogen load that would result from the development			
Policy number	Site address	Existing use	Site area (ha)	Greenfield / brownfield	Sub-catchment area	Development proposal (No. residential dwellings)	Equivalent population (Dwellings*2.18) (No. persons)	Wastewater volume generated by development (No. persons * 110litres) (litres/day)	Receiving WWTW	Receiving WWTW environmental permit limit (90%) or av. discharge for TN (mg/litre)	TN discharged after WWTW treatment (((90% of permit limit or av.discharge)* WW volume generated by development) /1,000,000) (kg/TN/day)	Annual WW TN load (kg/TN/yr)	Total area of current ag-land (ha)	Farm type / nitrate loss (kg/ha/yr)	N load - current ag-land use (Area *nitrate loss) (kg/yr)	Total area of current non-ag greenfield land (ha)	N load - current non-ag greenfield land (kg/yr)	Total area of current urban land (ha)	N load - current urban land (kg/yr)	Total N load from current land uses (kg/N/yr)	Retained ag land (ha)	Assumed farm type / nitrate loss (kg/ha/yr)	N load - retained ag land (kg/ha/yr)	Proposed urban land area (ha)	N load - proposed urban land (kg/yr)	Proposed open space and GI (ha)	N load - Proposed open space and GI (kg/yr)	Proposed allotment land (ha)	N load - Proposed allotment land (kg/yr)	Total N load from proposed land uses (kg/N/yr)	N load from WW (kg/N/yr)	N load from change in land use (kg/N/yr)	N budget (kg/N/yr)	20% precautionary buffer applied where N budget is positive
ND4	Land east of Broad Street, Lyminge	Forms part of Etchinghill Golf Course	2.1	Greenfield	Little Stour and Wingham	30	65.4	7194	Hythe	N/A	N/A	0	0.00	0.00	0.00	0.00	0.00	2.10	30.03	30.03	0.00	0.00	0.00	2.02	28.91	0.08	0.39	0.00	0.00	29.30	0.00	-0.73	-0.73	N/A
ND5	The Piggeries, Main Road Sellindge	Former Piggery and areas of scrub	0.31	Brownfield	Upper Stour Catchment	5	10.9	1195	Sellindge	27	0.0324	11.8161	0.00	0.00	0.00	0.00	0.00	0.31	4.43	4.43	0.00	0.00	0.00	0.31	4.43	0.00	0.00	0.00	0.00	4.43	11.82	0.00	11.82	14.18
ND5	Land West of Jubilee Cottage, Swan Lane, Sellindge	Cereal farm land	0.92	Greenfield	Upper Stour Catchment	15	32.7	3597	Sellindge	27	0.0971	35.4484	0.92	27.30	25.12	0.00	0.00	0.00	0.00	25.12	0.00	0.00	0.00	0.92	13.16	0.00	0.00	0.00	0.00	13.16	35.45	-11.96	23.49	28.19
ND5	Silver Spray	Residential dwelling, out-buildings and garden which is bordered by hedgerow, trees and fencing in part	0.45	Brownfield	Upper Stour Catchment	5	10.9	1195	Sellindge	27	0.0324	11.8161	0.00	0.00	0.00	0.00	0.00	0.45	6.44	6.44	0.00	0.00	0.00	0.45	6.44	0.00	0.00	0.00	0.00	6.44	11.82	0.00	11.82	14.18
ND8	Site 1: Land adjoining 385 Canterbury Road, Densole	Open field bounded by mature hedgerows and trees	1.53	Greenfield	Little Stour and Wingham	25	54.5	5995	Broomfield Bank	N/A	N/A	0.0000	0.00	0.00	0.00	1.53	7.65	0.00	0.00	7.65	0.00	0.00	0.00	1.46	20.95	0.07	0.33	0.00	0.00	21.27	0.00	13.62	13.62	16.35
ND8	Site 2: Land adjoining 385 Canterbury Road, Densole	Open field bounded by mature hedgerows and trees	1.3	Greenfield	Little Stour and Wingham	0	0	0	Broomfield Bank	N/A	N/A	0.0000	0.00	0.00	0.00	1.30	6.50	0.00	0.00	6.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	30.55	30.55	0.00	24.05	24.05	28.86
ND9	Etchinghill Nursery, Etchinghill	Former plant nursery, with disused horticultural buildings and an adjoining field	1.91	Greenfield	Little Stour and Wingham	30	65.4	7194	Hythe	N/A	N/A	0.0000	0.00	0.00	0.00	1.79	8.94	0.12	1.76	10.69	0.00	0.00	0.00	1.83	26.20	0.08	0.39	0.00	0.00	26.59	0.00	15.89	15.89	19.07
ND10	Land adjacent to the Golf Course, Etchinghill	Open, flat field inc. section of golf club access road	0.7	Greenfield	Little Stour and Wingham	8	17.44	1918.4	Hythe	N/A	N/A	0.0000	0.00	0.00	0.00	0.67	3.37	0.03	0.38	3.74	0.00	0.00	0.00	0.70	10.01	0.00	0.00	0.00	0.00	10.01	0.00	6.27	6.27	7.52
CSD9	Sellindge: Second Phase - Site A land to the west of phase 1	Non-agricultural greenfield, incl. one dwelling	9.06	Greenfield	Upper Stour Catchment	188	409.84	45082.4	Sellindge	27	1.2172	444.2871	0.00	0.00	0.00	8.98	44.90	0.08	1.14	46.04	0.00	0.00	0.00	8.57	122.57	0.49	2.44	0.00	0.00	125.01	444.29	78.97	523.25	627.90
CSD9	Sellindge: Second Phase - Site B land east of phase 1	Agricultural land including small woodland belt	18.91	Greenfield	Upper Stour Catchment	162	353.16	38847.6	Sellindge	27	1.0489	382.8431	17.16	27.30	468.47	1.05	5.25	0.70	10.01	483.73	0.00	0.00	0.00	18.49	264.39	0.42	2.11	0.00	0.00	266.49	382.84	-217.23	165.61	198.73
Windfall development	n/a	Non-agricultural greenfield	42.61	Greenfield	n/a	32	69.76	7673.6	Sellindge	27	0.2072	75.6233	0.00	0.00	0.00	42.61	213.07	0.00	0.00	213.07	0.00	0.00	0.00	42.61	609.39	0.00	0.00	0.00	0.00	609.39	75.62	396.32	471.94	566.33
Windfall development	n/a	Previously developed	109.20	Brownfield	n/a	82	178.76	19663.6	Sellindge	27	0.5309	193.7848	0.00	0.00	0.00	0.00	0.00	109.20	1561.56	1561.56	0.00	0.00	0.00	109.20	1561.56	0.00	0.00	0.00	0.00	1561.56	193.78	0.00	193.78	232.54
Otterpool Park / North Downs new settlement to 2036/37																																		
Scenario 1: Up to 8,500 dwellings delivered within the Outline Planning Application Boundary																																		
Option 1	Development served by upgraded Sellindge WWTW	Predominantly mixed ag land with some other grassland and roads	585.22	Greenfield	Upper Stour Catchment	8,500	18530	2038300	Sellindge	27	55.0341	20087.4465	484.29	Cereals, Hay Cut (General copping), Lowland grazing	10702.28	83.16	415.80	17.76	253.97	11372.04	0.00	0.00	0.00	290.22	4150.15	295.00	1475.00	0.00	0.00	5625.15	20087.45	-5746.90	14340.55	17208.66
Option 2	New on site facility draining to East Stour	Predominantly mixed ag land with some other grassland and roads	585.22	Greenfield	Upper Stour Catchment	8,500	18530	2038300	New on site facility	8.1	16.5102	6026.2340	484.29	Cereals, Hay Cut (General copping), Lowland grazing	10702.28	83.16	415.80	17.76	253.97	11372.04	0.00	0.00	0.00	290.22	4150.15	295.00	1475.00	0.00	0.00	5625.15	6026.23	-5746.90	279.34	335.20
Option 3	Development served by West Hythe WWTW	Predominantly mixed ag land with some other grassland and roads	585.22	Greenfield	Upper Stour Catchment	8,500	18530	2038300	Hythe	N/A	N/A	0	484.29	Cereals, Hay Cut (General copping), Lowland grazing	10702.28	83.16	415.80	17.76	253.97	11372.04	0.00	0.00	0.00	290.22	4150.15	295.00	1475.00	0.00	0.00	5625.15	0.00	-5746.90	-5746.90	N/A
Scenario 2: Up to 10,000 dwellings delivered within the Outline Planning Application Boundary and on residual land outside the planning application boundary																																		
Option 1	Development served by upgraded Sellindge WWTW	Predominantly mixed ag land with some other grassland, small settlements and roads	765	Greenfield	Upper Stour Catchment	10,000	21800	2398000	Sellindge	27	64.7460	23632.2900	540.65	Cereals, Hay Cut (General copping), Lowland grazing	11785.04	158.40	792.00	65.94	942.94	13519.98	55.00	23.50	1292.50	381.00	5448.30	329.00	1645.00	0.00	0.00	8385.80	23632.29	-5134.18	18498.11	22197.73
Option 2	New on site facility draining to East Stour	Predominantly mixed ag land with some other grassland, small settlements and roads	765	Greenfield	Upper Stour Catchment	10,000	21800	2398000	New on site facility	8.1	19.4238	7089.6870	540.65	Cereals, Hay Cut (General copping), Lowland grazing	11785.04	158.40	792.00	65.94	942.94	13519.98	55.00	23.50	1292.50	381.00	5448.30	329.00	1645.00	0.00	0.00	8385.80	7089.69	-5134.18	1955.50	2346.60
Option 3	Development served by West Hythe WWTW	mixed ag land with some other grassland, small settlements	765	Greenfield	Upper Stour Catchment	10,000	21800	2398000	Hythe	N/A	N/A	0	540.65	Cereals, Hay Cut (General copping), Lowland grazing	11785.04	158.40	792.00	65.94	942.94	13519.98	55.00	23.50	1292.50	381.00	5448.30	329.00	1645.00	0.00	0.00	8385.80	0.00	-5134.18	-5134.18	N/A

Allocation (site) information						Stage1 Calculate TP in kilograms per annum derived from the development that would exit the WWTW after treatment (Only applicable to WWTWs which drain into the Stour - Sellindge is only applicable facility for Folkestone & Hythe)							Stage 2 Adjust Phosphorus load to offset existing phosphorus from current land use								Stage 3 Adjust phosphorus load to account for land uses with the proposed development										Stage 4 Calculate the net change in the Total Phosphorus load that would result from the development			
Policy number	Site address	Existing use	Site area (ha)	Greenfield / brownfield	Sub-catchment area	Development proposal (No. residential dwellings)	Equivalent population (Dwellings*2.18) (No. persons)	Wastewater volume generated by development (No. persons * 110litres) (litres/day)	Receiving WWTW	Receiving WWTW environmental permit limit (90%) or av. discharge for TP (mg/litre)	TP discharged after WWTW treatment (((90% of permit limit or av.discharge)* WW volume generated by development) /1,000,000) (kg/TP/day)	Annual WW TP load (kg/TP/yr)	Total area of current ag-land (ha)	Farm type / phosphorus loss (kg/ha/yr)	P load - current ag-land use (Area * phosphorus loss) (kg/yr)	Total area of current non-ag greenfield land (ha)	P load - current non-ag greenfield land (kg/yr)	Total area of current urban land (ha)	P load - current urban land (kg/yr)	Total P load from current land uses (kg/P/yr)	Retained ag land (ha)	Assumed farm type / phosphorus loss (kg/ha/yr)	P load - retained ag land (kg/ha/yr)	Proposed urban land area (ha)	P load - proposed urban land (kg/yr)	Proposed open space and GI (ha)	P load - Proposed open space and GI (kg/yr)	Proposed allotment land (ha)	P load - Proposed allotment land (kg/yr)	Total P load from proposed land uses (kg/P/yr)	P load from WW (kg/P/yr)	P load from change in land use (kg/P/yr)	P budget (kg/P/yr)	20% precautionary buffer applied where P budget is positive
ND4	Land east of Broad Street, Lyminge	Forms part of Etchinghill Golf Course	2.1	Greenfield	Little Stour and Wingham	30	65.4	7194	Hythe	N/A	N/A	0.0000	0.00	0.00	0.00	0.00	0.00	2.10	1.74	1.74	0.00	0.00	0.00	2.02	1.68	0.08	0.01	0.00	0.00	1.69	0.00	-0.05	-0.05	N/A
ND5	The Piggeries, Main Road Sellindge	Former Piggery and areas of scrub	0.31	Brownfield	Upper Stour Catchment	5	10.9	1199	Sellindge	0.45	0.0005	0.1969	0.00	0.00	0.00	0.00	0.00	0.31	0.26	0.26	0.00	0.00	0.00	0.31	0.26	0.00	0.00	0.00	0.00	0.26	0.20	0.00	0.20	0.24
ND5	Land West of Jubilee Cottage, Swan Lane, Sellindge	Cereal farm land	0.92	Greenfield	Upper Stour Catchment	15	32.7	3597	Sellindge	0.45	0.0016	0.5908	0.92	0.36	0.33	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.92	0.76	0.00	0.00	0.00	0.00	0.76	0.59	0.43	1.02	1.23
ND5	Silver Spray	Residential dwelling, out-buildings and garden which is bordered by hedgerow, trees and fencing in part	0.45	Brownfield	Upper Stour Catchment	5	10.9	1199	Sellindge	0.45	0.0005	0.1969	0.00	0.00	0.00	0.00	0.00	0.45	0.37	0.37	0.00	0.00	0.00	0.45	0.37	0.00	0.00	0.00	0.00	0.37	0.20	0.00	0.20	0.24
ND8	Site 1: Land adjoining 385 Canterbury Road, Densole	Open field bounded by mature hedgerows and trees	1.53	Greenfield	Little Stour and Wingham	25	54.5	5995	Broomfield Bank	N/A	N/A	0.0000	0.00	0.00	0.00	1.53	0.21	0.00	0.00	0.21	0.00	0.00	0.00	1.46	1.22	0.07	0.01	0.00	0.00	1.23	0.00	1.01	1.01	1.21
ND8	Site 2: Land adjoining 385 Canterbury Road, Densole	Open field bounded by mature hedgerows and trees	1.3	Greenfield	Little Stour and Wingham	0	0	0	Broomfield Bank	N/A	N/A	0.0000	0.00	0.00	0.00	1.30	0.18	0.00	0.00	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30	0.36	0.36	0.00	0.18	0.18	0.22
ND9	Etchinghill Nursery, Etchinghill	Former plant nursery, with disused horticultural buildings and an adjoining field	1.91	Greenfield	Little Stour and Wingham	30	65.4	7194	Hythe	N/A	N/A	0.0000	0.00	0.00	0.00	1.79	0.25	0.12	0.10	0.35	0.00	0.00	0.00	1.83	1.52	0.08	0.01	0.00	0.00	1.53	0.00	1.18	1.18	1.42
ND10	Land adjacent to the Golf Course, Etchinghill	Open, flat field inc. section of golf club access road	0.7	Greenfield	Little Stour and Wingham	8	17.44	1918.4	Hythe	N/A	N/A	0.0000	0.00	0.00	0.00	0.67	0.09	0.03	0.02	0.12	0.00	0.00	0.00	0.70	0.58	0.00	0.00	0.00	0.00	0.58	0.00	0.46	0.46	0.56
CSD9	Sellindge: Second Phase - Site A land to the west of phase 1	Non-agricultural greenfield, incl. one dwelling	9.06	Greenfield	Upper Stour Catchment	188	409.84	45082.4	Sellindge	0.45	0.0203	7.4048	0.00	0.00	0.00	8.98	1.26	0.08	0.07	1.32	0.00	0.00	0.00	8.57	7.11	0.49	0.07	0.00	0.00	7.18	7.40	5.86	13.26	15.92
CSD9	Sellindge: Second Phase - Site B land east of phase 1	Agricultural land including small woodland belt	18.91	Greenfield	Upper Stour Catchment	162	353.16	38847.6	Sellindge	0.45	0.0175	6.3807	17.16	0.36	6.18	1.05	0.15	0.70	0.58	6.91	0.00	0.00	0.00	18.49	15.35	0.42	0.06	0.00	0.00	15.40	6.38	8.50	14.88	17.86
Windfall development	n/a	Non-agricultural greenfield	42.61	Greenfield	n/a	32	69.76	7673.6	Sellindge	0.45	0.0035	1.2604	0.00	0.00	0.00	42.61	5.97	0.00	0.00	5.97	0.00	0.00	0.00	42.61	35.37	0.00	0.00	0.00	0.00	35.37	1.26	29.40	30.66	36.80
Windfall development	n/a	Previously developed	109.20	Brownfield	n/a	82	178.76	19663.6	Sellindge	0.45	0.0088	3.2297	0.00	0.00	0.00	0.00	0.00	109.20	90.64	90.64	0.00	0.00	0.00	109.20	90.64	0.00	0.00	0.00	0.00	90.64	3.23	0.00	3.23	3.88
Otterpool Park / North Downs new settlement to 2036/37																																		
Scenario 1: Up to 8,500 dwellings delivered within the Outline Planning Application Boundary																																		
Option 1	Development served by upgraded Sellindge WWTW	Predominantly mixed ag land with some other grassland and roads	585.22	Greenfield	Upper Stour Catchment	8,500	18530	2038300	Sellindge	0.45	0.9172	334.7908	484.29	Cereals, Hay Cut (General copping), Lowland grazing	150.92	83.16	11.64	17.76	14.74	177.30	0.00	0.00	0.00	290.22	240.88	295.00	41.30	0.00	0.00	282.18	334.79	104.88	439.67	527.61
Option 2	New on site facility draining to East Stour	Predominantly mixed ag land with some other grassland and roads	585.22	Greenfield	Upper Stour Catchment	8,500	18530	2038300	New on site facility	0.27	0.5503	200.8745	484.29	Cereals, Hay Cut (General copping), Lowland grazing	150.92	83.16	11.64	17.76	14.74	177.30	0.00	0.00	0.00	290.22	240.88	295.00	41.30	0.00	0.00	282.18	200.87	104.88	305.76	366.91
Option 3	Development served by West Hythe WWTW	Predominantly mixed ag land with some other grassland and roads	585.22	Greenfield	Upper Stour Catchment	8,500	18530	2038300	Hythe	N/A	N/A	0.0000	484.29	Cereals, Hay Cut (General copping), Lowland grazing	150.92	83.16	11.64	17.76	14.74	177.30	0.00	0.00	0.00	290.22	240.88	295.00	41.30	0.00	0.00	282.18	0.00	104.88	104.88	125.86
Scenario 2: Up to 10,000 dwellings delivered within the Outline Planning Application Boundary and on residual land outside the planning application boundary																																		
Option 1	Development served by upgraded Sellindge WWTW	Predominantly mixed ag land with some other grassland, small settlements and roads	765	Greenfield	Upper Stour Catchment	10,000	21800	2398000	Sellindge	0.45	1.0791	393.8715	540.65	Cereals, Hay Cut (General copping), Lowland grazing	167.58	158.40	22.18	65.94	54.73	244.49	55.00	0.28	15.40	381.00	316.23	329.00	46.06	0.00	0.00	377.69	393.87	133.20	527.07	632.49
Option 2	New on site facility draining to East Stour	Predominantly mixed ag land with some other grassland, small settlements and roads	765	Greenfield	Upper Stour Catchment	10,000	21800	2398000	New on site facility	0.27	0.6475	236.3229	540.65	Cereals, Hay Cut (General copping), Lowland grazing	167.58	158.40	22.18	65.94	54.73	244.49	55.00	0.28	15.40	381.00	316.23	329.00	46.06	0.00	0.00	377.69	236.32	133.20	369.53	443.43
Option 3	Development served by West Hythe WWTW	Predominantly mixed ag land with some other grassland, small settlements and roads	765	Greenfield	Upper Stour Catchment	10,000	21800	2398000	Hythe	N/A	N/A	0.0000	540.65	Cereals, Hay Cut (General copping), Lowland grazing	167.58	158.40	22.18	65.94	54.73	244.49	55.00	0.28	15.40	381.00	316.23	329.00	46.06	0.00	0.00	377.69	0.00	133.20	133.20	159.84

Annex 2 – Figures

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Folkestone & Hythe Local Plan Nutrient Budget

Residential Allocations

Stour Operational Catchments

- Little Stour and Wingham
- Lower Stour
- Upper Stour

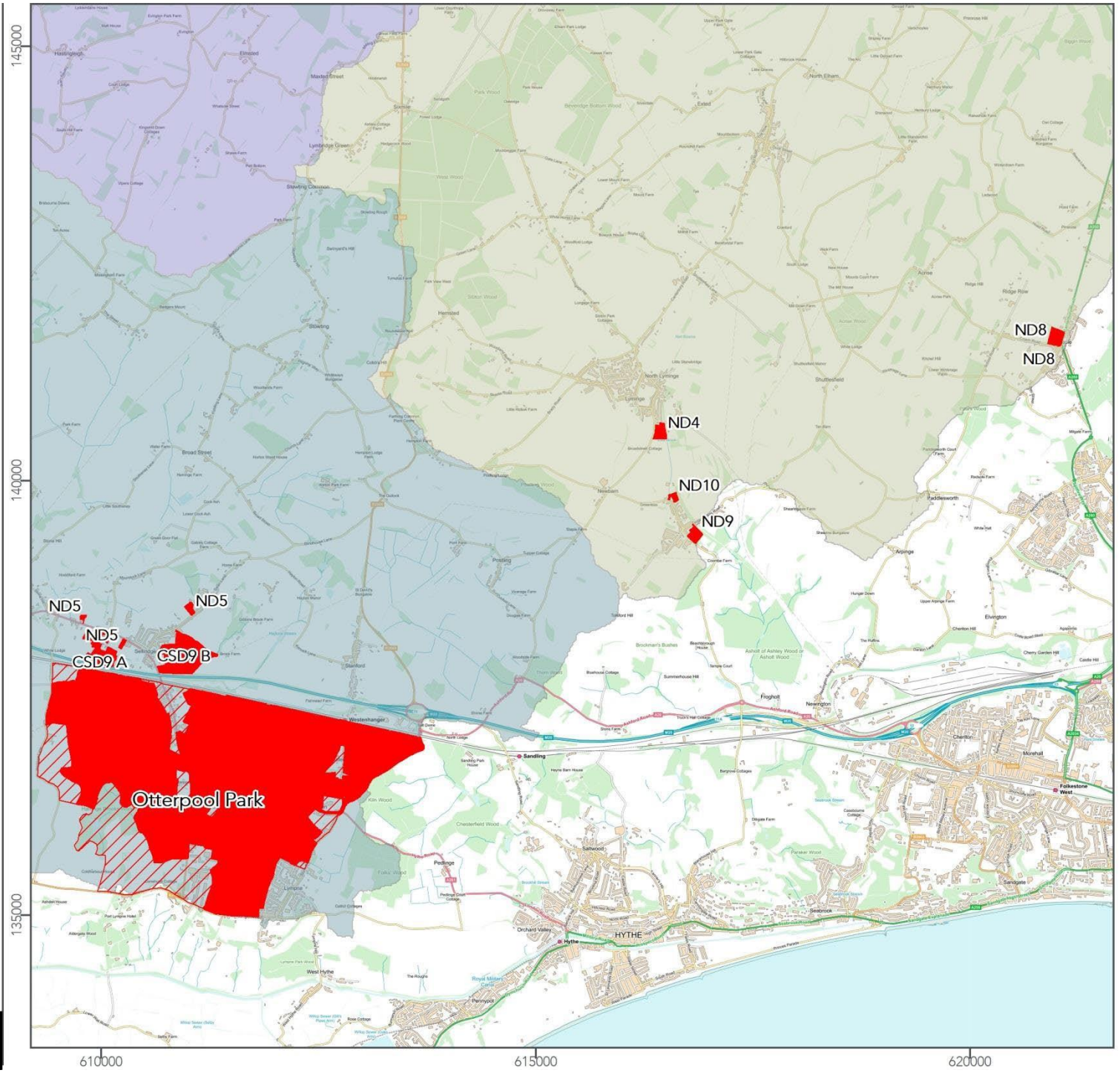

Figure A2.1: Residential allocations included in nutrient budget

0 1 2 3 Kilometers

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Scale: 1:64,582 **Created by:** [redacted]

Date: Aug 2020 **Reviewed by:** [redacted]

Drawing number:

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URBAN EDGE ENVIRONMENTAL CONSULTING Email [redacted] We[redacted]

Folkestone & Hythe Local Plan Nutrient Budget

- Special Areas of Conservation
- Special Protection Areas
- Ramsar Sites
- Sites of Special Scientific Interest

Stour Operational Catchments

- Little Stour and Wingham
- Lower Stour
- Upper Stour

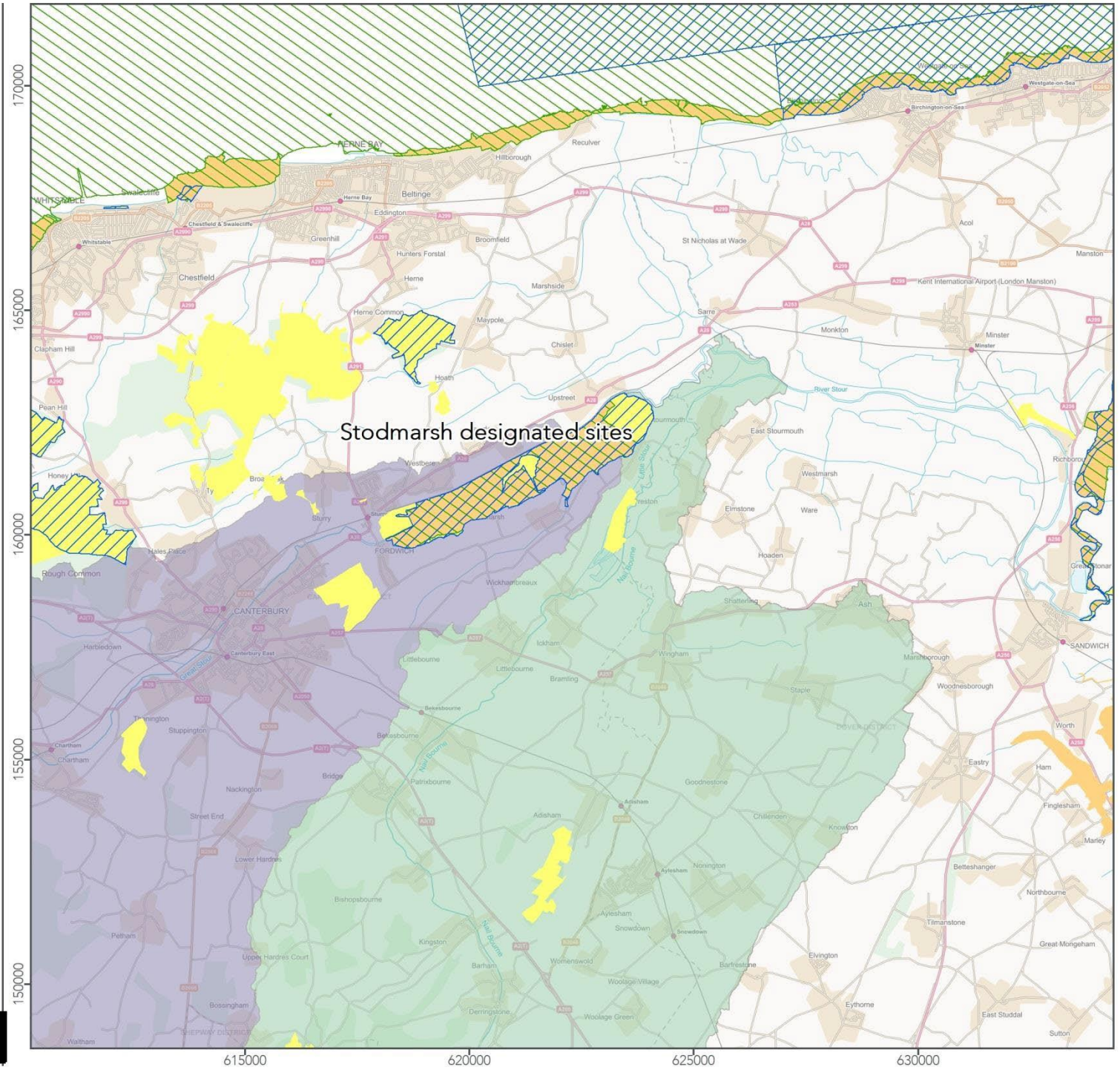

Figure A2.2: Stodmarsh designated sites

0 3 6
Kilometers

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Date: Aug 2020 **Reviewed by:**

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Appendix B

Otterpool Park - Nutrient Neutrality Mitigation Analysis Update

MEMO

ARCADIS Design & Consultancy for natural and built assets

SUBJECT
Otterpool Park Framework Masterplan - Nutrient Neutrality Mitigation Proposals

DATE
02 November 2020

DEPARTMENT
Water Management & Resilience

COPIES TO
[redacted]

TO
[redacted]

OUR REF
[redacted]

PROJECT NUMBER
[redacted]

FROM
[redacted]

1. Introduction

This technical note has been prepared on behalf of Folkestone and Hythe District Council (FHDC) to summarise Arcadis's latest findings of the nutrient budget calculations and associated mitigation proposals to achieve Nutrient Neutrality for the entire Otterpool Park Framework Masterplan Site Allocation, which includes revised Otterpool Park Outline Planning Application (OPA) for the initial 8,500 homes.

In addition, two specific site allocations in Sellindge (CSD9A and CSD9B) within FHDC's proposed Local Plan have been included within this updated assessment following the recent consultations with FHDC and Natural England (NE).

This assessment follows:

- NE's published final guidance on Nutrient Neutrality for new development in the Stour Valley Catchment in relation to the Stodmarsh Designated Sites for Local Planning Authorities (July 2020)
- Consultation advice provided to Arcadis for the Otterpool Park OPA within NE's letter dated 06th October 2020, as part of NE's Discretionary Advice Service
- Consultation advice provided to FHDC for their Local Plan Allocations within NE's letter dated 15th October 2020, as part of NE's Discretionary Advice Service

Environment Agency (EA)'s Guidance Manual for Constructed Wetlands, R&D Technical Report P2-159/TR2 (2003) has also been used for undertaking the initial hydraulic loading calculations and design preparation for the proposed wetlands.

2. Background to the Issue

Excessive nutrient levels (nitrogen and phosphorous) can negatively impact on the Stodmarsh Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar site. The site is also designated as a Site of Special Scientific Interest (SSSI) and National Nature Reserve (NNR). Information has recently emerged related to existing water quality impacts (eutrophication) on the designated sites, caused by high nutrient levels including nitrogen and in particular phosphorus. NE believes that the latter originates mainly from the permitted wastewater discharges into the River Stour and a detailed Water Industry National Environment Programme (WINEP) investigation is currently underway by Southern Water, which will report its findings in 2022. Existing Sellindge Wastewater Treatment Works (WwTW) that Otterpool Park could potentially use is also included in this WINEP investigation.

NE advised FHDC in May 2020 that the water quality issues should be assessed through an updated Habitats Regulation Assessment (HRA) as part of the Core Strategy Review, which is currently submitted for Examination. This should include all proposed site allocations (including the Otterpool Park), which may be served by the existing or new WwTW within the River Stour Catchment that can

impact Stodmarsh. This should include calculation of the nutrient budget for all affected site allocations with respect to nitrogen and phosphorous, with all mitigation options outlined, along with the fundamental precautionary principle that each scheme must achieve nutrient neutrality in order to provide certainty of avoiding adverse effect on integrity of the designated sites.

A roundtable meeting was subsequently organised by FHDC in June 2020 to discuss the methodology and scope for their Appropriate Assessment Update and Nutrient Neutrality Assessment for the Core Strategy Review and the Revised Otterpool Park OPA. At this meeting, Natural England also advised that if Otterpool Park OPA can demonstrate (i.e. as a standalone site) that it can achieve Nutrient Neutrality (as set out in their published guidance in relation to Stodmarsh), then it would fully satisfy their current concerns on any adverse impacts to Stodmarsh from Otterpool Park.

Following recent technical work and consultations undertaken with NE, by Arcadis and FHDC to address this issue, this latest assessment considers the entire Otterpool Park Framework Masterplan and nearby CSD9A and CSD9B site allocations in Sellindge. This ensures a consistent and strategic approach to the Nutrient Neutrality Assessment and mitigation plan, which will then form a key part of FHDC's Local Plan Appropriate Assessment Update.

3. Proposed Development

The Otterpool Park Framework Masterplan for the proposed garden town includes up to 10,000 new residential homes and associated non-residential uses/infrastructure, 71ha of existing community and 54.9ha of retained farmland, covering a total area of 756.1ha. Otterpool Park Garden Town is jointly promoted by FHDC and Otterpool Park LLP.

The proposed revised Otterpool Park OPA is located on 585.2ha land to deliver up to initial 8,500 dwellings and other uses including commercial, retail, education, health, community and leisure facilities, parking, landscaping, and public open space within the Otterpool Park Framework Masterplan. A summary of the approximate maximum floorspace areas for each land use type included in the revised OPA is shown in Table 1.

Table 1 Proposed Development

Land Use/Class	Development Quantum (Gross External Area m^2/ unit numbers)
Residential (C2, C3)	Up to 8,500 residential units
Hotel (C1)	Up to 8,000 m^2
Commercial (B1)	Up to 74,000 m^2
Light Industrial (B2)	Up to 13,500m^2
Retail (A1-A4)	Up to 29,000m^2
Education (D1)	Up to 46,000m^2 comprising primary schools, secondary schools and nurseries.
Health, Community Centres (D1)	Up to 21,000m^2
Leisure (D2)	Up to 8,500m^2
Outdoor sport-related recreation	c. < 30ha

Sellindge CSD9A and CSD9B site allocations include 188 new houses (total site area 9.06ha) and 162 new houses (total site area 18.91ha) respectively. These two sites are promoted by Quinn Estates.

4. Nutrient Budget Assessment

The existing land use within the area impacted by Otterpool Park Framework Masterplan boundary is predominately agricultural use or greenfield in nature although it includes 71ha of existing community and 54.9ha of retained farmland. **Appendix 1** includes a figure showing the existing land type categories in the main development area. This information is also summarised in Table 2 below, along with their assumed nutrient loss rates. This information is derived based on the NE's published guidance stated above, along with the ecological habitat surveys that had been undertaken by Arcadis throughout the project duration since 2016 and recent consultations undertaken with FHDC, NE, Arcadis project team and local land agents.

Table 2 Existing Land Types and Nutrient Loss Rates Within Otterpool Park Framework Masterplan

Existing Land Type[1]	Area (ha)	Average Total Nitrogen (TN) Loss Rate - Kg/ha/year	Average Total Phosporous (TP) Loss Rate - Kg/ha/year
Cereals	324.9	27.3	0.36
Lowland Grazing Livestock	119.1	12.2	0.24
Racetrack[2]	13.5	13.3	0.5
Hay Cut	18.9	5	0.14
Other Grassland or greenfield	101.1	5	0.14
Mixed - Urban	11.5	14.3	0.83
Mixed - Greenfield	4.5	5	0.14
Remaining Urban Area in Framework Masterplan	19.9	14.3	0.83
Total Area	**613.4**		

[1] The remaining 142.7 ha in the Otterpool Park Framework Masterplan boundary is excluded from the nutrient neutrality assessment, which includes 71 ha of existing community, 54.9 ha of retained farmland and 16.8 ha of retained buildings, waterbodies, woodland, hedgerows and other ecological features.

[2] Average TN and TP loss values of Urban Land and Lowland Grazing Livestock Farmland categories (i.e. assuming a 50:50 split) have been taken for the Racetrack as discussed with NE to reflect its former use.

Similarly, existing land use information for CSD9A and CSD9B is summarised in Table 3 below, along with their assumed nutrient loss rates.

Table 3 Existing Land Types and Nutrient Loss Rates Within CSD9A and CSD9B

Existing Land Type[1]	Area (ha)	Average Total Nitrogen (TN) Loss Rate - Kg/ha/year	Average Total Phosporous (TP) Loss Rate - Kg/ha/year
CSD9B/Cereals	17.16	27.3	0.36
CSD9B/ Urban	0.7	14.3	0.83
CSD9B/Other grassland or greenfield	1.05	5	0.14
CSD9A/ Urban	0.08	14.3	0.83
CSD9A/Other grassland or greenfield	8.98	5	0.14
Total Area	**27.97**		

The proposed land use information included in the nutrient budget assessment is summarised in Table 4 and 5 below, along with their assumed nutrient loss rates. **Appendix 2** includes the latest Open Space Parameter Plan and Draft Illustrative Masterplan for Otterpool Park revised OPA whereas **Appendix 3** includes Approved Landscaping and Land Use Parameter Plan for CSD9B Site under Planning Application Reference Y16/1122/SH.

Table 4 Proposed Land Types and Nutrient Loss Rates Within Otterpool Park Framework Masterplan

Proposed Land Type[1]	Area (ha)	Average Total Nitrogen (TN) Loss Rate - Kg/ha/year	Average Total Phosporous (TP) Loss Rate - Kg/ha/year
Urban Area[2]	352.4	14.3	0.83
Suitable Alternative Natural Greenspace (SANG)	191.4	5	0.14
Community Farm/Allotment	9.8	23.5	0.28
Mitigation Woodlands	35.0	5	0.02
Mitigation Wetlands[3]	24.8	N/A	N/A
Total Area	**613.4**		

[1] The remaining 142.7 ha in the Otterpool Park Framework Masterplan boundary is excluded from the nutrient neutrality assessment, which includes 71 ha of existing community, 54.9 ha of retained farmland and 16.8 ha of retained buildings, waterbodies, woodland, hedgerows and other ecological features.

[2] This is currently a precautionary estimate because 25.2 ha of extra Sustainable Urban Drainage Systems (SuDS) has been included within the urban area of the current illustrative masterplan for revised Otterpool Park OPA, which can be treated as SANG instead for the purpose of nutrient budget assessment if required in detailed planning stage.

[3] Assumed no loss rates for TN and TP for wetlands to avoid double counting as they included as mitigation measures.

Table 5 Proposed Land Types and Nutrient Loss Rates Within CSD9A & CSD9B

Proposed Land Type[1]	Area (ha)	Average Total Nitrogen (TN) Loss Rate - Kg/ha/year	Average Total Phosporous (TP) Loss Rate - Kg/ha/year
CSD9B/Urban Area	10.91	14.3	0.83
CSD9B/SANG	8.00	5	0.14
CSD9A/Urban Area	7.56	14.3	0.83
CSD9A/SANG	1.50	5	0.14
Total Area	**27.97**		

Nutrient budget estimates have been undertaken by Arcadis for the Otterpool Park Framework Masterplan (including additional CSD9A and CSD9B sites) for the currently preferred Onsite WwTW solution in accordance with Severn Trent Connect Proposal. The assessment is completed using NE's recommended potable water efficiency target of 110 l/person/day as well as the alternative 90 l/person/day target for comparison purpose.

Depending on the chosen final discharge outfall location and corresponding Dry Weather Flow (DWF) volume, the EA has confirmed the following indicative discharge permit values shown in Table 6 for the proposed Otterpool Park Onsite WwTW. Severn Trent Connect has confirmed that they are able to meet any of these EA discharge permit values whilst limiting Total Nitrogen discharge to 7.2 mg/l for the purpose of achieving NE's nutrient neutrality requirement. Therefore, as agreed with NE, a Total Nitrogen limit of 7.2mg/l and Total Phosphorus limit of 0.1 mg/l have been used for the purpose of latest Arcadis nutrient budget calculations presented in this Technical Note.

Table 6 Proposed Environment Agency Indicative Discharge Permit Values for Onsite WwTW

WwTW Option	Maximuum DWF Limit – 2,841 m3/d			Maximum DWF – 3,472 m^3/d		
	BOD (mg/l)	Ammonia (mg/l)	Phosphorus (mg/l)	BOD (mg/l)	Ammonia (mg/l)	Phosphorus (mg/l)
Upstream Outfall Location @ NGR 609426 137712 (at Harrindge Lane Bridge)	5	0.5	0.1	N/A	N/A	N/A
Downstream Outfall Location @ NGR 608558 138047 (at confluence with East Stour and Horton Priory Dyke)	8	2	0.3	7	2	0.3

The excel calculation files used for the nutrient budget assessment is attached in **Appendix 4**, which includes the following information:

- Worksheet 1 – Key Input Data
- Worksheet 2 – Nutrient Budget Calculations for Onsite Severn Trent Connect WwTW option, using a PCC of 110 l/p/d
- Worksheet 3 – Nutrient Budget Calculations for Onsite Severn Trent Connect WwTW option, using an alternative tighter PCC of 90 l/p/d
- Worksheet 4 – Wetland Mitigation Requirement Summary
- Worksheet 5 – Existing Land Type Information Used in the Assessment
- Worksheet 6 – Existing Mixed Land Type Information Used in the Assessment
- Worksheet 7 – Proposed Land Use Type Information Used in the Assessment
- Worksheet 8 – Proposed Wetland Details and Preliminary Hydraulic Loading Assessment

Table 7 below summarises the estimated nutrient budget requirement, which includes 20% buffer as per the Natural England's guidance.

Table 7 Nutrient Budget Assessment Summary for Severn Trent Connect Onsite WwTW Option

WwTW Option	PCC Rate – 110 l/p/d		PCC Rate – 90 l/p/d	
	TN (Kg/year)	TP (Kg/year)	TN (Kg/year)	TP (Kg/year)
Otterpool Park Framework Masterplan Only	1,287	256	-75	237
Otterpool Park Framework Masterplan plus Sellindge Sites CSD9A and CSD9B	1,288	270	-122	250

5. Preliminary Nutrient Mitigation Options

Table 8 below summarises the indicative total area of the new wetlands required to offset the nutrient loading surplus shown in Table 7. Arcadis team has identified potential locations to provide up to 24.8 ha of new wetlands within the revised Otterpool Park OPA boundary. Therefore, achieving nutrient neutrality with Severn Trent Connect onsite WwTW option is technically feasible with 110 l/p/d PCC rate to accommodate the proposed development in entire Otterpool Park Framework Masterplan and the two extra allocation sites CSD9A and CSD9B, involving a total of 10,350 new homes and associated non-residential development.

Table 8 Nutrient Budget Assessment Summary for WwTW Options

WwTW Option	PCC Rate – 110 l/p/d		PCC Rate – 90 //p/d	
	TN – Wetland Area[1] (ha)	TP – Wetland Area[2](ha)	TN – Wetland Area[1] (ha)	TP – Wetland Area[2] (ha)
Otterpool Park Framework Masterplan Only	1.4	21.3	N/A	19.7
Otterpool Park Framework Masterplan plus Sellindge Sites CSD9A and CSD9B	1.4	22.5	N/A	20.8

[1] Assumed TN removal rate of 93 g/m^2/yr for both wastewater and stormwater discharges
[2] Assumed TP removal rate of 1.2 g/m^2/yr for both wastewater and stormwater discharges

Worksheet 8 of the excel calculation files in Appendix 4 and Table 7 below summarise the key information related to the proposed wetlands. In line with Natural England's guidance, stormwater wetland sizes will be optimised where possible to maximise their nutrient removal efficiency by linking smaller storm wetlands with new wetlands, SuDS features and existing smaller local watercourses.

Preliminary hydraulic loading calculations have been undertaken in line with EA's Guidance Manual for Constructed Wetlands, R&D Technical Report P2-159/ TR2 to provide treatment storage for 15mm first flush runoff from the contributing stormwater catchments. The estimated treatment depth is shown in the table below, which suggests that the preliminary proposals are technically feasible and able to provide sufficient level of treatment volume. Preliminary Hydraulic Retention Time (HRT) for the Wastewater Treatment Wetland (W14) also suggests that this may vary between 1 day to 6 days (i.e. depending on the wetland treatment depth chosen from 50mm to 250mm) for the maximum DWF of 3,835 m^3/day arising from the proposed development. Again, this shows sufficient HRT is available at W13 to provide effective treatment for sediment and nutrient removal.

Table 9 Proposed Wetland Details Summary

Welland Location Ref.	Indicative Wetland Area (ha)	Treatment Depth (m)	Average Wetland Depth (m)	Comments
W1	1.21	0.42	0.72	Receives storm discharge. W1, W2, W3 & W8 are interlinked (Total area 3.7ha).
W2	0.81	0.43	0.73	Receives storm discharge. W1, W2, W3 & W8 are interlinked (Total area 3.7ha).
W3	0.25	0.15	0.45	Receives storm discharge. W1, W2, W3 & W8 are interlinked (Total area 3.7ha).
W4	1.70	0.07	0.37	Receives storm discharge.
W5	2.17	0.16	0.46	Receives storm discharge.
W6	2.63	0.27	0.87	Receives storm discharge.

Welland Location Ref.	Indicative Wetland Area (ha)	Treatment Depth (m)	Average Wetland Depth (m)	Comments
W7	1.87	0.05	0.35	Receives storm discharge.
W8	1.46	0.49	0.79	Receives storm discharge. W1, W2, W3 & W8 are interlinked (Total area 3.7ha).
W9	0.27	0.13	0.73	Receives storm discharge. W9 & W10 are interlinked (Total area 1.1ha)
W10	0.78	0.21	0.81	Receives storm discharge. W9 & W10 are interlinked (Total area 1.1ha)
W11	0.43	0.05	0.65	Receives storm discharge. W11 & W12 are interlinked (Total area 1.7ha).
W12	1.26	0.04	0.34	Receives storm discharge. W11 & W12 are interlinked (Total area 1.7ha).
W14	1.11	0.08	0.38	Receives storm discharge.
W13	8.86	0.25	0.35	Receives wastewater discharge. The total footprint of the wetland area is 11.8ha but only 75% is taken as effective area due to earth works required for constructing cascade wetland features.
Total Area	**24.8**			

The proposed offline storm wetlands are distributed across the Otterpool Park Site and strategically located in the downstream section of the contributing catchment, prior to discharging to the receiving watercourse. In addition, upstream of these proposed wetlands there will be a series of linked SuDS features that will work together to provide further source control and water quality treatment, prior to discharging to the wetlands.

The current illustrative masterplan for the revised Otterpool Park OPA alone, includes over 60 ha of such open surface SuDS features, which will help to maintain the required permanent baseflow within the proposed wetlands, ensuring the efficacy of their nutrient removal. The water permanently stored in proposed wetlands and SuDS will form a part of a rainwater recycling strategy for non-potable usage within Otterpool Park to reduce potable water consumption. Therefore, this also enables to circulate stormwater within the proposed linked SuDS and wetlands system to maintain sufficient baseflow for treatment efficacy during periods of dry weather as required.

The treated effluent from the onsite WwTW will then be routed through the proposed Wetland W13, prior to discharging to the East Stour. The total footprint of this large wetland area is approximately 11.8ha but only 75% of this is taken as effective treatment area in Table 9 above due to earth works required for constructing small cascade wetland features on 1 in 20 sloping existing ground.

The long-term adoption and management of the onsite WwTW, including the associated sewer infrastructure and Wastewater Wetland (W13) will be provided by Severn Trent Connect. Similarly, Severn Trent Connect has confirmed that they can adopt the proposed stormwater wetlands and strategic SuDS system at Otterpool Park. Therefore, this is the currently preferred approach for the long-

term maintenance of storm water wetlands and SUDS but alternatively, Otterpool Park Community Trust can take this responsibility if required.

6. Summary

This technical note confirms that Otterpool Park Framework Masterplan and two site allocation CSD9A and CSD9B can achieve Nutrient Neutrality based on the proposals presented in this Technical Note. This will be achieved by:

- Direct treatment mitigation with the proposed Severn Trent Connect Onsite WwTW option (based on 110 l/p/d PCC rate, TP limit of 0.1mg/l and TN limit of 7.2 mg/l)
- Direct mitigation, which includes 24.8 ha of offline wastewater and stormwater wetlands, and 35 ha of new woodland planting
- Indirect mitigation, which includes changing existing agricultural land use to a lower nutrient use such as stormwater SuDS, SANG, ecology/landscape mitigation

The current wetland area estimate is a precautionary estimate as advised by NE. For example, the urban area currently included in the nutrient budget assessment can be reduced by 25.2 ha if necessary to account for extra SuDS within the urban parcels as per the revised Otterpool Park Revised OPA/illustrative masterplan. SuDS will have lower nutrient leaching rates (i.e. similar to SANG) than the urban areas currently used, which means the wetland requirement will also be reduced by another 1.8 ha if this additional SuDS are considered in the detailed assessment.

This Technical Note demonstrates that Otterpool Park, CSD9A and CSD9B site allocations in FHDC Local Plan can achieve nutrient neutrality, protecting the integrity of the downstream Stodmarsh designated sites and thereby can meet the required tests under the HRA. Therefore, it is recommended that FHDC Local Plan Appropriate Assessment is updated based on findings of this Technical Note and a Statement of Common Ground with NE is urgently prepared ahead of the upcoming Examination in Public for the Core Strategy Review to reflect this.

FHDC to also update their previous Nutrient Neutrality calculations for the other smaller site parcels ND4, ND5, ND8, ND9 AND ND10 (a total of circa 232 dwellings) that are within the little Wingham and Stour sub-catchment that discharges downstream of Stodmarsh and propose any required extra mitigation within the in-combination appropriate assessment of the local plan allocations as required.

Arcadis and FHDC (in consultation with NE, EA and Severn Trent Connect) to continue developing the proposed onsite WwTW and wetland designs, maintenance and delivery programmes and cost estimates, including the finalisation of their long-term maintenance requirements.