Little Addington Parish Neighbourhood Plan

Draft Habitat Regulations Assessment

February 2026

PLANIT-X TOWN AND COUNTRY PLANNING SERVICES LTD
21 New Road
Burton Lazars
Melton Mowbray
Leicestershire. LE14 2UU

t: 01664 568819
e: info@planit-x.co.uk
w: www.planit-x.co.uk

Registered company no 07387991 | Registered office address: Unit F Whiteacres Whetstone Leicester LE8 6ZG

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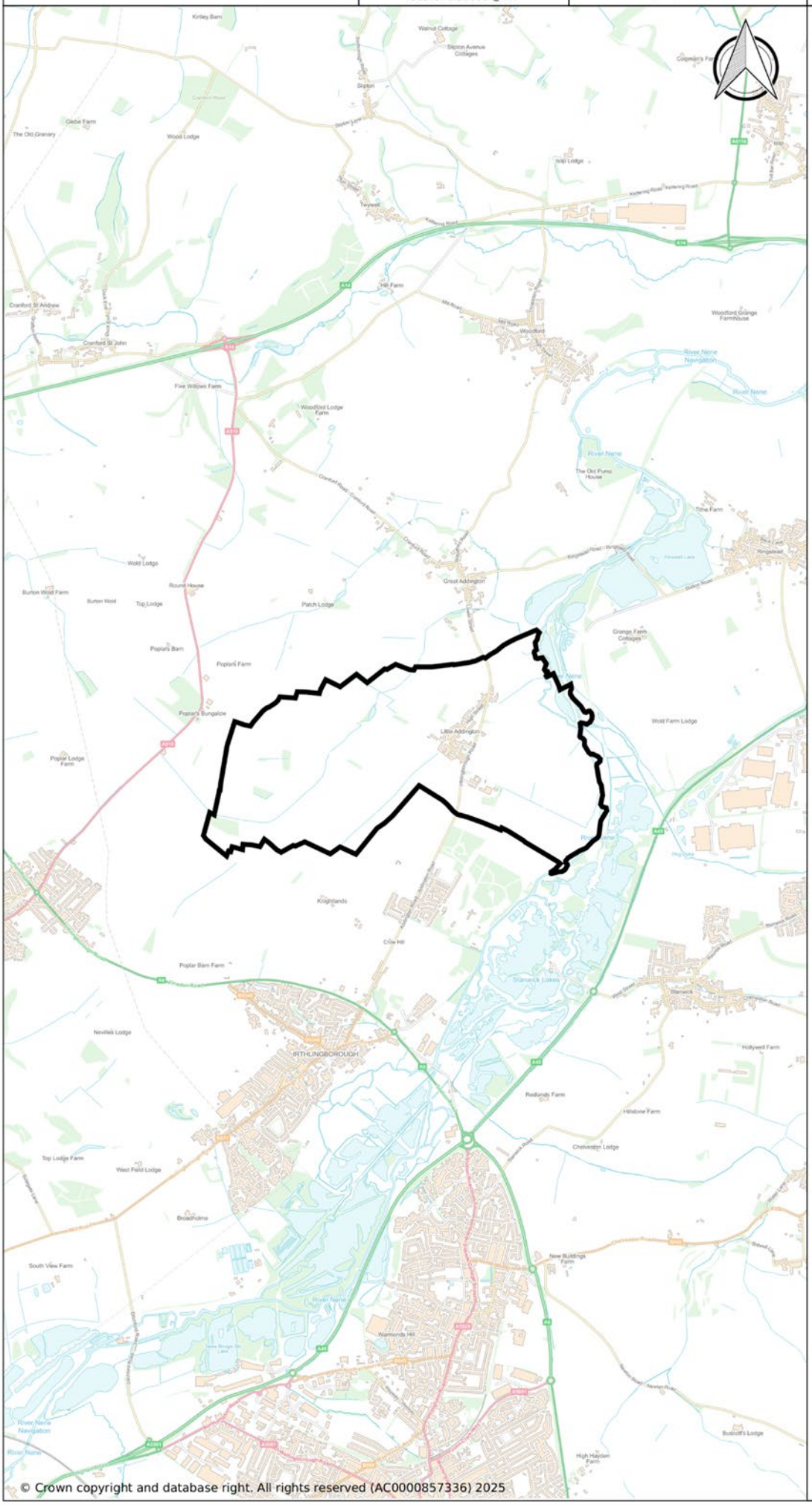
1. Introduction

1.1 Planit-X was appointed by Little Addington Parish Council to undertake a Habitat Regulation Assessment (HRA) for the Pre-submission Little Addington Neighbourhood Plan 2021-2045.

1.2 This Habitat Regulations Assessment informs the Parish Council of the potential effects of its Neighbourhood Plan on Habitats (previously European) Sites (Special Areas of Conservation, SACs, Special Protection Areas, SPAs, and Ramsar sites designated under the Ramsar convention) and how they are being addressed in the draft Neighbourhood Plan.

1.3 The objective of this report is to undertake an appropriate assessment to identify if any policies and / or sites proposed for allocation in the Little Addington Neighbourhood Plan have the potential to cause likely significant effects and, where identified, adverse effects on the Integrity of Habitats Sites, either in isolation or in-combination with other plans and projects. Where required recommendations to ensure the protection of Habitats Sites are made.

Little Addington Neighbourhood Area		Little Addington	
Map 1	0 200 400 800m **Scale:** 1:50000 @ A4	**Author:**	PARISH ONLINE
		Date: 31/12/2025	



Neighbourhood Area

2. Details of the Neighbourhood Plan

Title of the plan:

2.1 Little Addington Parish Neighbourhood Plan.

Name of Qualifying Body and Local Planning Authority:

2.2 The qualifying body preparing the Little Addington Parish Neighbourhood Plan is Little Addington Parish Council. The Local Planning Authority is North Northamptonshire Council.

2.3 From 1 April 2021, North Northamptonshire Council became the single unitary council responsible for providing a range of public services to residents and businesses in the areas of Corby, East Northamptonshire, Kettering and Wellingborough. It has replaced Corby Borough Council, East Northamptonshire Council, Kettering Borough Council and the Borough Council of Wellingborough, and now delivers all the services which were previously provided by these councils.

Little Addington Neighbourhood Plan contact point:

Parish Clerk
Email: clerk@littleaddingtonparishcouncil.gov.uk

Location and spatial extent of the Little Addington Parish Neighbourhood Plan:

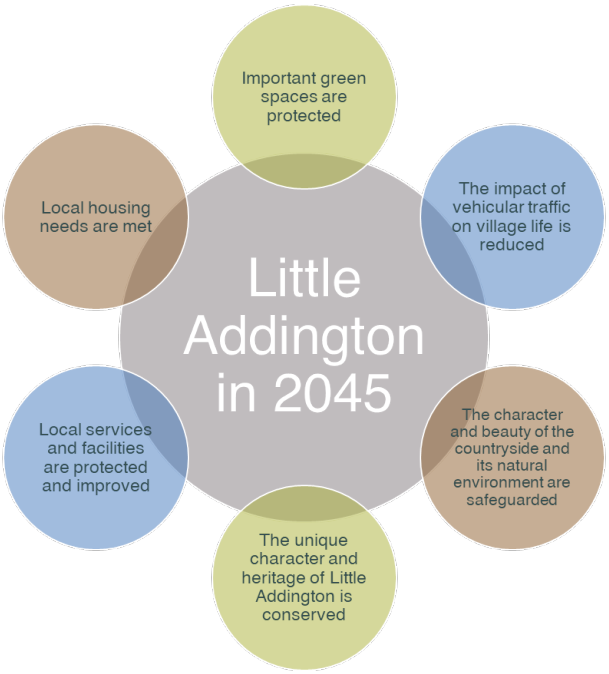
2.4 The Little Addington Parish Neighbourhood Plan covers the Little Addington Neighbourhood Area, comprising the parish of Little Addington which is located within North Northamptonshire. The parish is a rural area with a population of 290 individuals (2021 Census). The only settlement is Little Addington village located just above the floodplain of the River Nene.

Timeframe of the Little Addington Parish Neighbourhood Plan:

2.5 2024 to 2045.

Main aims of the Little Addington Neighbourhood Plan:

2.6 The following vision diagram for the Plan makes it clear what the Plan is aiming to achieve:



Relationship with the Local Plan:

2.7 The Little Addington Parish Neighbourhood Plan is being prepared in the context of the North Northamptonshire Development Plan. For the purposes of the Little Addington Neighbourhood Plan, the relevant parts are the North Northamptonshire Joint Core Strategy 2011-2031 (Adopted July 2016) and the East Northamptonshire Local Plan (Part 2) (Adopted December 2023).

2.8 The North Northamptonshire Joint Core Strategy (JCS) was adopted in July 2016. It is the overall strategic plan for North Northamptonshire setting out the spatial strategy. It is the strategic Part 1 Local Plan for Corby, East Northamptonshire, Kettering and Wellingborough.

2.9 The East Northamptonshire Local Plan (Part 2) develops in more detail the strategy outlined in the JCS and identifies sites for uses such as housing, employment and open space. It also contains development management policies which will be used to assess planning applications over the plan period. Table 16 of the East Northamptonshire Local Plan sets out a rural housing need for Parish Council areas of a particular scale in terms of population. The figures are intended as indicative guidance for potential/emerging Neighbourhood Plans in terms of helping meet future housing need, as opposed to a policy requirement. The indicative housing requirement for Little Addington is 11-20 dwellings.

2.10 Work has started on the North Northamptonshire Local Plan Review, to take into account changes since 2016 and extend the plan period to 2045. The Plan will cover both strategic and non-strategic matters. An initial consultation on its scope and issues was undertaken in March 2022.

Will the Little Addington Parish Neighbourhood Plan propose allocations? And if so, will these be over and above those likely to be included in the Local Plan?

2.11 Policy 29 of the Joint Core Strategy sets the housing requirement for East Northamptonshire at 8,400 dwellings net over the Plan period 2011 – 2031 equating to an annual average of 420 dwellings. It also establishes how it will be distributed in line with the spatial strategy and sets out housing requirements for each of the main towns and rural areas. Rushden as a growth town is required to accommodate 3,285 dwellings. Higham Ferrers (560), Irthlingborough (1,350), Raunds (1,060), Thrapston (680) and Oundle (645) are allocated a requirement in accordance with their role as market towns. In addition, the rural areas are identified as accommodating 820 dwellings over the Plan period. Little Addington is a village within the rural area of East Northamptonshire.

2.12 Table 16 of the East Northamptonshire Local Plan sets out a rural housing need for Parish Council areas of a particular scale in terms of population. The figures are intended as indicative guidance for potential/emerging Neighbourhood Plans in terms of helping meet future housing need, as opposed to a policy requirement. The indicative housing requirement for Little Addington is 11-20 dwellings.

2.13 Although the Little Addington Neighbourhood Plan does not need to plan for 11-20 dwellings, the Parish Council has been mindful that it wants to plan beyond 2031 and the opportunities for young people to live in the village are limited and unaffordable. Further some more homes are needed to improve the viability of the village and support community infrastructure improvements.

3. Legislative Background

3.1 A European site is protected by the Conservation of Habitats and Species Regulations 2017 as amended (known as the Habitats Regulations).

3.2 The following sites are protected by the Habitats Regulations and any proposals that could affect them will require an Habitat Regulation Assessment:

- Special Areas of Conservation (SACs)
- Special Protection Areas (SPAs)

3.3 Any proposals affecting the following sites would also require Habitat Regulation Assessment because these are protected by government policy:

- proposed SACs
- potential SPAs
- Ramsar sites - wetlands of international importance (both listed and proposed)
- areas secured as sites compensating for damage to a European site

3.4 The Neighbourhood Planning (General) Regulations 2012, state that submitted Plans need to be accompanied by a statement explaining how the proposed Plan meets the 'basic conditions' set out in Schedule 4B of the 1990 Town and Country Planning Act. These basic conditions include a requirement to demonstrate how the Plan is compatible with EU obligations, which include the need to undertake a Habitat Regulations Assessment.

3.5 The Habitat Regulation Assessment process should be taken at a level of detail that is appropriate and proportional and the first stage in the process in known as 'screening'. This is a risk assessment to decide whether the subsequent stage, known as 'Appropriate Assessment', is required. The essential question is: "Is the plan, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?"

3.6 The objective of screening is to identify those policies that can, without any detailed proposal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction with such a site. Only if a significant effect is likely would the need for an Appropriate Assessment of the Little Addington Parish Neighbourhood Plan be triggered.

European Designated Sites (Natura 2000)

Little Addington

Author:

Date: 19/02/2026

0 2 4 6 8km

Scale: 1:250000 @ A4

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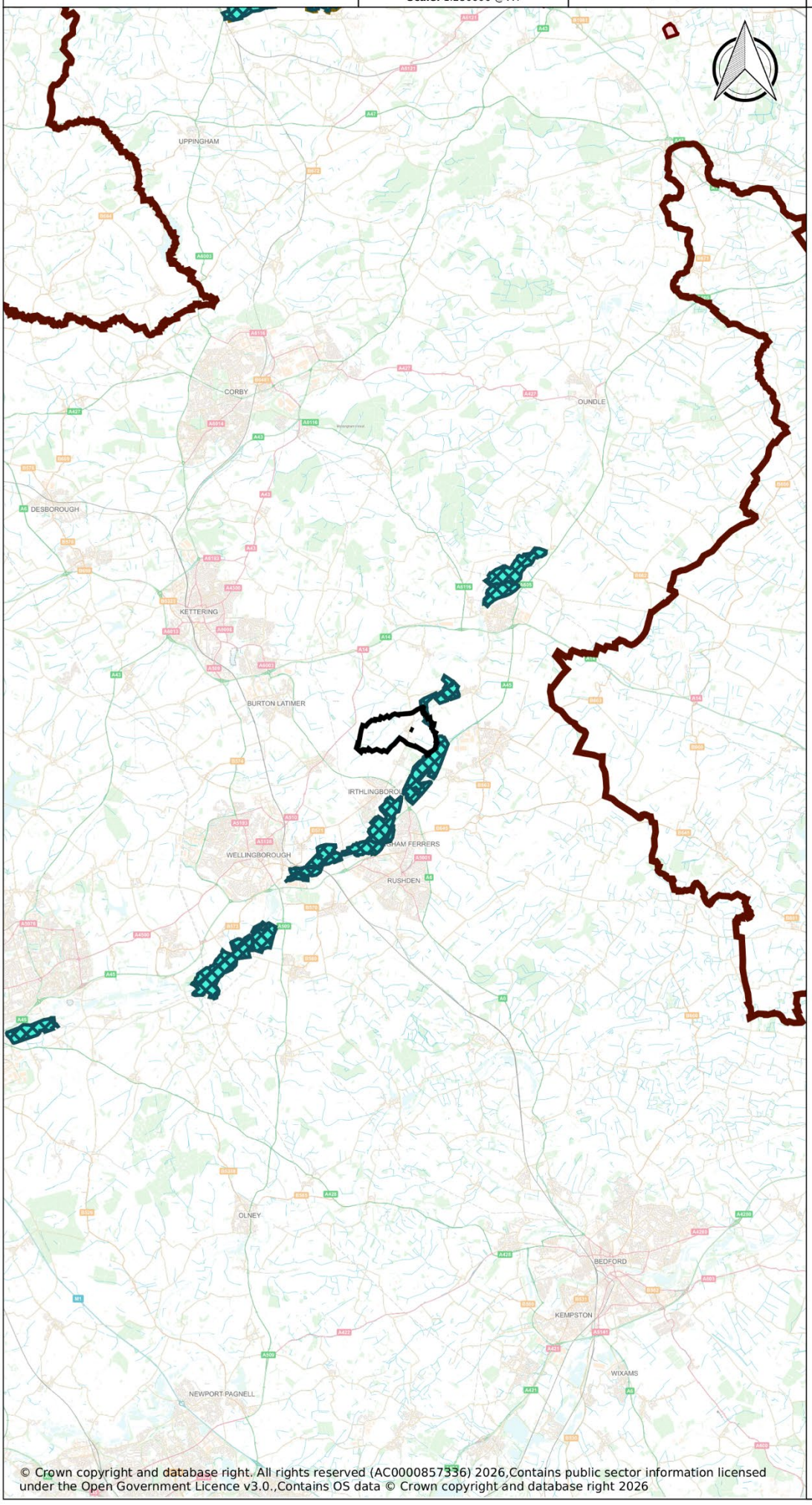

Special Protection Areas

Special Areas of Conservation (SAC)

RAMSAR

County

Mixed Use Site

Neighbourhood Area

4. North Northamptonshire Joint Core Strategy Habitat Regulations Assessment

4.1 The Little Addington Parish Neighbourhood Plan must be in general conformity with the strategic policies contained in the development plan for the area.

4.2 The North Northamptonshire Joint Core Strategy (JCS) was adopted in July 2016. It is the strategic Part 1 Local Plan for Corby, East Northamptonshire, Kettering and Wellingborough. It outlines a big picture to be developed in more detail through the Part 2 Local Plans prepared by the District and Borough Councils and by Neighbourhood Plans prepared by Neighbourhood Planning Groups.

4.3 In 2013 a Habitat Regulations Appropriate Assessment (Likely Significant Effects) exercise for the North Northamptonshire Joint Core Strategy was undertaken. A further Habitat Regulations Assessment was prepared in January 2015 to accompany the JCS public consultation.

4.4 The Habitats Regulation Assessment (HRA) concluded any policies and development outlined within the Joint Core Strategy, potential non-strategic sites that have submitted a planning application, but have not yet been granted, will not lead to an adverse effect on the integrity of the Rutland Water SPA, and Barnack Hills and Holes SAC either alone or in combination with other plans or projects. The JCS will have no effects on the integrity of the above-mentioned designated sites.

4.5 Potential effects on the integrity pf the Upper Nene Valley Gravel Pits SPA and Ramsar site as a result of strategy policies, and strategic and non-strategic sites within 3-4km of this SPA were identified. However, it was concluded that mechanisms to avoid adverse effects on the integrity of the Upper Nene Valley Gravel Pits SPA had been incorporated into the Joint Core Strategy (JCS) and the planning application determination process. The North Northamptonshire JCS defines a 3km zone from the Upper Nene Vally Gravel Pits SPA/Ramsar site within which development could result in increased activity within the SPA/Ramsar. The Habitat Regulation Assessment defined a 4km zone from the Upper Nene Valley Gravel Pits SPA/Ramsar site within which development on previously developed farmland could impact designated bird features associated with the SPA/Ramsar site.

4.6 The JCS Inspector's report indicates that the Habitat Regulation Assessment was satisfactory and taking into account advice from relevant consultees, notably Natural England, the Inspector concluded that the JCS was sound and consistent with Government policy.

5. The East Northamptonshire Local Plan (Part 2) Habitat Regulations Assessment

5.1 The Habitats Regulation Assessment submitted with the East Northamptonshire Local Plan was subsequently updated (October 2021) following discussions with Natural England.

5.2 The Upper Nene Valley Gravel Pits SPA/Ramsar site Rutland Water SPA lies within East Northamptonshire between Irthlingborough and Thorpe Waterville. The Habitat Regulations Assessment of the East Northamptonshire Local Plan concluded that areas of land located beyond the Upper Nene Valley Gravel Pits SPA/ Ramsar site may also be important ecologically in supporting populations for which the SPA has been designated, these areas are defined as Functionally Linked Land (FLL). In the case of the Upper Nene Valley Gravel Pits SPA, Natural England has advised that land beyond designated SPA/ Ramsar sites may provide foraging habitats for protected wintering bird species such as lapwing and golden plover.

5.3 Policy 4 of the JCS and the Special Protection Area Supplementary Planning Document (SPD) set out requirements where development would have an effect on the SPA to ensure that such development would have no significant effect on the SPA. The Special Protection Area SPD includes a Mitigation Strategy. The JCS Policies Map identifies two zones, one within a 3km buffer of the SPA and one within a 4km buffer of the SPA. Within the 3km buffer zone the SPA a Mitigation Strategy applies. For larger greenfield developments of 2ha or more, the Joint Core Strategy (paragraph 3.41) requires that within the 4km buffer these should be subject to site specific wintering bird surveys to determine if sites have a role as functionally linked land. The effectiveness and extent of the SPA buffer zones will need to be addressed through a review of the JCS, to ensure that a sustainable approach to future development proposals is agreed.

5.4 During the Local Plan process, Natural England raised concerns regarding the impacts of air quality and pollution upon the SPA/ Ramsar site. The local planning authority shared these concerns and since July 2020 has required air quality assessments submitted in support of planning applications/ proposals, which are to be prepared in line with the East Midlands Air Quality Network (EMAQN) guidance.

5.5 Sites within the 3km buffer zone are bound by the Mitigation Strategy; whereby financial contributions to mitigate the adverse impacts of development upon the SPA/Ramsar site will be sought in accordance with the Addendum to the SPA Supplementary Planning Document: Mitigation

Strategy. In line with the Special Protection Area SPD requirements, consultation is required by Natural England in advance of submitting a planning application. As part of that consultation, further mitigation may be needed in exceptional circumstances and where Natural England advise. If a bespoke process is required, then a project level Appropriate Assessment will be required to accompany a planning application.

5.6 Within the 3km and 4km zones and potentially beyond, to comply with Habitat Regulation Assessment legislation, development may need to be supported by bespoke assessments such as wintering bird surveys. To fulfil the precautionary principle, at Natural England's direction, the requirements for an appropriate assessment are set out below.

In submitting a planning application, the applicant will be required to provide evidence that the development will not result in a Likely Significant Effect upon the Upper Nene Valley Gravel Pits SPA/ Ramsar site. To achieve this, surveys will be required to determine habitats and current use of the site to determine if it does support a significant population of qualifying species. Where habitats are suitable, non-breeding bird surveys will be required to determine if the site and neighbouring land constitute a significant area of supporting habitat. Surveys should be required to be undertaken during autumn, winter and spring and at more than one year of survey data may be needed (to be agreed in consultation with the local planning authority and Natural England). If habitat within the site is identified to support significant populations of designated bird features avoidance measures and mitigation will be required, such as the creation of replacement habitat nearby, and the planning application will likely need to be supported by a project specific Habitats Regulations Assessment to ensure that the development does not result in adverse effects on integrity.

5.7 In terms of the Upper Nene Valley Gravel Pits SPA/Ramsar site, the Habitat Regulation Assessment concluded that all residential site allocations lie beyond the 3km screening distance defined by the JCS Habitat Regulation Assessment meaning that the SSP2 will not result in likely significant effects to this SPA/Ramsar. In addition, all residential and employment site allocations lies further than 4km from the Upper Nene Valley Gravel Pits SPA/Ramsar, the distance that golden plover from the SPA/Ramsar are considered to travel from the designated site to feed on parcels of agricultural land. The Habitat Regulation Assessment concludes the SSP2 will not result in likely significant effects regarding the loss of functionally linked land.

5.8 Likely significant effects are not anticipated with respect to the impact pathway water quality and resources. This is because the growth allocated through the SPP2 will not require an additional abstraction of water from the River Nene; the resource zone is predicted to remain in surplus throughout the Plan period and the Wastewater Treatment Works are being upgraded in line with the delivered development in the Report.

Finally, the JCS Habitat Regulation Assessment already assessed the potential in-combination effects of growth in the region at a more strategic level finding no adverse effects, which when considered in tandem with the SPP2 Habitat Regulation Assessment it is concluded that there will be no in-combination effects arising from the implementation of the SPP2.

5.9 It should be noted that Natural England advised in their representation on the SPP2, that golden plover can fly up to 15-20km away from the SPA. An update to the Habitat Regulation Assessment was prepared to address this representation, the updated Habitat Regulation Assessment (May 2020) was submitted with the plan. This update uses a 10km buffer for the assessment of functionally linked land. Following a further representation from Natural England additional information was provided to Natural England in relation to the sites allocated in the plan. With this additional information Natural England was satisfied that the SPP2 will have no likely significant effect on the Upper Nene Valley Gravel Pits SPA and Ramsar Site. The Inspector's Report concluded (para 92) that;

"The Habitats Regulation Assessment (May 2020) meets the necessary requirements and concludes that the Plan will have no likely significant effects on the Upper Nene Valley Gravel Pits Special Protection Area and Ramsar Site. Based on additional information provided by the Council (letter dated 39 June 2020) Natural England are satisfied with this conclusion."

European Designated Sites (Natura 2000)

Little Addington

Author:

Date: 19/02/2026

0 200 400 600 800m

Scale: 1:25000 @ A4

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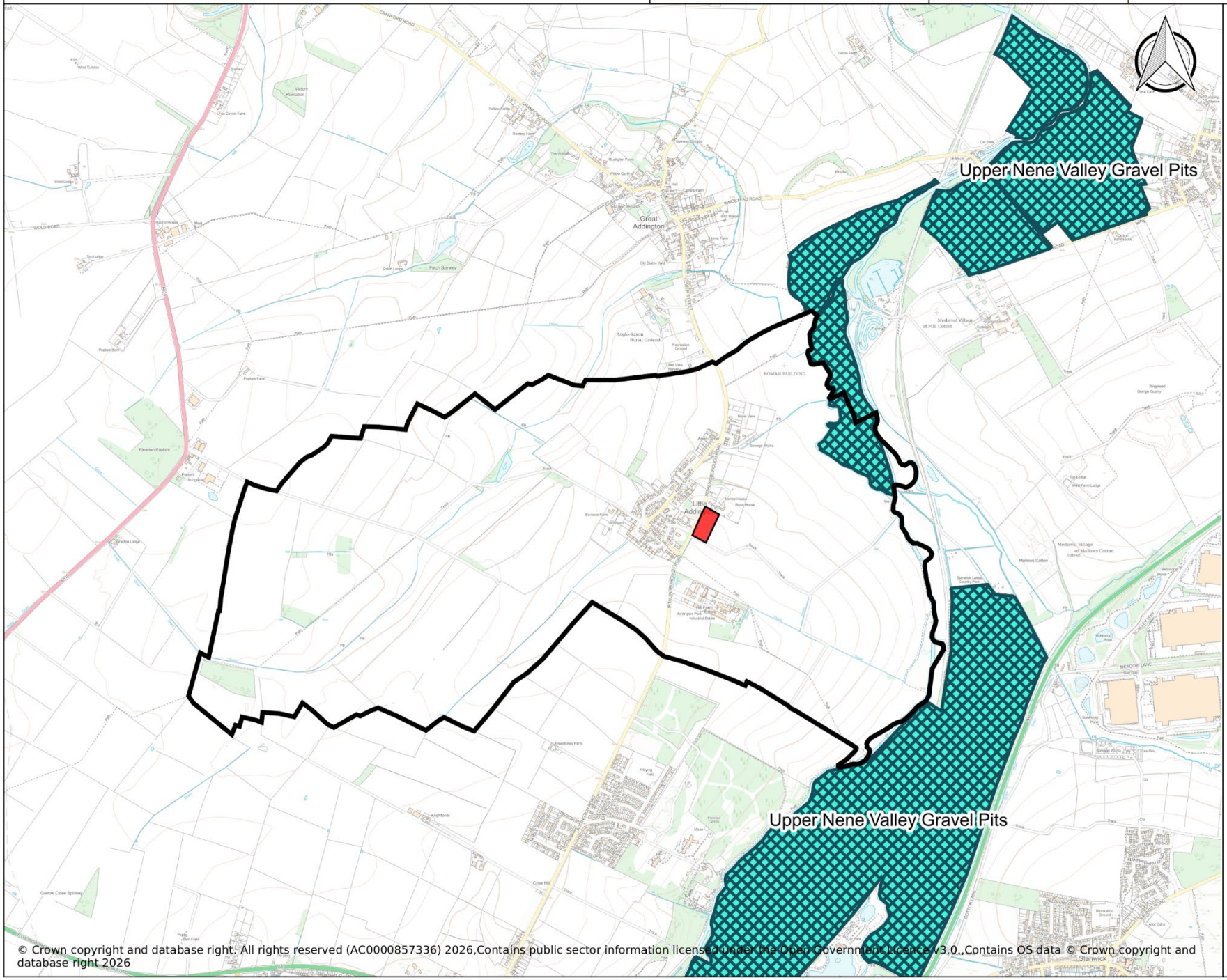

6. Habitat Sites

6.1 In view of the North Northamptonshire Joint Core Strategy and East Northamptonshire Local Plan (Part 2) Habitat Regulations Assessments, it has been concluded that the Upper Nene Valley Gravel Pits SPA/Ramsar site requires consideration. The Upper Nene Valley Gravel Pits SPA/Ramsar site lies partly within the Neighbourhood Area and is the only site protected by the Conservation of Habitats and Species Regulations 2017 that lies within 15km of the Neighbourhood Area.

Upper Nene Valley Gravel Pits SPA and Ramsar Site

6.2 The Upper Nene Valley Gravel Pits covers 1,358 hectares in total and is located along the River Nene between Northampton and Thorpe Waterville to the east. The SPA consists of 20 separate blocks of land and water fragmented by roads and other features and located adjacent and / or close to urban areas.

6.3 The SPA comprises a chain of extant and extinct gravel pits that follow alluvial deposits along the River Nene. It is dominated by a mix of shallow and deeper inland waterbodies, with associated marginal vegetation, improved grassland and nationally scarce wet broad-leaved deciduous woodland dominated by white willow (Salix alba) with crack willow (S. fragilis) and occasionally ash (Fraxinus excelsior), Osier (S. viminalis) and grey willow (S. cinereal). The site contains internationally important populations of nonbreeding wintering waterbirds that have been found in numbers in excess of 20,000 individuals.

6.4 The closest part of the Upper Nene Valley Gravel Pits is located within the eastern extent of the Little Addington Neighbourhood Area (Ringstead Gravel Pits Unit 7). SSSI Unit 7 is noted to be in Unfavourable - Recovering condition. The SSSI condition survey conducted in 2020 identified that "Birds present in appropriate numbers with pochard, coot and shoveler species only slightly below previous survey figures. Part of site not being managed appropriately which will eventually lead to loss of feeding habitat."

6.5 SSSI Unit 6 (Stanwick Gravel Pits) lies to the southeast of the Neighbourhood Area. The SSSI condition survey, also conducted in 2020 identified the unit as Unfavourable – Recovering noting: "Wintering Wigeon, pochard, coot and golden plover numbers have declined in this unit. This unit is being appropriately managed under stewardship agreements, however, recreational disturbance and development pressure is likely contributing to species decline. However, much of the recreational issues are managed through use of monitoring and pedestrian use of paths."

SPA Qualifying Features

6.6 The site is designated as an SPA under article 4.1 of the Directive (Directive 2009/147/EC) for its wintering population of:

- Eurasian bittern (Botaurus stellaris)
- European golden plover (Pluvialis apricaria)

6.7 The site is designated as an SPA under article 4.2 of the Directive (Directive 2009/147/EC) for its population of:

- Gadwall (Anas strepera)

6.8 In the non-breeding season the area regularly supports internationally important populations of waterfowl including northern shoveler (*Anas clypeata*), Eurasian wigeon (*Anas penelope*), mallard (*Anas platyrhynchos*), Gadwall (*Anas strepera*), Common pochard (*Aythya farina*), tufted duck (*Aythya fuligula*), Eurasian bittern (*Botaurus stellaris*), Eurasian coot (*Fulica atra*), great cormorant (*Phalacrocorax carbo*), golden plover (*Pluvialis apricaria*), great crested grebe (*Podiceps cristatus*), and northern lapwing (*Vanellus vanellus*).

Ramsar Qualifying Features

6.9 The Ramsar is designated for:

Criterion 5
In the non-breeding season, the site regularly supports 23,821 individual waterbirds;

Criterion 6 regularly supports 1% of the individuals in the populations of the following species or subspecies of waterbird in any season:

- Gadwall (*Anas strepera*)
- Mute Swan (*Cygnusolor*)

Conservation Objectives

6.10 "With regard to the SPA and the individual species and/or assemblages of species for which the site has been classified (the 'Qualifying Features' listed above), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Bird Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features,
- The structure and function of the habitats of the qualifying features,

• The supporting processes on which the habitats of the qualifying features rely,

• The populations of each of the qualifying features, and

• The distribution of qualifying features within the site."

Threats / Pressures to Integrity of SPA

6.11 The key threats and pressures to the integrity of the Upper Nene Valley Gravel Pits SPA / Ramsar have been identified in Natural England's Site Improvement Plan and the Supplementary Advice on Conservation Objectives:

- Public access / disturbance (recreational pressure)
- General planning permissions (including loss of functionally linked land)
- Fisheries: Freshwater
- Change in land management
- Water quantity
- Water quality

6.12 The Information Sheet on Ramsar Wetlands identifies additional factors (past, present, or potential) adversely affecting the site's ecological character:

- Unspecified development: urban use (including loss of functionally linked land)
- Vegetation succession
- Introduction/ Invasion of non-native species
- Recreation / tourism disturbance (recreational pressure)

7. Impact Pathways

7.1 In carrying out an Habitat Regulation Assessment it is important to avoid confining oneself to effectively arbitrary boundaries (such as Local Planning Authority or parish boundaries). Instead, it is important to utilise the source-pathway-receptor model to evaluate whether an impact arising from a NP is connected to relevant Habitats Sites via a realistic pathway. Briefly defined, impact pathways are routes by which a development proposal can lead to an effect upon a Habitats Site. As highlighted earlier, it is also important to bear in mind guidance which states that the Appropriate Assessment should be 'proportionate to the geographical scope of the [plan policy]' and that 'an Appropriate Assessment need not be done in any more detail, or using more resources, than is useful for its purpose' (CLG, 2006, p.623).

7.2 Based upon Natural England's SIPs and professional judgement, there are several impact pathways that require consideration in relation to policies within the Little Addington Neighbourhood Plan and the relevant Habitats Sites, which are:

- Recreational Disturbance,
- Loss of functionally linked land (associated with development),
- Water quality (surface water runoff), and
- Water quality (treatment of sewage effluent).
- Water quantity, level and flow.

7.3 Full details of the background to impact pathways are provided in Appendix A.

Recreational pressure

7.4 Increased residential development can lead to increased visitor numbers to a Habitats Site, particularly those within relatively easy recreational access. The Upper Nene Valley Gravel Pits SPA/ Ramsar supports a wide assemblage of breeding, non-breeding and overwintering bird species that can be easily disturbed by human activities such as dog walking and hiking. Furthermore, recreation disturbance in winter can be more adverse because birds are more vulnerable at this time of year due to food shortages. Since Little Addington Neighbourhood Area is in close proximity to the Upper Nene Valley Gravel Pits SPA/ Ramsar it is expected that recreational pressure would likely result from increased residential development.

7.5 This impact pathway is to be discussed, particularly in-combination with residential growth in the wider region.

Loss of functionally linked land

7.6 Birds are highly mobile creatures that are not expected to be confined to the boundaries of Habitats Site boundaries. There is now an abundance of authoritative examples of Habitat Regulation Assessment cases on plans affecting bird populations, where Natural England recognised the potential importance of functionally linked land.

7.7 In relation to the Habitats Sites considered in this Habitat Regulation Assessment, the golden plover (*Pluvialis apricaria*) and, to a lesser extent, lapwing (*Vanellus vanellus*) are the species that this concept is most relevant to (shoveler is also of some relevance but tend to stay immediately adjacent to the SPA). Both golden plover and lapwing are known to feed on parcels of agricultural land outside of Habitats Site boundaries. This has been documented in several academic articles and research reports by the British Trust for Ornithology (BTO). For example, a study in County Durham (UK) determined that foraging fields of golden plover were up to 3.7km away from their nest site. A BTO research report highlighted that flocks, or at least individuals, of golden plover made regular movements of 10-12km between agricultural fields, highlighting the potentially long foraging trips this species undertakes. Aside from the distance to Habitats Sites, field size and surrounding land use are also factors that require consideration.

7.8 This impact pathway is to be discussed, in-combination with residential growth in the wider region.

Water quality: surface water runoff

7.9 Increased residential development within Little Addington could lead to the loss of previously undeveloped land and increased surface water runoff to nearby Habitats Sites. The Upper Nene Valley Gravel Pits SPA/ Ramsar overlaps Little Addington Neighbourhood Area and part of the SPA/Ramsar is located within the Neighbourhood Area.

7.10 This impact pathway is to be discussed, In-combination and in-isolation with residential growth in the wider region.

Water quality: discharge of treated sewage effluent

7.11 Increased housing development at Little Addington Neighbourhood Area could lead to increased sewage production. Sewage effluent from residential development in Little Addington Parish is treated by Little Addington Sewage Treatment works (STW) operated by Anglian Water, discharge of sewage takes take place at local watercourses including the River Nene that is hydrologically connected to the Upper Nene Valley Gravel Pits SPA/ Ramsar. Therefore, it is necessary to consider any risk

that increased sewage could degrade the water quality (i.e. through increased phosphorus discharge) of Habitats Sites when in the absence of environmental mitigation and adequate wastewater treatment works.

7.12 This impact pathway is to be discussed, particularly in-combination with residential growth in the wider region.

Water quantity, level and flow.

7.13 Increased housing development at Little Addington Neighbourhood Area will result in increased need for water resources, that could result in an increase in the need for water abstraction. Water abstraction has the potential to alter hydrological conditions within Habitats Sites that are hydrologically linked to the source of the abstraction. For designated features which are dependent on wetland habitats that are supported by water quantity, flow and volume, maintaining the water supply is critical, especially at certain times of the year during key stages of their life cycles. Poor water quantity, volume and flow has the potential to adversely affect the availability and suitability of feeding and roosting sites foe the Upper Nene Valley Gravel Pits SPA/ Ramsar site.

7.14 This impact pathway is discussed, particularly in-combination with residential growth in the wider region.

In Combination Assessment

7.15 It should be noted that due to the small size of the parish and small quantum of development provided by the Little Addington Neighbourhood Plan, most of the impact pathways are considered in combination with other projects and plans. For example, an increase in 16 net new dwellings in isolation would not result in an in isolation recreational pressure linking impact pathway on the Upper Nene Valley Gravel Pits SPA/ Ramsar site. However, when looked at in combination with other projects and plans, the in-combination contribution is likely to be significant. As such, considered in this Habitat Regulation Assessment is the Special Protection Area Mitigation Strategy24 prepared for the Upper Nene Valley Gravel Pits SPA. This strategy was adopted by East Northamptonshire Council on the 21st November 2016, as an addendum to the SPA Supplementary Planning Document (SPD). This places a mitigation charge for any new dwelling within a 3km of the SPA boundary to address possible significant effects of additional residential development to the SPA. Alternatively, individual developments may undertake a bespoke project level Appropriate Assessment and undertake the identified mitigation in agreement with Natural England. However, the existence of this strategy is not taken into account in determining likely significant effects.

7.16 The following impact pathway are considered in isolation:

- Water quality (surface water runoff).

7.17 The following impact pathways are considered in combination:

- Recreational pressure;
- Loss of functionally linked land;
- Water quantity;
- Water quality (treatment of sewage effluent); and,
- Water quantity, level and flow.

8. Likely Significant Effects Screening

Introduction

8.1 When seeking to identify relevant Habitats Sites, consideration has been given primarily to identified impact pathways and the source-pathway-receptor approach, rather than adopting purely a 'zones'-based approach. The source-pathway-receptor approach is a standard tool in environmental assessment. In order for an effect to occur, all three elements of this mechanism must be in place, whereas the absence of one or more of the elements means there is no possibility for an effect. Furthermore, even where an impact is predicted to occur, it may not result in significant effects (i.e., those which undermine the Conservation Objectives of a Habitats Site).

8.2 The likely zone of influence of a plan or project is the geographic extent over which significant ecological effects are likely to occur. It will vary depending on the specifics of a particular proposal and must be determined on a case-by-case basis with reference to a variety of criteria, including the:

- nature, size / scale and location of the plan;
- connectivity between the plan and Habitats Sites, for example through hydrological interactions or the natural movement of qualifying species;
- sensitivity of ecological features under consideration; and,
- potential for in-combination effects.

Approach to Little Addington Neighbourhood Plan Policy Screening

8.3 There are 19 policies within the Little Addington Neighbourhood Plan. Policies were screened out of having likely significant effects on a Habitats Site where any of the following criteria applied:

- they are environmentally positive;
- they will not themselves lead to any development or other change;
- they make provision for change but could have no conceivable negative effect on a Habitats Site. This can be because there is no linking pathway between the policy and the qualifying features of a Habitats Site, or because any effect would be positive;
- they make provision for change but could have no significant effect on a Habitats Site (i.e., the effect would not undermine the Conservation Objectives of a Habitats Site); or

- the effects of a policy on any Habitats Site cannot be ascertained because the policy is too general. For example, a policy may be screened out if, based on absence of detail in the policy, it is not possible to identify where, when, or how the policy may be implemented, where effects may occur, or which sites, if any, may be affected.

8.4 Any 'criteria-based' policy (i.e., those that simply list criteria with which development needs to comply) or other general policy statements that have no spatial element were also screened out. Likewise, policies that simply 'safeguard' an existing resource (e.g., existing green infrastructure or mineral resources) by preventing other incompatible development, were also screened out.

8.5 Therefore, the appraisal focussed on those policies with a definable spatial component. Having established which policies required scrutiny by virtue of being spatially defined, consideration was given as to whether likely significant effects could be dismissed due to a lack of connectivity to any Habitats Site for one of the following reasons:

- a potentially damaging activity may occur because of the policy but there is no reasonable pathway connecting it to a Habitats Site (due to distance, for example);
- there are no Habitats Sites vulnerable to any of the activities that the policy will deliver; or,
- the policy will not result in any damaging activities.

8.6 The results of the likely significant effects screening of policies included in the Neighbourhood Plan are presented below. Where a policy is shaded green, there are no linking impact pathways to Habitats Sites and likely significant effects can be excluded. Where the screening outcome is shaded orange, likely significant effects cannot be excluded, and the policy is screened in for Appropriate Assessment.

Results of Policy Screening

8.7 Of the 19 Neighbourhood Plan policies, three (Policy LA10: Village Hall, Policy LA14: Housing Requirement and Policy LA16: Land east of Irthlingborough Road, Little Addington) are considered to have the potential to result in likely significant effects, either alone or in combination with other plans and projects, as they are associated with impact pathways linking to Habitats Sites. All three policies relate to a mixed-development allocation comprising 20 dwellings and a new village hall east of Irthlingborough Road, Little Addington. Potential linking impact pathways that are taken forward to Appropriate Assessment are: recreational

pressure, loss of functionally linked land, water quality (surface water runoff), water quality (treatment of sewage effluent), and water quantity, volume and flow.

Screening table of the policies included in the Little Addington Neighbourhood Plan

Policy number/title	Policy text	Likely Significant Effects screening assessment
Policy LA1: Local Green Space	The following sites, identified on Map 2 and the Policies Maps of the Neighbourhood Plan, are designated as Local Green Space: 1. The Green 2. Saint Mary the Virgin churchyard, allotments and Top Green 3. The Sheep Fields The determination of development proposals within a Local Green Space will be consistent with national policies for Green Belt.	**No Likely Significant Effects** This is a development management policy relating to Local Green Space. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA1 aims to protect local green space. This is a positive policy. Depending on its location, loss of local green spaces could increase recreational pressures on the SPA/ Ramsar site. This policy provides protection for local green spaces.
Policy LA2: Residential Parking Standards	New two or three-bedroom dwellings shall provide for three off-street parking spaces each. Dwellings having four or more bedrooms should provide four off-street spaces per dwelling. Northamptonshire County Council's Parking Standards will apply to other forms of development.	**No Likely Significant Effects** This is a development management policy relating to parking standards. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA2 does not specify a quantum or location of development.
Policy LA3: The Countryside	The Countryside (land outside the Settlement Boundary as defined on Map 3) will be protected for the sake of its intrinsic character, beauty, heritage and wildlife, the wealth of its natural resources and to ensure it may be enjoyed by all. In Countryside locations only development that is in accordance with national planning policies, strategic planning policies or allocations; or with the other policies of this Neighbourhood Plan will be supported.	**No Likely Significant Effects** This is a development management policy relating to The Countryside. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA3 is designed to protect the countryside including wildlife and natural resources. It does not specify any quantum, location or type of development.

Policy number/title	Policy text	Likely Significant Effects screening assessment
Policy LA4: Locally Important Views	Development should be located and designed in a way that is sensitive to the local landscape. The potential to enhance the landscape should be considered wherever possible. Views of and from the primary landmark of St Mary's Church are to be protected. Particular sensitivity should be shown for the views that are regarded as highly characteristic of the area, as listed below and shown on Maps 3 and 4: 1. View of The Green from Chapel Hill 2. View of The Green from Dovecote Drive 3. View from Top End towards Church Walk 4. Views of the sheep field from Main Street 5. View from footpath MB/004 northeast towards Great Addington 6. View from footpath UM/012 northwest towards Poplars Farm and Burton Latimer beyond 7. View from bridleway MB/005 southwards 8. View from footpath MB/001 looking northwards 9. View from footpath MB/001 looking northwards 10. View from Back Lane/ High Street junction southwards to St Marys Church Major development proposals, and proposals that could affect the primary landmark of St Mary's Church and Locally Important Views should be supported by a Landscape Visual Impact Assessment.	**No Likely Significant Effects** This is a development management policy relating to Locally Important Views. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA4 does not specify a quantum, location or type of development.
Policy LA5: Public Rights of Way Network	Development should protect public Rights of Way and wherever possible create new links to the network including footpaths, bridleways and cycle	**No Likely Significant Effects** This is a development management policy relating to Public Rights of Way Networks Development management policies

Policy number/title	Policy text	Likely Significant Effects screening assessment
	ways. The creation of an off-road cycle/footpath link between Little Addington and The Greenway is supported.	do not present linking impact pathways and can be screened out from Appropriate Assessment. The creation or enhancement of any Public Rights of Way in proximity to the SPA/ Rasar site could result in a linking impact pathway. However, Policy LA5 does not specify a quantum or location of Public Right of Way development.
Policy LA6: Upper Nene Valley Gravel Pits Special Protection Area Mitigation Strategy	For all residential development within the Upper Nene Valley Gravel Pits SPA/Ramsar site 3km buffer zone, as shown in the Local Plan, financial contributions to mitigate the adverse impacts of development upon the SPA/Ramsar site will be sought in accordance with the Addendum to the SPA Supplementary Planning Document: Mitigation Strategy or a later update of the SPD. Consultation with Natural England on residential development proposals may identify a requirement for mitigation measures beyond simply a payment. In such circumstances, and in the case of other types of development potentially resulting in loss of functionally linked habitat to the Upper Nene Valley SPA, a project level Appropriate Assessment will be required to accompany any planning application.	**No Likely Significant Effects** This is a key development management policy which provides for protection of the SPA/ Ramsar site from increased recreational development. It identifies the need for mitigation to ensure an increase in recreational pressure stemming from new residential development does not have an adverse effect on the Upper Nene Valley Gravel Pits Habitats Sites.
Policy LA7: Ecology and Biodiversity	Development should not harm the network of local ecological features and habitats (Map 5). New development should maintain and enhance these and other ecological corridors and landscape features (such as watercourses, hedgerows and tree-lines). New development should secure measurable net gains for biodiversity. The priority	**No Likely Significant Effects** This is a development management policy relating to ecology and biodiversity. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. This is a positive policy. Policy LA7 is designed to protect the local ecological features and habitats associated with the parish

Policy number/title	Policy text	Likely Significant Effects screening assessment
	for biodiversity enhancement is to link the wetland habitat reservoirs through the River Nene corridor. Within the Nene Valley Nature Improvement Area, planning applications should be accompanied by an ecological survey unless the type and location of development is such that the impact on biodiversity will be insignificant.	and the Nene Valley corridor (as identified in Map 5 of the NP).
Policy LA8: Trees and Hedges	Existing trees and hedgerows should be retained where possible and integrated into new developments. Development that damages or results in the loss or deterioration of ancient trees, hedgerows or trees of good (BS 5837 retention categories A and B) arboricultural and amenity value will not be supported. Proposals should be designed to retain ancient trees, hedgerows or trees of arboricultural and amenity value. Proposals should be accompanied by a tree survey that establishes the health and longevity of any affected trees and hedgerows, indicating replanting where appropriate.	**No Likely Significant Effects** This is a development management policy relating to trees and hedgerows. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA8 is designed to protect the local ecology features (trees and hedgerows) and does not provide for any development.
Policy LA9: The Bell Inn	The Bell Inn will be safeguarded in accordance with North Northamptonshire Joint Core Strategy 2011-2031 Policy 7. Development that would make it more difficult to retain the village pub will not be supported.	**No Likely Significant Effects** This is a development management policy relating to the retention of community services and facilities. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA9 does not specify a quantum or location of housing / employment development. This is a positive policy.
Policy LA10: Village Hall	Land for the development of a village hall is allocated east of Irthlingborough Road, Little	**Potential for likely significant effects, screened in for Appropriate Assessment**

Policy number/title	Policy text	Likely Significant Effects screening assessment
	Addington (Map 7). The development shall provide for: A. A village hall of approximately 180sqm comprising a hall, toilets, community room, kitchen and storage. The village hall should be designed and built to maximise energy efficiency and minimise energy and maintenance costs. The design should also have regard to Sport England's guidance notes on village and community halls; B. The village hall shall be located to the south of the site; and C. Car parking and bicycle parking, including electric vehicle charging points.	Policy LA10 specifically allocates land for development east of Irthlingborough Road as part of a mixed-use site that includes 20 dwellings (see Policy LA16). Therefore, this policy has the potential to result in likely significant effects regarding the following impact pathways: • Recreational pressure; • Loss of functionally linked land; • Water quality (surface water runoff); • Water quality (treatment of sewage effluent); and, • Water quantity, volume and flow. Allocation LA16 comprises grazed grassland, with existing residential development on two sides.
Policy LA11: Infrastructure	New development will be supported by the provision of new or improved infrastructure, together with financial contributions for the following off-site infrastructure requirements where appropriate: A. The provision of a new Village Hall; B. Countryside access improvements in accordance with Policy LA5; C. Upper Nene Valley Gravel Pits Special Protection Area Mitigation in accordance with Policy LA6; D. Community infrastructure improvements including the provision of traffic speed reduction measures, parish notice boards, seats, children's play area equipment, litter bins.	**No Likely Significant Effects** This is a development management policy relating to infrastructure. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA11 does not specify a quantum, type or location of development, it merely supports it.

Policy number/title	Policy text	Likely Significant Effects screening assessment
	The level of contributions should not undermine the deliverability of the Neighbourhood Plan.	
Policy LA12: Non-Designated Heritage Assets	Development proposals that will affect the following locally valued heritage assets or their setting will be assessed having regard to the scale of any harm or loss and the significance of the heritage asset: Features of Local Heritage Interest (Map 9): 1. Parliament Row, 1-4 High Street 2. Old School House, High Street 3. The Gables, High Street 4. Telephone call-box and post-box, High Street 5. Rose Cottages, 1-5 Chapel Hill 6. The Old Chapel, Chapel Hill 7. Oakroy, The Green 8. Linden House, The Green 9. The Green 10. The Old Bakery and cottages, Bakehouse Hill Traditional stone walls (Map 9) Ridge and Furrow areas	**No Likely Significant Effects** This is a development management policy relating to Locally Valued Heritage Assets. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA12 does not specify a quantum, type, or location of development.
Policy LA13: Design	To support the creation of high quality, beautiful and sustainable buildings and places, development should reflect the Little Addington Design Guide (Appendix 4). Development that is not well designed will not be supported, especially where it fails to reflect the Little Addington Design Guide and government and local guidance on design.	**No Likely Significant Effects** This is a development management policy relating to design. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA13 does not specify a quantum, type or location of development.
Policy LA14: Housing Requirement	The housing requirement for Little Addington Neighbourhood Area for the period 2021 to 2045 is	**Potential for likely significant effects, screened in for Appropriate Assessment**

Policy number/title	Policy text	Likely Significant Effects screening assessment
	for approximately 11 to 20 dwellings. This will be met by: A. Dwellings built since 2021 (including 11 dwellings at Howards Way) and existing committed developments; B. Infill development in accordance with Policy LA15; and C. The allocation of land east of Irthlingborough Road, Little Addington for the development of approximately 20 dwellings in accordance with Policy LA16.	Policy LA14 specifically allocates a new site for development (beyond that provide by the overarching Local Plan) east of Irthlingborough Road. The allocation is for 20 new dwellings and a village hall. Policy LA14 includes windfall development with an overall expectation of all development in the range of 11 to 20 dwellings in the plan period. Therefore, this policy has the potential to result in likely significant effects regarding the following impact pathways: • Recreational pressure; • Loss of Functionally Linked Land; • Water quality (surface water runoff); • Water quality (treatment of sewage effluent); and, • Water quantity, volume and flow. Allocation LA16 comprises grazed grassland, with existing residential development on two sides.
Policy LA15: Infill	Housing development proposals will be supported within the Settlement Boundary identified on Map 10 provided the other requirements of the Neighbourhood Plan's policies are met.	**No Likely Significant Effects** This is a development management policy relating to infill. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA15 supports development rather than allocate it. It does not specify a quantum or explicit location of housing development.
Policy LA16: Land east of Irthlingborough Road, Little Addington	Approximately 1.1 hectares of land east of Irthlingborough Road, as shown on Map 10, is allocated of for a mixed development comprising housing and a village hall. Development will be supported subject to the following criteria: A. The development shall provide for the construction of a new village hall in accordance	**Potential for likely significant effects, screened in for Appropriate Assessment** Policy LA16 specifically allocates 1.1 hectares for development east of Irthlingborough Road. The allocation is for 20 dwellings and a village hall. Therefore, this policy has the potential to result in likely significant effects regarding the following impact pathways:

Policy number/title	Policy text	Likely Significant Effects screening assessment
	with Policy LA10. The hall is critical to the overall development which would not be supported without it; B. The development shall provide for approximately 20 dwellings with a housing mix in accordance with Policy LA17; C. Affordable housing shall be provided in accordance with the National Planning Policy Framework, Joint Core Strategy and Policy LA18 unless this would make the development unviable; D. Vehicular access should be off Irthlingborough Road with a pedestrian crossing provided to link the site with the rest of the village; E. The residential amenities of adjoining properties are protected; F. A sustainable drainage system with suitable surface water and foul water drainage strategies devised in consultation with the relevant infrastructure bodies; G. A landscaping scheme to provide for: (a) On-site Mandatory Biodiversity Net Gain unless it is not possible to provide this on-site; (b) Other than where necessary to provide for site access, boundary hedgerows to be retained and reinforced or replaced, using native hedgerow species; (c) Woodland screening along the eastern boundary of the site to minimise the impact of the development on the wider landscape; and	• Recreational pressure; • Loss of functionally linked land; • Water quality (surface water runoff); • Water quality (treatment of sewage effluent); and, • Water quantity, volume and flow. Allocation LA16 comprises grazed grassland, with existing residential development on two sides. It is noted that criterion H of this policy provides protection of the Upper Nene Valley Gravel Pits Habitats Sites.

Policy number/title	Policy text	Likely Significant Effects screening assessment
	H. The proposal must demonstrate that there is an adequate solution to mitigate the effects of development on the Upper Nene Valley Gravel Pits SPA to ensure no adverse effects on the integrity of the Habitats Site result prior to any grant of planning permission.	
Policy LA17: Housing Mix	Unless informed by more up to date evidence of housing need, on developments of five or more dwellings, the proportion of market housing that is four or more bedrooms should be at the lower end of the 15-20% range. Wherever practicable, development proposals should also demonstrate how they will contribute to meeting the housing needs of older people.	**No Likely Significant Effects** This is a development management policy relating to housing mix. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA17 does not specify a quantum or location of housing development.
Policy LA18: Affordable Housing	All affordable housing will be subject to conditions, or a planning obligation will be sought, to ensure that when homes are allocated, priority is given to people with a local connection to Little Addington Neighbourhood Area (i.e. including living, working or with close family ties in the Area).	**No Likely Significant Effects** This is a development management policy relating to affordable housing. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA18 does not specify a quantum or location of housing development.
Policy LA19: Working from Home	Insofar as planning permission is required, development that enables home working will be supported if the development: A. Is in keeping with the scale, form and character of its surroundings; B. Does not significantly adversely affect the amenities of residents in the area; and C. Has safe and suitable access to the site for all people.	**No Likely Significant Effects** This is a development management policy that supports working from home. Development management policies do not present linking impact pathways and can be screened out from Appropriate Assessment. Policy LA19 does not specify a quantum, type or location of development.

9. Appropriate Assessment

Introduction

9.1 The law does not prescribe how an Appropriate Assessment should be undertaken or presented but that it must consider all impact pathways that were screened in, whether they are due to policies alone or in-combination with other projects and plans. The law does not require the alone and in-combination effects to be examined separately provided all effects are discussed.

9.2 The three policies that could potentially result in a likely significant effect and require Appropriate Assessment (as determined within Section 8) are:

- Policy LA10: Village Hall
- Policy LA14: Housing Requirement
- Policy LA16: Land east of Irthlingborough Road, Little Addington

9.3 The North Northamptonshire Joint Core Strategy identified a need for 820 dwellings in Rural areas during the plan period. The indicative housing requirement for Little Addington is 11-20 dwellings (to 2031). The Little Addington Neighbourhood Plan identifies one site allocation (Policy LA16 for 20 new dwellings) to fulfil this target and is only responsible for a small portion of growth within the North Northamptonshire Joint Core Strategy. Therefore, it is determined that the Appropriate Assessment focuses on the in-combination impacts with other plans and projects.

9.4 By virtue of the small amount of growth specified for Little Addington (i.e. 20 net new dwellings) and the distance to the closest Habitats Sites (about 0.4km between the Habitats Site and the urban fringe of Little Addington), the main impact pathways of concern to this Habitat Regulation Assessment (water quality, water quantity, volume and flow, recreational pressure and loss of functionally linked habitat) are inherently 'in combination' with all other growth in the North Northamptonshire Joint Core Strategy and neighbouring plans and projects. However, for completeness, the potential impacts of 20 net residential developments within Little Addington Parish in isolation are also assessed with regards to water quality changes relating to surface runoff.

9.5 The impact pathways that could not be screened out in the Likely Significant Effects Test (Chapter 7) identified as being relevant in relation to the Little Addington Neighbourhood Plan are:

- Recreational Pressure;
- Loss of functionally linked land;

- Water quality (surface water runoff);
- Water quality (treatment of sewage effluent); and,
- Water quantity, volume and flow.

Recreational Pressure

9.6 Human activity can affect birds either directly (e.g. by causing them to flee) or indirectly (e.g. by damaging their habitat or reducing their fitness in less obvious ways e.g. stress). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to much subtler behavioural (e.g. alterations in feeding behaviour, avoidance of certain areas and use of sub optimal areas etc.) and physiological changes (e.g. an increase in heart rate). While these are less noticeable, they might result in major population-level changes by altering the balance between immigration/birth and emigration/death[1].

9.7 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding[2]. Disturbance therefore risks increasing energetic expenditure of birds while reducing their energetic intake, which can adversely affect the 'condition' and ultimately survival of the birds. Additionally, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they then must sustain a greater number of birds[3]. Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they, or any nestlings, are to predators. Recreational effects on ground-nesting birds are particularly severe, with many studies concluding that urban sites support lower densities of key species, such as stone curlew and nightjar[4] [5]. Recreation disturbance in winter can be more adverse because birds are more vulnerable at this time of year due to food shortages.

[1] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.
[2] Riddington, R. et al. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. Bird Study 43:269-279
[3] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. RSPB Conservation Review 12: 67-72
[4] Clarke R.T., Liley D., Sharp J.M., Green R.E. 2013. Building development and roads: Implications for the distribution of stone curlews across the Brecks. PLOS ONE. doi:10.1371/journal.pone.0072984.
[5] Liley D., Clarke R.T. 2003. The impact of urban development and human disturbance on the numbers of nightjar Caprimulgus europaeus on heathlands in Dorset, England. Biological Conservation 114: 219-230.

9.8 Evidence in the literature suggests that the magnitude of disturbance clearly differs between different types of recreational activities. For example, dog walking leads to a significantly higher reduction in bird diversity and abundance than hiking[6]. Scientific evidence also suggests that key disturbance parameters, such as areas of influence and flush distance, are significantly greater for dog walkers than hikers[7]. A UK meta-analysis suggests that important spatial (e.g. the area of a site potentially influenced) and temporal (e.g. how often or long an activity is carried out) parameters differ between recreational activities, suggesting that activity type is a factor that should be considered in Habitat Regulation Assessments[8].

9.9 Studies investigated recreational disturbance on the golden plover, one of the key qualifying species that overwinters in the Upper Nene Valley Gravel Pits SPA / Ramsar. One study showed that golden plover actively avoided any areas within 200m of footpaths used by visitors[9]. These results were corroborated in another study, which determined that golden plover responded with major flight to moorland visitors that approached to within 200m[10]. The disturbance effect was more pronounced when chicks were present, with parents spending 11% of the day reacting to people that represented a 15% increase in energy expenditure.

9.10 Disturbance can also result from a wider urbanisation effect that might pose a more direct threat to survival, such as in the case of predation by dogs and cats. Dogs are often exercised off-lead and roam out of sight of their owners and have been documented to kill ground-nesting birds. Cats tend to roam freely at night, potentially seeking out prey many kilometres away from their home.

Discussion

9.11 Following the submission of the draft North Northamptonshire Joint Core Strategy Habitat Regulation Assessment in 2012, Natural England recommended a visitor access survey of the Upper Nene Valley Gravel Pits designated site be undertaken. The Visitor Access Study[11] undertaken in winter 2012 and spring 2013 interviewed 939 individuals. 98% of the interviewees were on a short visit from home. The most common activity

[6] Banks P.B., Bryant J.Y. 2007. Four-legged friend or foe? Dog walking displaces native birds from natural areas. Biology Letters 3: 14pp.
[7] Miller S.G., Knight R.L., Miller C.K. 2001. Wildlife responses to pedestrians and dogs. 29: 124-132.
[8] Weitowitz D., Panter C., Hoskin R., Liley D. The spatio-temporal footprint of key recreation activities in European protected sites. Manuscript in preparation
[9] Finney S.K., Pearce-Higgins J.W. & Yalden D.W. (2005). The effect of recreational disturbance on an upland breeding bird, the golden plover Pluvialis apricaria. Biological Conservation 121: 53-63.
[10] Yalden P.E. & Yalden D.W. (1990). Recreational disturbances of breeding golden plovers Pluvialis apricaria. Biological Conservation 51: 243-262
[11] Footprint Ecology (2014). Visitor Access Study of the Upper Nene Valley Gravel Pits SPA.

undertaken by visitors to the Upper Nene Valley Gravel Pits was dog walking (48% of interviewees) with 636 dogs recorded on site. Walking was the next most common activity (36% of interviewees), followed by bird watching.

9.12 The survey found that the median distance travelled by a visitor from a home postcode to a survey point location within the designated site was 3.2km (mean 5.85km ± 0.31) with 75% of visitors living within 7.5km of the survey point within the designated site. There was no statistically significant seasonal difference between the distances travelled between spring and winter. Following discussions with Natural England, the Joint Planning Unit and following consideration of the Visitor Access Study, it was decided that the zone from which a significant quantum of recreational pressure to the designated sites originated was 3km. As such, it was determined that any new residential development within 3km of the SPA/Ramsar site could result in an in-combination likely significant effects due to of increases in recreational activities within the sites.

9.13 The site allocation Policy LA16: Land east of Irthlingborough Road, Little Addington allocates a total of 20 dwellings and a village hall, is located 570m southwest of the Upper Nene Valley Gravel Pits SPA/Ramsar. Therefore, strategic mitigation measures will be required to prevent recreation pressure resulting in an adverse effect on the integrity upon the Upper Nene Valley Gravel Pits SPA/Ramsar in combination with development provided in surrounding authorities within 3km of the Upper Nene Valley Gravel Pits Habitats Site.

9.14 Paragraph 1.4 of the mitigation strategy Special Protection Area SPD Addendum states that "residential developments which result in a net increase in the number of dwellings within 3km of the SPA it is proposed to avoid and mitigate likely significant effect on the SPA by making a financial contribution towards Strategic Access Management and Monitoring (SAMM) and/or other suitable mitigation". In the Special Protection Area SPD Addendum, the contribution is identified as £269.44 per dwelling but this is indexed linked, as of 1 April 2023 the rate is £363.6236 This value is subject to change. The Special Protection Area SPD Addendum note that large sites situated close to the SPA may need to deliver additional mitigation such as Suitable Alternative Natural Greenspace. However, the site allocated in Policy LA16 will only accommodate 20 dwellings, and as such is not considered to be a large site.

9.15 The delivery of 20 net new dwellings, assuming a typical average occupancy of 2.4 residents per dwelling, would result in 48 new residents. Assuming that these are all people who do not already live within the village (which is a precautionary assumption), it would involve a 15% increase in dwellings and a 17% increase in the population of 290 in the

village. Although this is a significant increase in percentage within the village the absolute numbers involved are insignificant, this development would not materially change the level of recreational pressure on the Upper Nene Valley Gravel Pits Habitats Sites arising from Little Addington village.

9.16 Therefore, although the housing site is located close to the SPA and certainly within easy walking distance, the appropriate financial contributions to the SPD mitigation strategy are likely to be sufficient to conclude no adverse effect on integrity from this development alone or in combination with other projects and plans. It is noted that the SPD also states that "Further mitigation will be in exceptional circumstances and where Natural England advise. If a bespoke process is required, then a project level Appropriate Assessment will be required". This requirement would therefore need to be reflected in Neighbourhood Plan policy to allow for the appropriate application-level assessment as needed.

9.17 In accordance with the Upper Nene Valley Gravel Pits SPA mitigation strategy, it is a requirement that discussion with Natural England is undertaken at the earliest possible stage of planning.

9.18 The Little Addington Neighbourhood Plan does provide mitigation policies for the protection of Habitats Sites:

- Policy LA6: Upper Nene Valley Gravel Pits Special Protection Area Mitigation Strategy
  For all residential development within the Upper Nene Valley Gravel Pits SPA/Ramsar site 3km buffer zone, as shown in the Local Plan, financial contributions to mitigate the adverse impacts of development upon the SPA/Ramsar site will be sought in accordance with the Addendum to the SPA Supplementary Planning Document: Mitigation Strategy or a later update of the SPD.

  Consultation with Natural England on residential development proposals may identify a requirement for mitigation measures beyond simply a payment. In such circumstances, and in the case of other types of development potentially resulting in loss of functionally linked habitat to the Upper Nene Valley SPA, a project level Appropriate Assessment will be required to accompany any planning application.

- Policy LA7: Ecology and Biodiversity
  Development should not harm the network of local ecological features and habitats (Map 5).

  New development should maintain and enhance these and other ecological corridors and landscape features (such as watercourses, hedgerows and tree-lines). New development should secure measurable net gains for biodiversity. The priority for biodiversity enhancement is to link the wetland habitat reservoirs through the River Nene corridor.

Within the Nene Valley Nature Improvement Area, planning applications should be accompanied by an ecological survey unless the type and location of development is such that the impact on biodiversity will be insignificant.

- Policy LA16: Land east of Irthlingborough Road, Little Addington (Criterion H):
  The proposal must demonstrate that there is an adequate solution to mitigate the effects of development on the Upper Nene Valley Gravel Pits SPA to ensure no adverse effects on the integrity of the Habitats Site result prior to any grant of planning permission.

9.19 it is considered that the overall avoidance measures provided by the Little Addington Parish Neighbourhood Plan, the overarching Development Plan documents and the strategic Upper Nene Valley Gravel Pits SPA Supplementary Planning Document will provide sufficient policy framework to ensure that no adverse effects on integrity arise alone or in combination with growth across the relevant parts of East Northamptonshire or elsewhere within the recreation 3km zone of influence.

Loss of Functionally Linked Land

9.20 While most Habitats Sites have been geographically defined to encompass the key features that are necessary for coherence of their structure and function, and the support of their qualifying features, this is not necessarily the case. A diverse array of qualifying species including birds, bats and amphibians are not always confined to the boundary of designated sites. For example, the highly mobile nature of both wader and waterfowl species implies that areas of habitat of crucial importance to the integrity of their populations lie outside the physical limits of Habitats Sites. Despite not being part of the formal designation, these habitats are integral to the maintenance of the structure and function of the designated site, for example by encompassing important foraging grounds. Therefore, land use plans that may affect such functionally linked habitat require further assessment.

9.21 There is now an abundance of authoritative examples of Habitat Regulation Assessment cases on plans affecting bird populations, where Natural England recognised the potential importance of functionally linked land[12].

9.22 The identification of an area as functionally linked habitat is not always a straightforward process. The importance of non-designated land parcels

[12] Chapman C & Tyldesley D. 2016. Functional linkage: How areas that are functionally linked to European sites have been considered when they may be affected by plans and projects – A review of authoritative decisions. Natural England Commissioned Reports 207. 73pp

may not be apparent and thus might require the analysis of existing data sources (e.g. Bird Atlases or data from records centres) to be firmly established. In some instances, data may not be available at all, requiring further survey work.

Discussion

9.23 The Upper Nene Valley Gravel Pits Habitats Site is partially designated for bittern, golden plover and gadwall as well as an important bird assemblage including wigeon and lapwing. Of these species the most likely to utilise land outside of the site include golden plover, wigeon and lapwing as indicated in the Supplementary Advice on the Conservation Objectives. These species utilise arable farmland during the winter for foraging, with golden plover utilising farmland up to 10km from their roosting sites (e.g. the SPA). Areas of arable land within 10km of the site SPA and Ramsar could potentially be utilised as functionally linked land for one or more of the SPA and Ramsar species.

9.24 The East Northamptonshire LP Habitat Regulation Assessment (2021) concluded that a precautionary distance of 10km around the SPA defined the extent to which functionally linked land associated with the SPA could be found.

9.25 The single site allocation (Policy LA16: Land east of Irthlingborough Road, Little Addington) is an area of grazed grassland that is potentially suitable for breeding lapwing and golden plover, however the SPA designation is for wintering (non-breeding) birds of these species.

9.26 Both lapwing and golden plover are known to forage in farmland habitats, including open permanent grassland and large arable fields with open boundaries, especially where manure has been applied. They often return to the same fields year after year. Golden plover often feed alongside lapwings. Earthworms form a major part of the winter diet of both species. However, they prefer tilled soil.[13]

9.27 However, allocation LA16 is highly unlikely to provide functionally linked land. It is approximately 1.1 ha in size. Sites of < 2ha in size are less likely to provide sufficient functionally linked habitat to regularly support more than 1% of the population of a qualifying bird species. The Upper Nene Valley Gravel Pits SPA Supplementary Planning Document states that undeveloped farmland sites (2 ha or larger) could provide functionally linked land to support designated features. The site allocated LA16 is 1.1ha which is below the threshold documented in the SPD. The land parcel is located on the edge of the village, to the west of Little Addington. The land

[13] Illustrated guide to managing farmland for lapwings (TIN090) Available at https://publications.naturalengland.org.uk/file/92021 [Accessed 10/04/24]

parcel is also located within a semi-disturbed setting, surrounded on two sides by residential development and the Irthlingborough Road. There are many other arable fields in the area which surround Little Addington for 2-3km in all directions and more closely meet the requirements of foraging habitats for golden plover and lapwing. All these factors confirm that the site would not be used as functionally linked land for designated bird features.

9.28 Other windfall development that is bought forward is likely to be within the urban envelope (and thus subject to high levels of existing disturbance) or in the vicinity of existing disturbance associated with farm yard activities, and thus making the land parcels unsuitable for functionally linked land. Nonetheless, any development bought forward would have to be in accordance with Policy LA6: Upper Nene Valley Gravel Pits Special Protection Area Mitigation Strategy and the overarching North Northamptonshire Joint Core Strategy, both of which provide a suitable projective framework.

9.29 It is considered that a sufficient policy framework exists to ensure that no adverse effects on integrity arise alone in relation to loss of functionally linked land will arise.

Water Quality: discharge of treated sewage effluent

9.30 Sewage and some industrial effluent discharges contribute to increased nutrients in the Habitats Sites and most importantly to elevated phosphate levels in watercourses. Phosphorus is the primary limiting nutrient in surface waters such as lakes, reservoirs and rivers, and excessive concentrations might lead to undesirable shifts in ecological communities such as dominance of the phytoplankton by cyanobacteria.

9.31 The quality of the water that feeds Habitats Sites is an important nature determinant of their habitats and the species they support. Rivers, streams and aquatic environments supported/that are fed by these sites can be affected by pollution from road run-off such as oil/ vehicle chemicals, and in the winter increased salt from de-icing the roads and pollution incident(s), and increased run-off from a specific land parcel (such as a site allocation).

9.32 Poor water quality can have a range of environmental impacts. At high levels, toxic chemicals and metals can result in the immediate death of aquatic life. At lower levels, detrimental effects can also be experienced, including increased vulnerability to disease and changes in wildlife behaviour.

9.33 Dabbling ducks such as gadwall, for which the Upper Nene Valley Gravel Pits SPA / Ramsar is designated, mainly feed on submerged macrophytes and these, largely being shaped by phosphate levels, are susceptible to the influx of sewage effluent. Freshwater bodies are therefore particularly prone to eutrophication, which involves excessive algal growth and concomitant deoxygenation of the water. Overall, sewage pollutants, and especially phosphorus levels, have the potential to affect the food sources of gadwall.

Discussion

9.34 Increased housing development at Little Addington would likely lead to increased sewage production. Sewage effluent from residential development in Little Addington is treated by Little Addington Sewage Treatment Works (STW) operated by Anglian Water.

9.35 Little Addington STW discharges processed effluent into the River Nene Navigation, which is very likely to be connected to the gravel pits that constitute the SPA and Ramsar site. However, this connection will be through groundwater which significantly limits the ability of phosphate discharged to surface watercourse to influence surface water phosphate concentrations in the gravel pits due to percolation through the intervening soils. It is important to ensure that the treatment plant operates within its Environment Agency (EA) discharge consent in order to meet the water quality objectives set out in the Water Framework Directive (WFD) and to ensure that no adverse effects on the integrity to the Upper Nene Valley Gravel Pits Habitats Site results. As identified in Natural England's Site Conservation Objective Supplementary Advice for the SPA / Ramsar, this will ensure that the site integrity of the Upper Nene Valley Gravel Pits SPA / Ramsar remains protected.

9.36 Little Addington Neighbourhood Plan Policy LA7: Ecology and Biodiversity states that "Development should not harm the network of local ecological features and habitats (Map 5)" which includes the Upper Nene Valley Gravel Pits SPA and Ramsar, and the Nene Valley Nature Improvement Area (NVNIA) surrounding the Habitats Site. The policy requires additional ecological assessments for developments within the Nene Valley Nature Improvement Area.

9.37 Little Addington Neighbourhood Plan LA16: Land east of Irthlingborough Road, Little Addington includes the requirement of development that "A sustainable drainage system, with suitable surface water and foul water drainage strategies devised in consultation with the relevant infrastructure bodies" is in place.

9.38 Further, the overarching North Northamptonshire Joint Core Strategy includes supporting text that states in paragraph 4.28 "… In relation to water quality it is important that development does not go ahead unless the required sewage and water infrastructure is in place to accommodate the required sewage to ensure that there will not be locally significant effects or adverse effects on Natura 2000 sites. In North Northamptonshire, this relates to the Upper Nene Valley Gravel Pits SPA". The North Northamptonshire Joint Core Strategy Policy 10 – Provision of Infrastructure states "Development must be supported by the timely delivery of infrastructure, services and facilities necessary to meet the needs arising from the development".

9.39 With the current policy wording it is considered that the overall policy framework provided by the Little Addington Neighbourhood Plan and overarching development plan documents will provide sufficient policy framework to ensure that no adverse effects on the integrity of the Upper Nene Valley Gravel Pits Habitats Sites arise alone or in combination with growth from the discharge of treated sewage effluent or from surface water runoff.

Water Quantity, Volume and Flow (including runoff)

9.40 North Northamptonshire (within which the Little Addington Neighbourhood Area is located) lies within Anglian Water's Ruthamford South Water Resource Zone (WRZ). The Ruthamford South WRZ is supplied from surface water, with a direct abstraction on the River Great Ouse going to Grafham Water reservoir. There is also a small groundwater contribution from the abstraction in the Woburn Sands aquifer. The Upper Nene Valley Gravel Pits is not located within the River Ouse water catchment area, but within the Nene River water catchment, so does not provide for a linking pathway. In addition, the Habitat Regulation Assessment of the Anglian Water Revised Draft Water Resource Management Plan does not identify impacts relating to water resources impacting the Upper Nene Valley Gravel Pits designated site. Since the WRMP is based on robust population projections and forecasts to 2050 it can be concluded that the Great Addington Neighbourhood Plan (which runs to 2045) will not result in likely significant effects on any Habitats Sites in relation to increased water demand, either alone or 'in-combination'.

Discussion

9.41 The site allocation is located 0.57km from the Habitats Site and there are no direct water runoff linkages to the Habitats Site from the site allocation. This impact pathway is screened out from resulting in an adverse effect on the integrity of any Habitats Sites.

In-combination Assessment

9.42 The Appropriate Assessment of the Little Addington Neighbourhood Plan is inherently undertaken in-combination with other plans and projects. By its nature, the evidence that underpins the assessments of water quality and quantity, and recreational pressure impacts (and the mitigation that addresses any potential impacts) is in-combination. Furthermore, the contribution of the Little Addington Neighbourhood Plan to development is marginal compared to the growth allocated in overarching Local Plans, such that any negative environmental impacts arise primarily in-combination.

9.43 It has already been concluded that allocation Policy LA16 does not constitute functionally linked land. Any windfall development that is bought forward will be delivered in accordance with both Little Addington Neighbourhood Plan policy and that of the North Northamptonshire authority within which the Parish is located which provides the following policy: Policy 20 – The Nene and Ise Valleys: "Proposals should ensure the integrity of European designated sites such as the Upper Nene Valley Gravel Pits SPA are protected"

9.44 It can be considered that the overall protective policy framework provided by the Little Addington Neighbourhood Plan and overarching North Northamptonshire Joint Core Strategy and associated development plan documents provide sufficient policy framework to ensure that no adverse effects on the integrity of the Upper Nene Valley Gravel Pits Habitats Sites will arise "in combination".

10. Conclusion

10.1 The Little Addington Neighbourhood Plan has a total of 19 policies. Of these policies three have the potential to cause a likely significant effect and were discussed with regards to their impacts on Habitats Sites within the Appropriate Assessment. These policies were:

- Policy LA10: Village Hall
- Policy LA14: Housing Requirement
- Policy LA16: Land east of Irthlingborough Road, Little Addington

10.2 These policies were discussed relating to Upper Nene Valley Gravel Pits SPA / Ramsar sites and the Little Addington Neighbourhood Plans impact to those sites regarding the following impact pathways:

- Recreational pressure;
- Loss of functionally linked land;
- Water quality (surface water runoff);
- Water quality (treatment of sewage effluent); and,
- Water quantity, volume and flow.

10.3 It is considered that the current policy wording provided by the Little Addington Neighbourhood Plan (and overarching development plan documents) will provide sufficient policy framework to ensure that no adverse effects on the integrity of the Upper Nene Valley Gravel Pits SPA/Ramsar will arise in isolation or in combination for:

- Recreational Pressure,
- Loss of functionally linked land (alone),
- Water quality (surface water runoff), and
- Water quality (treatment of sewage effluent).

Appendix A: Background to Impact Pathways

Recreational Pressure

There is growing concern over the cumulative impacts of recreation on key nature conservation sites in the UK, as most sites must fulfil Conservation Objectives while also providing recreational opportunity. Various research reports have provided compelling links between changes in housing and access levels and impacts on Habitats protected sites.[14] [15].

Recreational use of a site has the potential to:

- Cause disturbance to sensitive species such as wintering wildfowl;
- Prevent appropriate management or exacerbate existing management difficulties;
- Cause damage through erosion, trampling and fragmentation; and
- Cause eutrophication as a result of dog fouling.

Different types of Habitats Sites (e.g., coastal, heathland, chalk grassland) have varying vulnerabilities and are sensitive to different types of recreational pressures. Studies across a range of species have shown that the effects from recreation can be complex.

Bird Disturbance

Disturbance effects can have negative impacts on qualifying birds in various ways, with reduced chick provisioning and increased nest predation as a result of adults being flushed from the nest and deterred from returning to it by the presence of people and dogs likely to be a particular problem. A literature review on the effects of human disturbance on breeding birds found that 36 out of 40 studies reported reduced breeding success as a consequence of disturbance[16]. The main reasons given for the reduction in breeding success were nest abandonment and increased predation of eggs or young. Studies of other species have shown that birds nest at lower densities in disturbed areas, particularly when there is weekday as well as weekend pressure[17].

[14] Liley D, Clarke R.T., Mallord J.W., Bullock J.M. 2006a. The effect of urban development and human disturbance on the distribution and abundance of nightjars on the Thames Basin and Dorset Heaths. Natural England / Footprint Ecology.
[15] Liley D., Clarke R.T., Underhill-Day J., Tyldesley D.T. 2006b. Evidence to support the appropriate Assessment of development plans and projects in south-east Dorset. Footprint Ecology / Dorset County Council.
[16] Hockin, D., M. Oundsted, M. Gorman, D. Hill, V. Keller and M.A. Barker (1992) – Examination of the effects of disturbance on birds with reference to its importance in ecological assessments. Journal of Environmental Management, 36, 253-286.
[17] Van der Zande, A.N., J.C. Berkhuizen, H.C. van Letesteijn, W.J. ter Keurs and A.J. Poppelaars (1984) – Impact of outdoor recreation on the density of a number of breeding bird species in woods adjacent to urban residential areas. Biological Conservation, 30, 1-39.

Studies have shown that birds are more significantly affected by dog walkers than by people alone, with birds flushing more frequently, at greater distances and for longer (Underhill-Day, 2005). In addition, dogs, rather than people, tend to be the cause of many management difficulties, notably by worrying grazing animals, and can cause eutrophication near paths. Nutrient-poor habitats are particularly sensitive to the fertilising effect of inputs of phosphates, nitrogen and potassium from dog faeces[18].

Underhill-Day (2005) summarises the results of visitor studies that have collected data on the use of semi-natural habitat by dogs. In surveys where 100 observations or more were reported, the mean percentage of visitors who were accompanied by dogs was 54.0%.

A study of bird disturbance in North Kent was undertaken in 2010/2011 by Footprint Ecology[19]. It focused on recreational pressure on wintering waterfowl on intertidal habitats along the North Kent shoreline, stretching between Gravesend and Whitstable and encompassing the following three SPAs: the Thames Estuary and Marshes SPA, Medway Estuary and Marshes SPA and Swale SPA. From 1,400 events (records of visitors in the bird survey areas) occurring within 200m of the birds, 3,248 species-specific observations were noted of which:

- 74% resulted in no response.
- 13% resulted in a major flight.
- 5% resulted in a short flight.
- 5% resulted in a short walk.
- 3% resulted in an alert.

Dog walking accounted for 55% of all major flight observations with a further 15% attributed to walkers without dogs. After controlling for distance, major flights were more likely to occur when activities took place on the intertidal zone (compared to events on the water or events on the shore), when dogs were present and a higher number of dogs were present in visitor groups.

There were significant differences between species with curlew Numenius arquata the species with the highest probability of major flight and teal and black-tailed godwit Limosa limosa the lowest. Tide state was also significant with major flights more likely at high tide, after controlling for distance. There was a significant interaction between distance and tide, indicating that the way in which birds responded varied according to tide.

[18] Shaw, P.J.A., K. Lankey and S.A. Hollingham (1995) – Impacts of trampling and dog fouling on vegetation and soil conditions on Headley Heath. The London Naturalist, 74, 77-82.
[19] D. Liley & H. Fearnley (Footprint Ecology), 2011. Bird Disturbance Study North Kent.

However, bird disturbance studies need to be treated with care. For instance, the magnitude of disturbance is not necessarily correlated with the impact of disturbance, i.e., the most easily disturbed species are not necessarily those that will suffer the greatest impacts. For example, it has been shown that, in some cases, the most easily disturbed birds simply move to other feeding sites, whilst others may remain (possibly due to an absence of alternative sites) and thus suffer greater population-level impacts[20]. A recent literature review undertaken for the RSPB[21] also urges caution when extrapolating the results of disturbance studies because responses differ between species and may be impacted by local environmental conditions. These facts must be taken into account when attempting to predict the impacts of future recreational pressure on international sites.

It should be emphasised that recreational use is not necessarily a problem. Many Habitats Sites are also National Nature Reserves or nature reserves managed by Wildlife Trusts and the RSPB. At these sites, access is encouraged and resources are available to ensure that recreational use is managed appropriately.

Where increased recreational use is predicted to increase pressure and cause adverse impacts on a site, avoidance and mitigation should be considered. Avoidance of recreational impacts at Habitats Sites involves locating new development away from such sites; Local Plans and other strategic plans, including NPs, provide the mechanism for this. Where avoidance is not possible, mitigation will usually involve a mix of access management, habitat management and provision of alternative recreational space.

Background to Loss of Functionally Linked Habitat

While most Habitats Sites have been geographically defined to encompass the key features that are necessary for coherence of their structure and function, and the support of their qualifying features, this is not always the case. A diverse array of qualifying species including birds, bats and amphibians are not confined to the boundary of designated sites.

For example, the highly mobile nature of both wildfowl and heathland birds implies that areas of habitat of crucial importance to the maintenance of their populations are outside the physical limits of Habitats Sites. Despite not being part of the formal designation, this habitat is still integral to the maintenance of the structure and function of bird populations in the designated site and, therefore, land use plans that may affect such areas should be subject to further assessment. This has been underlined by a recent European Court of Justice

[20] Gill et al. (2001) - Why behavioural responses may not reflect the population consequences of human disturbance. Biological Conservation, 97, 265-268
[21] Woodfield & Langston (2004) - Literature review on the impact on bird population of disturbance due to human access on foot. RSPB research report No. 9.

ruling (C-461/17, known as the Holohan ruling[22]) which in paragraphs 37 to 40 confirms the need for an Appropriate Assessment to consider the implications of a plan or project on habitats and species outside the Habitats Site boundary, provided that those implications are liable to affect the Conservation Objectives of the site.

Regarding birds, functionally linked habitats typically provide habitat for foraging or other ecological functions essential for the maintenance of the designated population e.g., high-tide roosts for coastal waders and waterfowl. Functionally linked habitats may extend up to the maximum foraging distances established for relevant bird species. However, the number of birds foraging will tend to decrease further away from the protected site and thus the importance of the land to the maintenance of the designated population will decrease.

Natural England's Impact Risk Zones (IRZs)[23] identify the core foraging distances that wintering birds will travel from their SPAs / Ramsars and the guidance that underlies those zones will be utilised in this Habitat Regulation Assessment. The relevant

Natural England's Impact Risk Zones (IRZs) for different groups of designated bird species are shown below:

Assemblage	Impact Risk Zone (IRZ, based on core foraging distance)
Wintering birds (except wintering waders and grazing wildfowl; wigeon and geese)	Up to 500m
Dabbling ducks such as teal, mallard and gadwall	Home ranges could extend beyond site boundaries at coastal sites, but less likely to do so at inland water bodies.
Wintering waders (except golden plover and lapwing), brent goose & wigeon	Maximum foraging distance is 2km
Wintering lapwing and golden plover	Maximum foraging distance is 15-20km. Golden plover can forage up to 15km from a roost site within a protected site. Lapwing can also forage similar distances. Both species use lowland farmland in winter and it is difficult to distinguish between designated populations and those present within the wider environment. Developments affecting functionally linked land more than 10km from the site are unlikely to impact significantly on designated populations.

[22] The Holohan ruling also requires all the interest features of the European sites discussed to be catalogued (i.e., listed) in the HRA.
[23] Knight M. (2019). Impact Risk Zones Guidance Summary – Sites of Special Scientific Interest Notified for Birds. Version 1.1. 8pp.

Wintering white-fronted goose, greylag goose, Bewick's swan, whooper swan, pink-footed goose & wintering bean goose	Maximum foraging distance is 10km although studies have shown that pink-footed geese will fly 20km from their roosting site to feed. A bespoke functional land IRZ has replaced the individual Birds 6/7 IRZs for sites supporting the following goose and swan species: pink-footed geese, barnacle goose, Bewick's swan, white-fronted goose and whooper swan. The IRZ is based on GIS distribution records of feeding pink-footed geese from a study undertaken for Natural England by the Wildfowl & Wetlands Trust52 and the results of work undertaken by the British Trust for Ornithology to identify functionally connected habitat used by barnacle goose, Bewick's swan, white-fronted goose and whooper swan based on WeBS site and BirdTrack data and focuses on only the areas of land that we know are being used as functional habitat by designated populations

The guidance document further identifies that for SSSIs designated for wintering waterfowl and waders (other than golden plover and lapwing) a maximum of 2km is appropriate for the identification of potential functionally linked habitat, with the exception of wind energy (3km) and airports (10km).

There is now an abundance of authoritative examples of HRA cases on plans affecting bird populations, where Natural England recognised the potential importance of functionally linked land[24].

Generally, the identification of an area as functionally linked habitat is now a relatively straightforward process and it is reasonable to assume that a site <2 ha in size is unlikely to support a large enough population of birds (taking sightlines etc. into account) to constitute 1% of an SPA population. However, the importance of non-designated land parcels may not be immediately apparent and could require the analysis of existing data sources to be firmly established. In some instances, data may not be available at all, requiring further survey work.

Background to Water Quality

Increased amounts of housing or business development can lead to reduced water quality of rivers and estuarine environments. Sewage and industrial effluent discharges can contribute to increased nutrients and toxic contaminants in Habitats Sites leading to unfavourable conditions.

[24] Chapman C & Tyldesley D. 2016. Functional linkage: How areas that are functionally linked to European sites have been considered when they may be affected by plans and projects – A review of authoritative decisions. Natural England Commissioned Reports 207: 73pp.

The quality of the water that feeds Habitats Sites is an important determinant of the nature of their habitats and the species they support. Poor water quality can have a range of environmental impacts:

- At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour. Eutrophication, the enrichment of plant nutrients in water, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.
- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.
- For sewage treatment works close to capacity, further development may increase the risk of effluent escape into aquatic environments. In many urban areas, sewage treatment and surface water drainage systems are combined, and therefore a predicted increase in flood and storm events could increase pollution risk.

Background to Water Quantity, Volume and Flow (including runoff)

The unique nature of wetlands combines shallow water, high levels of nutrients and high primary productivity. These conditions are ideal for the growth of organisms at the basal level of food webs, which feed many species of birds, mammals, fish and amphibians. Overwintering and migrating wetland bird species are particularly reliant on these food sources, as they need to build up enough nutritional reserves to sustain their long migration routes.

Maintaining a steady water supply is of critical importance for many hydrologically dependent SPAs, SACs and Ramsars. For example, in many wetlands winter flooding is essential for sustaining a variety of foraging habitats for SPA / Ramsar wader and waterbird species. However, different species vary in their requirements for specific water levels. Splash and / or shallow flooding is required to provide suitable feeding areas and roosting sites for ducks and waders. In contrast, deeper flooding is essential to provide foraging habitats for Bewick's swans and other ducks.

Wetland habitats (and thus the fauna they support) rely on hydrological connections with other surface waters, such as rivers, streams and lakes. A constant supply of water is fundamental to maintaining the ecological integrity of

sites. However, while the natural fluctuation of water levels within narrow limits is desirable, excess or too little water supply might cause the water level to be outside of the required range of qualifying birds, invertebrate or plant species. This might lead to the loss of the structure and functioning of wetland habitats. There are two mechanisms through which urban development might negatively affect the water level in Habitats Sites:

- The supply of new housing with potable water will require increased abstraction of water from surface water and groundwater bodies. Depending on the level of water stress in the geographic region, this may reduce the water levels in Habitats Sites sharing the same catchment.
- The proliferation of impermeable surfaces in urban areas increases the volume and speed of surface water runoff. As traditional drainage systems often cannot cope with the volume of stormwater, sewer overflows are designed to discharge excess water directly into watercourses. Often this pluvial flooding results in downstream inundation of watercourses and the potential flooding of wetland habitats.