

**Air quality mitigation plan for the impact on
St Neots Common SSSI
of two potential residential development sites**

Final report

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1. Introduction

Cambridge Environmental Research Consultants Ltd was commissioned by Robinson & Hall to put together an air quality mitigation plan for two potential residential development sites: Flints Field ¹; and Top Homes Field ², submitted as part of the 2020 ‘Call for Sites’ for Bedford Borough Council’s Local Plan.

Natural England have found that both potential development sites trigger the Impact Risk Zone (IRZ) for St Neots Common, which is designated as a Site of Special Scientific Interest (SSSI). Natural England have expressed the need for a mitigation plan detailing how certain activities will limit impact on the air quality sensitivities of the SSSI.

The two development sites are:

- Flints Field: Land to the west of the A1, Duloe way, north of Dennybrook
- Top Homes Field: Land to the south of Duloe (west of A1), north-east edge of Dennybrook

Each of the sites would comprise 400-450 residential dwellings, and they are adjacent to the boundary with Huntingdonshire District Council.

The air quality standards relevant to the SSSI are presented in Section 3. A description of the location and data on the existing air quality in the local area is provided in Section 4.

Section 5 looks at the potential sources of emissions to air resulting from the two developments and their likely impact on sensitive habitats at St Neots Common SSSI. Section 6 summarises the potential for cumulative and in-combination effects.

Finally, the conclusions of the assessment are presented in Section 7, in the form of a mitigation plan based on the findings of the assessment.

¹ Call for Sites form <https://bedford.oc2.uk/form/930>

² Call for Sites form <https://bedford.oc2.uk/form/931>

2. Air quality standards

Critical levels for the protection of vegetation and ecosystems, as set out in the Environment Agency’s guidance for environmental permits, are summarised in Table 3.1.

These are applicable at Sites of Special Scientific Interests (SSSIs)³, such as St Neots Common. For this specific site, the less stringent of the two SO₂ and NH₃ critical levels is appropriate, as sensitive lichen and bryophyte communities are not present, according to the Air Pollution Information System (APIS) web site⁴.

A residential development is highly unlikely to have any impact on levels of hydrogen fluoride, but this pollutant is included for completeness.

Table 3.1: Critical levels for the Protection of Vegetation and Ecosystems ($\mu\text{g}/\text{m}^3$)

Pollutant	Critical Level	Comment
sulphur dioxide SO ₂	10	annual mean (for lichens and bryophytes)
	20	annual mean (for all higher plants)
nitrogen oxides NO _x	30	annual mean
	75	daily mean
ammonia NH ₂	1	annual mean (for lichens and bryophytes)
	3	annual mean (for all higher plants)
hydrogen fluoride HF	0.5	weekly mean
	5	daily mean

Site-dependent critical loads, against which nitrogen and acid deposition rates are assessed, are presented in Section 4.5.

³ Declared by the statutory country conservation agencies, which have a duty under the Wildlife and Countryside Act 1981

⁴ <http://www.apis.ac.uk/>

3. Site location and baseline air quality

3.1. Site location

The potential residential development sites are located adjacent to the boundary between Bedford Borough Council and Huntingdonshire District Council administrative areas, to the west of St Neots. St Neots Common Site of Special Scientific Interest (SSSI) is located around 800 m to the east of the Flints Field site. These locations are shown on Figure 4.1.

This map also shows the St Neots Air Quality Management Area (AQMA), which is further discussed in Section 4.2.

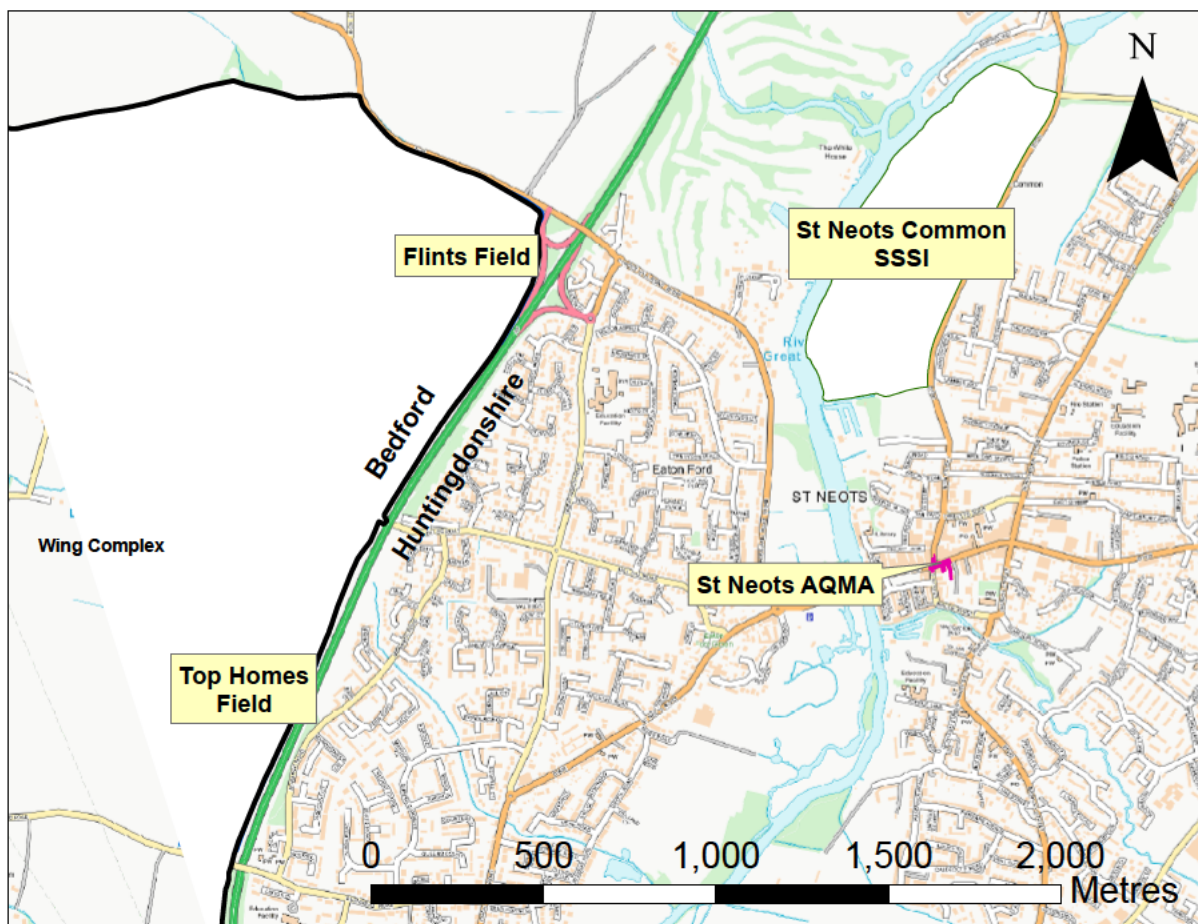


Figure 4.1: Location of the potential residential development sites, SSSI and AQMA

3.2. Air Quality Management Areas

The Local Air Quality Management (LAQM) process, as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality limit values are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the limit values.

Huntingdonshire District Council has declared four AQMAs, the nearest of which is in St Neots town centre, over 1 km east of the potential development sites and 500 m south of the St Neots Common SSSI, as shown on Figure 4.2. The other three are more than 10 km away.

The St Neots AQMA has been proposed for revocation and Defra have expressed their support of this proposal. Following a number of years meeting the objectives, and completion of a detailed modelling assessment⁵, Huntingdonshire District Council can demonstrate that the air quality objectives are being achieved within the designated area.

Bedford Borough Council has declared one AQMA, in Bedford Town Centre, 12 km to the south west.

3.3. Air quality monitoring

The nearest monitoring stations in Bedford Borough Council are in Wyboston, about 3 km to the south of St Neots.

Huntingdonshire District Council carries out air quality monitoring in St Neots at eleven diffusion tube sites, which provide monthly measurements of NO₂ concentrations.

A summary of the sites is presented in Table 4.1. The measured annual average NO₂ concentrations for the five years 2015 to 2019 are presented in Table 4.2. All data were taken from Huntingdonshire District Council's Air Quality Annual Status Report, 2019.

There are no monitored exceedences of the annual average NO₂ air quality standard of 40 µg/m³ at any of the diffusion tubes. Eight of the eleven sites, those closest to the proposed development sites and SSSI, are shown on Figure 4.2. Of these monitoring sites, St Neots 4, an urban background site, is likely to give the best estimate of NO₂ concentration at St Neots Common.

It is worth noting that the critical level applicable at the SSSI is for total nitrogen oxides (NO_x) rather than just NO₂. However, diffusion tubes do not monitor NO_x; Sections 4.4 and 4.5 provide information regarding the likely NO_x concentrations at St Neots Common.

⁵ <https://www.huntingdonshire.gov.uk/media/3245/st-neots-air-quality-modelling-report.pdf>

Table 4.1: Summary of monitoring sites in St Neots

Site name	Location	Site type	In AQMA?	x,y
St Neots 1	The Paddocks	Kerbside	No	517869, 260132
St Neots 2	18 Cromwell Gardens	Roadside	No	519541, 260280
St Neots 3	71 Avenue Road	Urban background	No	518925, 260503
St Neots 4	20 Harland Road	Urban background	No	518489, 260871
St Neots 5	8-10 High Street (PO)	Kerbside	Yes	518323, 260263
St Neots 6	35 High Street (traffic lights)	Kerbside	Yes	518433, 260321
St Neots 7	17 Arundel Crescent	Suburban	No	518424, 258556
St Neots 8	122 Lindisfarne Close	Suburban	No	518707, 258260
St Neots 9	5 Duchess Close	Suburban	No	516370, 259514
St Neots 10	81 Great North Road	Roadside	No	516921, 258382
St Neots 11	119 Cambridge Road	Roadside	No	519925, 260291

Table 4.2: Monitored annual average NO₂ concentrations (µg/m³)

ID	2015	2016	2017	2018	2019
St Neots 1	20.5	22.1	21.6	17.5	18.1
St Neots 2	-	-	20.3	20.7	21.4
St Neots 3	16.6	18.3	16.9	15.0	15.8
St Neots 4	14.3	16.8	15.4	13.9	14.7
St Neots 5	31.7	31.3	31.2	28.7	28.8
St Neots 6	28.7	29.6	29.9	28.4	29.0
St Neots 7	19.9	20.5	19.9	17.4	18.7
St Neots 8	-	-	20.1	18.8	19.9
St Neots 9	24.5	28.4	28.1	22.4	23.0
St Neots 10	-	-	-	-	24.7
St Neots 11	-	-	-	-	18.7

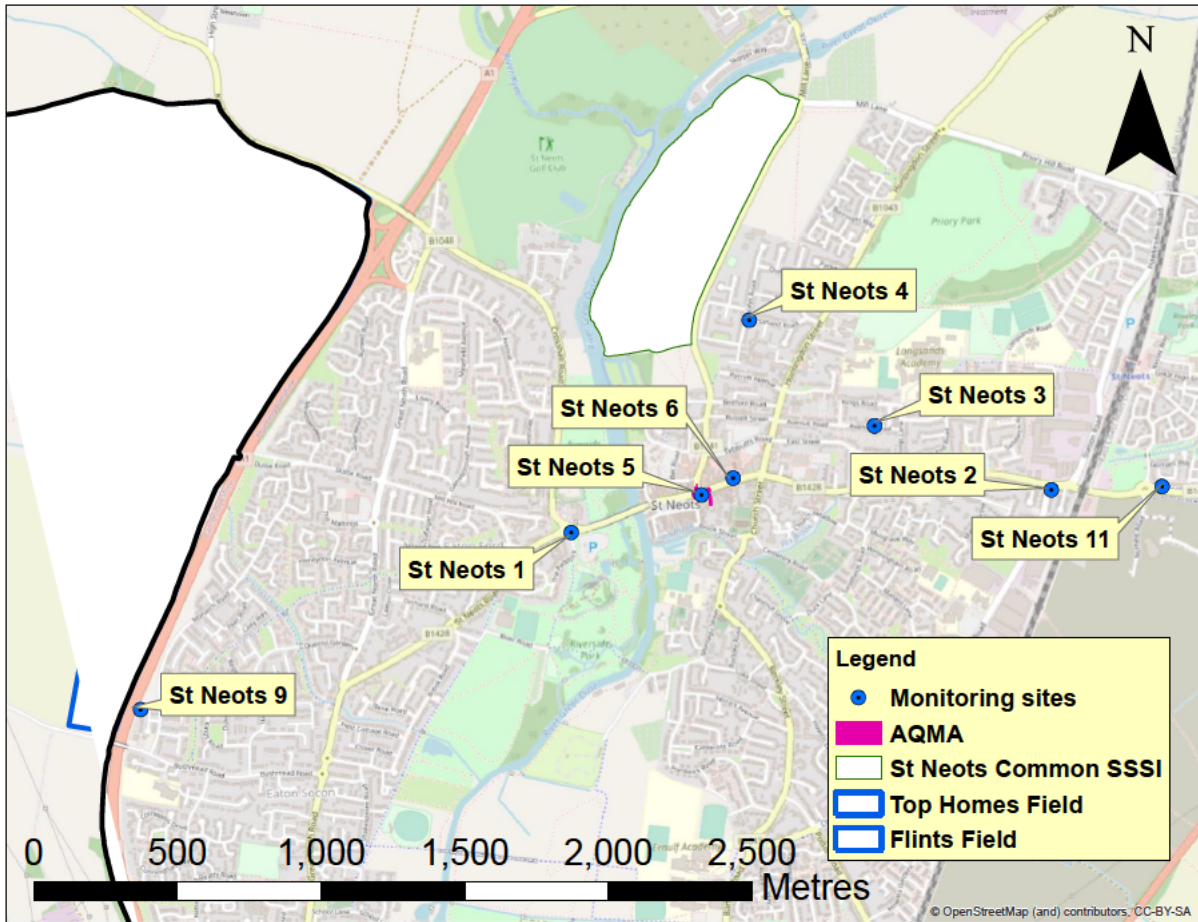


Figure 4.2: Locations of St Neots monitoring sites (St Neots 7, 8 and 10 are further south)

3.4. Defra background maps

Defra provide maps of 1 km resolution background pollutant concentrations across the country, providing estimates of pollutant concentrations away from major sources such as busy roads. The latest versions of these background maps are for a base year of 2018, with projections up to 2030⁶.

Table 4.4 presents annual average concentrations for the grid squares in which the two development sites and St Neots Common are located. The background concentrations of NO_x and NO₂ for year of 2018, without any projection to future years, are presented. The mapped background concentrations are well below the relevant air quality standards.

Table 4.4: 2018 background concentrations from Defra background maps ($\mu\text{g}/\text{m}^3$)

Site	Grid square mid-point (x, y)	NO _x	NO ₂
Flints Field	517500, 260500	15.3	11.5
	517500, 261500	16.3	12.2
	516500, 260500	15.1	11.4
	516500, 261500	11.7	9.0
Top Homes Field	516500, 259500	16.0	12.0
	516500, 260500	15.1	11.4
St Neots Common SSSI	517500, 260500	15.3	11.5
	517500, 261500	16.3	12.2
	518500, 260500	15.4	11.6
	518500, 261500	13.6	10.3

⁶ <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

3.5. St Neots Common SSSI

Table 4.5 presents the existing concentrations of each relevant pollutant across St Neots Common SSSI, taken from the Air Pollution Information System (APIS) web site⁴. Minimum, maximum and average concentrations across the site are presented; for NH₃, these values are the same. There are no current exceedences of the relevant annual average critical levels at St Neots Common SSSI.

Table 4.5: Existing concentrations ($\mu\text{g}/\text{m}^3$) at St Neots Common SSSI

	NO_x	SO₂	NH₃
Critical level	30	20	3
Concentration	Min: 15.0 Max: 17.8 Avg: 15.5	Min: 0.9 Max: 1.2 Avg: 1.0	2.3

Tables 4.6 and 4.7 present the existing nitrogen and acid deposition rates, respectively, across St Neots Common SSSI, also taken from the APIS web site

One habitat type, ‘neutral grassland’, was identified for St Neots Common. The deposition rates presented are specific to this habitat type and represent the average deposition over the years 2017 to 2019, due to existing local sources and background contributions. For acid deposition, the nitrogen (N) and sulphur (S) contributions are presented.

Table 4.6: Existing nitrogen deposition rates ($\text{kg N ha}^{-1} \text{yr}^{-1}$) at St Neots Common SSSI

Habitat type	Critical load ($\text{kg N ha}^{-1} \text{yr}^{-1}$)	Total deposition ($\text{kg N ha}^{-1} \text{yr}^{-1}$)
Neutral grassland	20 - 30	19.8

Table 4.7: Existing acid deposition rates ($\text{keq ha}^{-1} \text{yr}^{-1}$) at St Neots Common SSSI

Habitat type	Acidity class	Critical load ($\text{keq ha}^{-1} \text{yr}^{-1}$)	Total deposition N S ($\text{keq ha}^{-1} \text{yr}^{-1}$)
Neutral grassland	Calcareous grassland	Maximum: CLminN: 0.928 CLmaxN: 4.928 CLmaxS: 4.000 Minimum: CLminN: 0.856 CLmaxN: 4.856 CLmaxS: 4.000	1.4 0.2

For acid deposition, the Critical Load function is defined by three quantities to account for the contribution of different species to total acid deposition. CLmaxS is the maximum Critical Load for acidity expressed in terms of sulphur i.e. when nitrogen deposition is zero; this value also considers non-marine chloride deposition. Similarly, CLmaxN is the maximum Critical Load of acidity expressed in terms of nitrogen only i.e. when sulphur and non-marine chloride deposition is zero. Finally, CLminN defines a nitrogen deposition level below which additional nitrogen will not acidify the system, due to long-term nitrogen losses in the soil, e.g. nitrogen uptake by vegetation.

There are no current exceedences of the nitrogen or acid critical loads at St Neots Common SSSI.

4. Air quality assessment

This section comprises a brief qualitative assessment of potential air quality impacts of the two potential residential developments, on the habitats at St Neots Common SSSI, for operational and construction phases of development.

The potential for general air quality impacts was assessed based on Institute of Air Quality Management (IAQM) guidance: *A guide to the assessment of air quality impacts on designated nature conservation sites*.⁷

The guidance describes three stages of air quality assessment: Scoping; Quantification; and Screening. As sufficient information to quantify the impacts is not yet available, this assessment is limited to the Scoping stage.

The aim of the Scoping stage is to determine the scope of the assessment in terms of the habitats sites to be assessed, and to screen out any emission sources if they are too small or far away to have a meaningful effect.

In this case, Natural England has already specified that the assessment should focus on St Neots Common SSSI.

Potential impacts on air quality at the SSSI may arise from the following activities associated with the residential developments:

- Road traffic
- Heating combustion
- Construction

Each of these is considered in the sections below.

4.1. Road traffic

St Neots Common SSSI is adjacent to the B1041, Mill Lane, which runs north-south along its eastern boundary. The spatial distribution of qualifying features within the SSSI is not known, however it is extremely likely that the ‘neutral grassland’ habitat identified from the APIS web site in Section 4.5 extends to within 200 m of this road, as the SSSI is only about 350 m across.

In order to determine the risk of road traffic emissions having an impact on neutral grassland habitat, the traffic screening criteria provided by the Design Manual for Roads and Bridges (DMRB) were used: a change in Annual Average Daily Traffic (AADT) flows on a given road of 1000 vehicles or 200 heavy duty vehicles (HDVs). In the absence of any other thresholds, these are widely used to screen out the need for quantitative assessment.

⁷ <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2019.pdf>

The Transport Assessments generated to support three recent planning applications in the area were accessed via the Huntingdonshire District Council online planning applications web site ⁸. Table 5.1 sets out the number of traffic movements assumed to be generated by each of these developments.

Table 5.1: Vehicle trip generation for proposed local residential developments

Planning application	Number of dwellings	AM peak (8-9 am)	PM peak (5-6 pm)	Average peak per dwelling
20_00847_OUT ⁹	648	306	334	0.49
20_01407_OUT ¹⁰	350	261	237	0.71
21_00572_FUL ¹¹	321	254	212	0.73

Flints Field has been put forward for 400-450 dwellings and Top Homes Field for 400 dwellings. Based on the highest trip generation in Table 5.1, Table 5.2 presents the likely vehicle trip generation for each of the two developments. The average peak was converted to an AADT using a factor of 12, taken from Road Traffic Statistics spreadsheet TRA0307. ¹²

Table 5.2: Vehicle trip generation for Flints Field and Top Homes Field

Development	Number of dwellings	Average peak	AADT
Flints Field	450	329	3948
Top Homes Field	400	292	3504

Two roads are within the prescribed distance (200 m) of St Neots Common: Crosshall Road (B1048) and Mill Lane/New Street (B1041); the latter is directly adjacent to the Common. The screening assessment involves determining whether or not the additional LDV movements on either of these two roads are likely to exceed the threshold of 1000 AADT.

Access to Flints Field will be at the northern end of the site, via Kimbolton Road (B645). Most traffic would be expected to travel either via the A1 or into/out of St Neots via either Great North Road or Crosshall Road. A significant fraction may travel via Crosshall Road and, if this is greater than 25%, the threshold of 1000 AADT may be exceeded.

Access to Top Homes Field will be at the southern end of the site, via Bushmead Road. Most traffic would be expected to travel into/out of St Neots via Great North Road. Only a small fraction of trips generated by Top Homes Field would be expected to access Crosshall Road or New Street/Mill Lane. In order to exceed the threshold of 1000 AADT, more than around 30% of trips would have to access these roads, which seems unlikely.

Construction HDVs are unlikely to use either Crosshall Road or Mill Lane/New Street and, as the developments are residential, there will be few operational HDVs. Therefore, the number of additional HDV movements on these two roads is likely to be below the threshold of 200 AADT.

⁸ <https://publicaccess.huntingdonshire.gov.uk/online-applications/>

⁹ WSP Transport Assessment for Washingley Farm, Huntingdon, March 2020

¹⁰ Waterman Transport Assessment for Land off Glatton Road, Sawtry, July 2020

¹¹ Icen Projects Transport Assessment for RAF Upwood, Bury, Huntingdonshire, January 2021

¹² <https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra#annual-daily-traffic-flow-and-distribution-tra03>

4.2. Heating combustion

The Future Homes Standard¹³ states that, from 2025, new homes will not be built with fossil fuel heating, such as a natural gas boiler. Development of either Flints Field or Top Homes Field sites is unlikely to begin before 2025. Therefore, provided that other forms of combustion, such as biomass boilers, are avoided, the air quality impact of the development due to heating combustion will be negligible.

4.3. Construction

Step one of the methodology described in the *IAQM Guidance on the assessment of dust from demolition and construction*¹⁴ provides screening criteria for the assessment of the dust soiling and air quality impacts of demolition and construction.

An assessment for an ecological receptor is required where that ecological receptor is within:

- 50 m of the boundary of the site; or
- 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

The nearest ecological receptor, St Neots Common SSSI, is about 800 m east of the Flint Fields site and an even greater distance from the Top Homes Field site. There are no ecological receptors located within the prescribed distances and therefore no further consideration of construction dust impacts is required.

4.4. Summary of Scoping assessment

Air quality impacts on St Neots Common SSSI due to heating combustion sources and construction have been scoped out of the assessment, assuming that no heating combustion sources will be put in place.

Regarding traffic emissions, trip generation from Top Homes Field is unlikely to result in exceedance of the LDV threshold of 1000 AADT or the HDV threshold of 200 AADT. However, it is concluded that trip generation from Flints Field development could result in exceedance of the LDV threshold of 1000 AADT on Crosshall Road, within 200 m of St Neots Common SSSI. This should be revisited once a Transport Assessment is available, and specific relevant mitigation should be determined.

¹³

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/956094/Government_response_to_Future_Homes_Standard_consultation.pdf

¹⁴ <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

5. Cumulative impacts

As well as the cumulative impact of the Flints Field and Top Homes Field developments, the following approved developments within the Huntingdonshire District Council area are relevant for potential in-combination impacts due to road traffic emissions:

- Wintringham Park, Cambridge Road, St Neots: mixed use, including 2,800 dwellings.
- Loves Farm Eastern Expansion Development Area, Cambridge Road, St Neots: mixed use, including 1,020 dwellings.
- Land at Riversfield, Great North Road, Little Paxton: mixed use, including 199 dwellings.

Wintringham Park and Loves Farm, although large, are located to the east of St Neots and so less likely to contribute significantly to air quality impacts at St Neots Common SSSI. However, Land at Riversfield is located directly to the north of the SSSI and would be accessed via Mill Land (B1041), which passes directly along the eastern boundary of the SSSI. Further assessment of cumulative and in-combination impacts of road traffic emissions on the SSSI may therefore be necessary.

Due to the relatively short-term nature of the construction phase and that dust impacts due to the construction phase of a development site are assessed up to a maximum distance of 500 m from the site boundary, it is considered unlikely that cumulative or in-combination construction dust impacts will be significant.

6. Conclusions: mitigation plan

The IAQM position statement *Mitigation of Development Air Quality Impacts*¹⁵ outlines hierarchy principles for mitigation, in which those measures that act to prevent or avoid emissions are the most preferable, those that act to reduce and minimise exposure the next most preferable, and those that act to offset emissions the least preferable.

This general hierarchy is echoed in the Chartered Institute of Ecology and Environmental Management (CIEEM) Advisory Note *Ecological Assessment of Air Quality Impacts*¹⁶, which also states that “This is usually best achieved through taking air quality considerations into account at the development proposal design stage.”

The Call for Sites forms state that “Renewable energy will be considered as part of the design process of the proposed dwellings.” For the Flints Field site, the Call for Sites form also gives an example of “solar panelling on the roofs of dwellings” as an example of renewable energy to be considered.

Bedford Borough Council’s draft air quality planning guidance document is not yet available. The Greater Cambridge Partnership (GCP) *Sustainable Design and Construction Supplementary Planning Document* (SPD), adopted in January 2020, states that developers should aim for an air quality neutral development and, in line with the IAQM and CIEEM guidance referred to above, recommends that appropriate mitigation is integrated into the development.

6.1. Transport

Road traffic emissions resulting from the developments have the potential to impact air quality at the SSSI, and other local development could contribute to this. Therefore, mitigation of this air quality impact is required.

Policy 89 of the Bedford Borough Local Plan¹⁷ refers to Electric Vehicle (EV) Infrastructure and states:

“The Council will maximise the use of sustainable transport in developments, and support low carbon public and personal transport such as electric cars, bikes and buses. The Council will require new facilities for low emission vehicles to be integrated into new major development schemes where local centres or communal facilities are proposed. [...] To maximise the use of sustainable modes of transport, new residential developments should be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations and, where appropriate, provide electric charging points at a rate of one per dwelling.”

¹⁵ http://iaqm.co.uk/text/position_statements/mitigation_of_development.pdf

¹⁶ <https://cieem.net/resource/advisory-note-ecological-assessment-of-air-quality-impacts/>

¹⁷ <https://bbcdevwebfiles.blob.core.windows.net/webfiles/Planning%20and%20Building/local-plan-2030/Local%20plan%202030.pdf>

In conjunction with the provision of EV charging points, reduced or restricted car parking, such as parking reserved for EVs or car clubs, should be considered.

Promotion of walking, cycling, public transport can be made by means of designing the development layout to promote these forms of transport and incorporating high quality walking and cycling routes.

Policy 87 refers specifically to Public Transport and states:

“The Council will require that new developments provide the following:

- i. Where appropriate, for new developments which are not currently connected to the public transport network, highway and public transport infrastructure suitable for including dedicated facilities will be provided from an early stage of occupation of the development, and
- ii. Where there is an existing bus service with hourly or more frequent service levels, or there is potential to improve current services to such levels, then every dwelling and work place should usually be within 400 metres walking distance of a bus stop, and
- iii. Deliver facilities which are capable of reflecting technological requirements (such as real time information or a similar future technology) in conjunction with the public transport and infrastructure, and
- iv. Contribute to the development of off-site interchange facilities directly related to the proposed development.”

In line with this policy, the developments should be designed to provide links to the public transport network and infrastructure.

6.2. Heating

Combustion heating should be avoided and zero-emission heating sources utilised, such as: efficient electric heating; solar thermal and/or photovoltaic technology; and air or ground source heat pumps.

6.3. Construction dust

Although it is unlikely that construction of the proposed developments will have an impact at St Neots Common SSSI, standard good practice should be followed to minimise dust impacts, as set out in the IAQM guidance.¹⁸

¹⁸ <https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>