A428 Black Cat to Caxton Gibbet improvements

TR010044

Volume 6

6.1 Environmental Statement

Chapter 15: Assessment of Cumulative Effects

Planning Act 2008

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

26 February 2021

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A428 Black Cat to Caxton Gibbet improvements

Development Consent Order 202[ ]

Chapter 15: Assessment of Cumulative Effects

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15 Assessment of cumulative effects

15.1 Introduction

15.1.1 This chapter presents the results of the assessment of the likely significant combined and cumulative environmental effects of the Scheme following the methodology set out in Design Manual for Roads and Bridges (DMRB) *LA104 Environmental assessment and monitoring (Revision 1)* (Ref 15-1) and the Planning Inspectorate's (the Inspectorate) *Advice Note Seventeen* (Ref 15-2).

15.1.2 This assessment has been undertaken by a competent expert within AECOM, the quality and completeness of which has been approved by an Associate Director who holds the qualification of MLPM (Hons) in Landscape Planning and Management, and is a Chartered Environmentalist (CEnv) and Chartered Scientist (CSci). They are also full members of the Institute of Environmental Management and Assessment, and the Institution of Environmental Sciences.

15.1.3 They have over twenty years of experience in the co-ordination, management, direction and technical review of environmental impact assessments (EIA) and Environmental Statements. They frequently lead on complex linear development projects across the UK and possess wide ranging experience in the transportation sector.

15.2 Legislation and policy framework

15.2.1 *Schedule 4 of the EIA Regulations 2017* (SI No. 572) (Ref 15-3) states that the EIA should include consideration of both the interaction between the different aspects of the environment likely to be affected by the development (Regulation 5 (2)(e)), and the likely significant effects of the development resulting from the cumulation of effects with other existing or approved projects (Schedule 4, Paragraph 5(e)).

15.2.2 As discussed in **Chapter 1, Introduction** of the Environmental Statement **[TR010044/APP/6.1]**, the primary basis for deciding whether or not to grant a Development Consent Order (DCO) is the *National Policy Statement for National Networks* (NPSNN)[1] (Ref 15-4). Sections 4 and 5 of the *NPSNN* (Ref 15-4) set out policies to guide how DCO applications will be decided and how the impacts of national networks infrastructure should be considered.

15.2.3 Paragraph 4.16 of the *NPSNN* (Ref 15-4) states that: "*when considering significant cumulative effects, any environmental statement should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence).*"

[1] Although other policies can have weight as relevant and important matters in decision making. See Case for the Scheme for more information **[TR010044/APP/7.1]**.

15.2.4 In addition to the *NPSNN* (Ref 15-4), the *Overarching National Policy Statement for Energy (EN-1)* (Ref 15-5) is of relevance to the assessment of the gas pipeline diversion within the Scheme. *EN-1* (Ref 15-5) states that information on how the effects of the applicant's development would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence) should be presented in the Environmental Statement.

15.2.5 Although the *National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)* (Ref 15-6) is of relevance to the gas pipeline diversion within the Scheme, it does not contain any policies or requirements specifically relating to the assessment of cumulative effects of pipeline developments.

15.3 Cumulative assessment methodology

Combined effects methodology

15.3.2 The assessment of combined effects has considered whether an individual receptor or resource would likely be affected by more than one type of impact as a result of the Scheme. For example, a residential occupant could be exposed to simultaneous noise and air quality impacts as a result of earth moving activities during the construction phase.

Study area

15.3.3 The study area for the assessment of combined effects is defined by the study areas used in each of the environmental topics set out in **Chapters 5 to 14** of the Environmental Statement **[TR010044/APP/6.1]**.

Assessment of effects

15.3.4 The assessment methodology has involved the identification of impact interactions associated with the Scheme upon separate environmental resources and receptors, in order to understand the overall environmental effect of the Scheme.

15.3.5 Potential interactions were identified by reviewing the topic conclusions within **Chapters 5 to 14** of the Environmental Statement **[TR010044/APP/6.1]**, in order to establish where individual impacts would combine and result in likely significant combined effects. The following chapters are considered to have assessed combined effects relating to the above receptors, and therefore are not repeated in this chapter:

a. **Chapter 6, Cultural heritage** and **Chapter 8, Biodiversity** of the Environmental Statement **[TR010044/APP/6.1]**, consider the potential interactions of effects relating to construction and operational noise and air quality, and construction dust on receptors. **Chapter 6, Cultural heritage** of the Environmental Statement **[TR010044/APP/6.1]** also includes consideration of effects to ground water and how this affects the in-situ preservation of archaeological remains. **Chapter 8, Biodiversity** of the Environmental Statement **[TR010044/APP/6.1]** also includes consideration of effects on the water environment and how this could affect ecological receptors.

b. **Chapter 12, Population and human health**, of the Environmental Statement **[TR010044/APP/6.1]** considers the combined residual effects from other assessment topics (noise, air quality, traffic, landscape and visual) which could affect people's enjoyment of a public right of way, community facility or public open space.

c. **Chapter 13, Road drainage and the water environment** of the Environmental Statement **[TR010044/APP/6.1]** considers the effects of traffic in combination with changes that would be made to the water environment.

d. **Chapter 14, Climate** of the Environmental Statement **[TR010044/APP/6.1]** includes specific consideration of combined climate impacts. The In-combination Climate Change Impact (ICCI) assessment did not identify the potential for significant combined effects of future climate change and the Scheme on identified receptors in the surrounding environment.

15.3.6 This assessment has therefore considered the combined effects on residential receptors. The types of impacts that could be experienced by these receptors and may interact are noise, air quality and visual effects; during both construction and operation.

15.3.7 In order to consider effects that are not significant, but could become significant in combination with other effects, the following effects have been considered for each topic:

a. Air quality – receptors identified as sensitive locations with respect to construction dust and receptors experiencing a small magnitude or larger change in nitrogen dioxide in the Opening Year.

b. Visual effects – receptors experiencing a slight adverse or worse impact during construction or in the Opening Year.

c. Noise and vibration – receptors experiencing a slight adverse or worse impact during construction or in the Design Year.

15.3.8 The significance of combined effects upon environmental resources and receptors was determined using professional judgement, with input provided by the competent experts responsible for the production of the individual assessments, and taking into account the criteria and definitions set out in **Table 15-2** of this chapter in line with *LA 104* (**Ref 15-1**).

Cumulative effects methodology

15.3.9 Cumulative effects are defined as the effect resulting from impacts of the Scheme acting together with an impact or impacts associated with other proposed development schemes on a single receptor. This can be two similar impacts acting on a single receptor (such as increases in air quality emissions as a result of the Scheme and another development), or two different impacts acting on a single receptor (such as an increase in air quality emissions from the Scheme and an increase in noise levels from another development).

15.3.10 The assessment methodology follows the guidance set out by the Inspectorate in *Advice Note Seventeen* which requires a four-stage approach to the assessment of cumulative effects (Ref 15-2).

Study area

15.3.11 Early in the sifting process, an initial search area of approximately 10 kilometres (6.2 miles) from the Order Limits was adopted for all developments. This was to allow for overlap in Zones of Influence (ZoI) between the Scheme and other developments, and to accommodate for any uncertainties in the extent of cumulative effects which could occur.

15.3.12 Once the ZoI for the Scheme were finalised, the initial search area was reduced accordingly. Subsequently, two study areas have been adopted in the assessment to enable all developments, which could potentially cause cumulative effects with the Scheme, to be identified:

a. Largest topic ZoI + 1 kilometre (0.6 miles) buffer – this is being applied when searching for other planned developments within, and development allocations made by, the relevant local authorities.

b. Largest topic ZoI + 3 kilometre (1.8 miles) buffer – this is being applied when searching for Nationally Significant Infrastructure Projects (NSIPs) and other highway projects proposed to be implemented on the strategic road network.

15.3.13 In accordance with the Inspectorate's *Advice Note Seventeen*: (Ref 15-2), developments which were outside, but close to the study area, were included in the shortlisting process.

Comments from Scoping Report

15.3.14 Scoping was undertaken in 2019 to identify the matters to be covered by the cumulative assessment.

15.3.15 The outcomes of scoping were recorded in a scoping report (Ref 15-7), which was consulted upon as part of a formal request to the Inspectorate for a scoping opinion. The scoping report included a summary of all assessment work undertaken as part of the design-development of the Scheme up to the point of its publication.

15.3.16 The Scoping Opinion **[TR010044/APP/6.5]** requested that the following matters should be addressed in the cumulative effects assessment:

a. The Inspectorate advised that the ZoI for each aspect should be defined in the Environmental Statement with reference to the extent of the likely impact and the sensitivity of the relevant receptors. This has been addressed in **Table 15-1**.

b. Information on the criteria used to determine receptor value and impact magnitude. This has been addressed in **Table 15-2**.

c. The Applicant should make every effort to agree the list of other developments to be assessed with relevant consultation bodies. Details of the consultation which has taken place to agree the list of other developments, are provided in paragraph **15.3.41**.

Assessment of effects

15.3.17 The assessment of cumulative effects has considered the effects on environmental resources and receptors that would likely occur from the incremental changes arising from the Scheme in conjunction with other planned developments.

15.3.18 The assessment of cumulative effects has been guided by the following considerations:

a. Understanding the temporal and spatial limits of the effects associated with the Scheme and those of other planned developments.

b. The sensitivity, value or importance of environmental resources or receptors, and their susceptibility to effects.

c. Whether different types of effect would occur and interact in a way that alters their significance.

d. Whether effects would be temporary or permanent in duration, what their timescales would be, and whether the frequency of such effects would be intermittent or constant.

e. Whether effects would require any additional mitigation measures, in order to reduce their significance.

f. The degree of certainty and confidence relating to the effects.

15.3.19 In accordance with the approach contained within *Advice Note Seventeen* (Ref 15-2), the following tasks were undertaken within the cumulative assessment, the full details of which are presented in **Appendix 15.1** of the Environmental Statement **[TR010044/APP/6.3]**.

Stage 1: Establishing the long list of 'other existing development and/or approved development'

15.3.20 The maximum study area or cumulative ZoI is defined in **Table 15-1** below for each environmental topic. This is based on the study areas used for the topic assessments in **Chapters 5 to 14** of the Environmental Statement **[TR010044/APP/6.1]** and is based on an assumption that sensitive receptors at the furthest extent of the Scheme study areas would also be at the furthest extent of a theoretical study area for other development.

15.3.21 A traffic model covering the locality associated with the strategic and local road network has been developed to forecast future traffic flows, both with and without the Scheme, during construction and operation. **Chapter 4, Environmental assessment methodology** of the Environmental Statement **[TR010044/APP/6.1]** summarises the approach undertaken as part of the traffic modelling process to:

a. Predict the amount of traffic growth likely to occur in the future, in the absence of the Scheme.

b. Account for the influence that other development projects in the region (classified as being "near certain" or "more than likely" to be implemented) would have on future traffic flows.

c. Predict the changes that the operation of the Scheme would have on future traffic flows.

15.3.22 Full details of the other development projects included within the traffic model (covering developments in Bedford, Central Bedfordshire, Huntingdonshire, Cambridge City and South Cambridgeshire) and the factors applied during the modelling process, are presented within the Transport Assessment **[TR010044/APP/7.2]**.

15.3.23 The following assessments, as noted in **Table 15-1**, have relied wholly, or in part, on the forecasts derived from the traffic model for the Do Minimum scenario and the Do Something scenario:

a. Air quality – see **Chapter 5, Air quality** of the Environmental Statement **[TR010044/APP/6.1]**.

b. Noise and vibration – see **Chapter 11, Noise and vibration** of the Environmental Statement **[TR010044/APP/6.1]**.

c. Population and human health (as part of the calculations of traffic related severance) – see **Chapter 12, Population and human health** of the Environmental Statement **[TR010044/APP/6.1]**.

d. Road drainage and the water environment (as part of the calculations for road runoff and accidental spillages) – see **Chapter 13, Road drainage and the water environment** of the Environmental Statement **[TR010044/APP/6.1]**.

15.3.24 As the influence of other development projects already forms an inherent part of the traffic forecasts upon which the assessments of the Scheme's effects within these topics have been based, by default cumulative effects are included and reported within their operational assessments. Subsequently, the operational effects as reported within **Chapter 5, Air quality** and **Chapter 11, Noise and vibration** of the Environmental Statement **[TR010044/APP/6.1]** are effectively cumulative impact assessments in that they take account of all potential traffic generated by future development proposals. This also applies to the conclusions drawn where other topics have relied on the results of these assessments, for example biodiversity (see **Chapter 8, Biodiversity** of the Environmental Statement **[TR010044/APP/6.1]**).

15.3.25 Each development within the long list (see **Appendix 15.1** of the Environmental Statement **[TR010044/APP/6.3]**) was assigned a status (or tier), informed by feedback from the relevant planning authority and information freely available on their planning portal, which indicated the level of certainty and provided an indication of the likely level of detail available.

15.3.26 Guidance contained in *LA 104* (Ref 15-1) states that the study area for an assessment should reflect the project and the surrounding environment over which effects are reasonably thought to occur, taking into account cumulative effects.

15.3.27 The long list of developments is presented in **Appendix 15.1** of the Environmental Statement **[TR010044/APP/6.3]** and comprises a total of 126 developments and two development allocations, the locations of which are illustrated on **Figure 15.1** of the Environmental Statement **[TR010044/APP/6.2]**.

Table 15-1: Summary of zones of influence

Environmental Topic	Zone of Influence
Air quality	**Construction**: 200m ZoI from construction activities for effects relating to construction dust and emissions. **Operation:** The 'affected roads' define the ZoI. As the operational phase traffic data for the Scheme include the traffic associated with other planned developments, the air quality assessment to be included within the Environmental Statement will partially be a cumulative assessment. Accordingly, these developments will not be considered in the cumulative assessment. Refer to **Chapter 5**, **Air quality** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.
Cultural heritage	**Construction and operation:** 1km ZoI for both construction and operational effects on archaeological remains, historic buildings and historic landscapes. Refer to **Chapter 6**, **Cultural heritage** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.
Landscape and visual effects	**Construction and operation:** The ZoI for the Landscape and visual effects assessment includes all land within the Order Limits and the area within which the Scheme may give rise to significant landscape and visual effects, as illustrated on **Figure 7.1** of the Environmental Statement **[TR010044/APP/6.2]**. Refer to **Chapter 7**, **Landscape and visual effects** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.
Biodiversity	**Construction and operation:** A 2km ZoI for both construction and operational effects on national statutorily designated sites and non-statutorily designated sites, and for bats. As no internationally designated sites are located within the 5km ZoI adopted in the assessment, this ZoI will not be considered in the cumulative assessment. As the preliminary findings of the Habitats Regulations Assessment screening exercise indicate that no significant effects on European Sites are likely to occur as a result of the Scheme, the ZoI does not extend to cover the 30km study area adopted within this exercise. Refer to **Chapter 4**, **Environmental assessment methodology** and **Chapter 8, Biodiversity** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.

Environmental Topic	Zone of Influence
Geology and soils	**Construction and operation:** A 500m ZoI for both construction and operational effects on geology and soils. Refer to **Chapter 9, Geology and soils** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.
Material assets and waste	**Construction:** A ZoI defined by the Order Limits (including any temporary land requirements during construction) for material resources, sterilisation of mineral safeguarding sites and peat resources, waste arising from the construction of the Scheme and direct impacts on the operations of waste management infrastructure and a ZoI defined by the geographic areas within which materials will be sourced and wastes will be managed. **Operation:** Scoped out of the EIA; therefore, no ZoI applies. Refer to **Chapter 10, Material assets and waste** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.
Noise and vibration	**Construction:** The construction ZoI is defined by the proximity of identified receptors to the construction works. **Operation:** The study area for the detailed quantitative assessment of noise impacts comprises a 600m calculation area corridor either side of the Scheme carriageway and 600m either side of the existing roads bypassed by the Scheme. This has been extended to some sensitive receptors outside of 600m where significant effects were considered to be likely to occur. The study area is illustrated in **Figure 9.1** of the Environmental Statement **[TR010044/APP/6.2].** Refer to **Chapter 11, Noise and vibration** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.
Population and human health	**Construction and operation:** When assessing impacts on land-use and accessibility, the study area will be based on the Order Limits including compounds and temporary land take, as well as a 500m area surrounding the Order Limits. Where effects are either identified outside of the 500m area or are unlikely to occur within the 500m area, the study area has been amended accordingly. The human health baseline study area has been determined by the local authorities and wards which are either directly or indirectly affected by the Scheme. The following local authorities make up the study area for the human health baseline assessment: a. Bedford Borough Council b. Central Bedfordshire District Council c. Huntingdonshire District Council d. South Cambridgeshire District Council Refer to **Chapter 12, Population and human health** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.

Environmental Topic	Zone of Influence
Road drainage and the water environment	**Construction and operation:** A 1km ZoI for the water resource (flow and quality) assessment has been considered for construction and operational effect. The ZoI extends further than 1km for watercourse flow impacts and flood risk on hydrological features and receptors, where a pathway for potential effects has been identified. Refer to **Chapter 13, Road drainage and the water environment** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.
Climate	**Construction and operation:** A ZoI covering greenhouse gas emissions arising from the construction and operation of the Scheme. Refer to **Chapter 14, Climate** of the Environmental Statement **[TR010044/APP/6.1]** for further information on the ZoIs and assessment study areas.

Stage 2: Establishing a shortlist of 'other existing development and/or approved development'

15.3.28 This stage involved reviewing the long list of planned developments, in order to identify those to be taken forward into the cumulative assessment.

15.3.29 The result of this process was a definition of a shortlist of developments, for which more detailed information gathering was subsequently undertaken during Stage 3 to assist the identification of cumulative effects.

15.3.30 The shortlist of developments is presented in **Appendix 15.2** of the Environmental Statement **[TR010044/APP/6.3]** and comprises a total of five developments, the locations of which are illustrated on **Figure 15.2** of the Environmental Statement **[TR010044/APP/6.2].**

Stage 3: Information gathering

15.3.31 This stage involved sourcing information relating to the shortlisted developments, in order to establish the details of their likely environmental effects.

Stage 4: Assessment

15.3.32 This stage involved identifying where cumulative effects are likely to occur, and assessing the significance of these effects on environmental resources and receptors. A summary of the results can be seen in **Section 15.6** of this chapter and the full details can be found in **Appendix 15.2** of the Environmental Statement **[TR010044/APP/6.3].**

Traffic related effects

15.3.33 A traffic model covering the locality associated with the strategic and local road network has been developed by Highways England to accurately forecast future traffic flows, both with and without the Scheme.

15.3.34 **Chapter 5, Air quality** of the Environmental Statement **[TR010044/APP/6.1]** summarises the approach undertaken as part of the traffic modelling process to:

a. Predict the changes that the operation of the Scheme would have on future traffic flows.

b. Predict the amount of traffic growth likely to occur in the future, in the absence of the Scheme.

c. Account for the influence that the operation of other development projects in the region (classified as being "near certain" or "more than likely" to be implemented) would have on future traffic flows.

15.3.35 Full details of the other development projects included within the traffic model, and the factors applied during the modelling process, are presented within the Transport Assessment **[TR010044/APP/7.2]**.

15.3.36 The following assessments have relied wholly, or in part, on the forecasts derived from the traffic model for the do minimum scenario (representative of the conditions that would exist at a given point in the future without the Scheme in place, but accounting for other development projects) and the do something scenario (as above, but with the Scheme in place).

a. Air quality – see **Chapter 5, Air quality** of the Environmental Statement **[TR010044/APP/6.1]**

b. Noise and vibration – see **Chapter 11, Noise and vibration** of the Environmental Statement **[TR010044/APP/6.1]**

c. Population and human health (as part of the calculations of driver stress and traffic related severance) – see **Chapter 12, Population and human health** of the Environmental Statement **[TR010044/APP/6.1]**

d. Road drainage and the water environment (as part of the calculations for road runoff and accidental spillages – see **Chapter 13, Road drainage and the water environment** of the Environmental Statement **[TR010044/APP/6.1]**

15.3.37 As the influence of other development projects already forms an inherent part of the traffic forecasts upon which the assessments of the Scheme's effects within these topics have been based, by default the cumulative effects are included and reported within their operational assessments. This also applies to the conclusions drawn where other topics have relied on the results of these assessments, for example biodiversity – see **Chapter 8, Biodiversity** of the Environmental Statement **[TR010044/APP/6.1].**

Identification of likely significant effects

15.3.38 The significance of both combined and cumulative effects has been determined in accordance with the criteria set out in **Table 15-2**, which draws upon the content of *LA 104* (Ref 15-1).

Table 15-2: Combined and cumulative effects significance criteria

Significance category	Typical descriptors of effect
Very large (typically adverse only)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be very highly significant (positive or negative). Effects would be permanent for receptors of very high value.
Large (adverse or beneficial)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be highly significant (positive or negative). Effects would be: a. Widespread/large scale for a receptor of high value. b. Permanent for a receptor or receptors of high value[2]. c. Localised for a receptor or receptors of very high value. d. Temporary for a receptor or receptors of very high value.
Moderate (adverse or beneficial)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be significant (positive or negative). Effects would be: a. Permanent for a receptor or receptors of medium value. b. Localised for a receptor or receptors of high value. c. Temporary for a receptor or receptors of high value.
Slight (adverse or beneficial)	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be noteworthy but not significant (positive or negative). Effects would be: a. Permanent for receptors of low value. b. Localised for a receptor or receptors of medium value. c. Temporary for a receptor or receptors of medium value.
Neutral	Where the combined impacts of the Scheme or cumulative impacts of the Scheme in association with other development upon an individual or collection of environmental receptors would be negligible and not significant (positive or negative).

15.3.39 Within the assessment, the value (or sensitivity) of receptors has been based on the highest rating within the relevant environmental topic assessments. For example, if a receptor is high value for landscape and moderate value for noise, the assessment has deemed this to be of high value for the purposes of combined effects assessments.

[2] Note that the term 'value' refers here to both intrinsic value and sensitivity.

15.3.40 Combined and cumulative effects that are of moderate, large or very large significance are deemed to be significant.

Consultation

15.3.41 The long list of identified development and search methodology was discussed and agreed with the local planning authorities: South Cambridgeshire District Council, Central Bedfordshire Council, Bedford Borough Council and Huntingdonshire District Council initially in June 2020.

15.3.42 The list was then updated in September 2020 to include any additional planning applications which had been submitted between 30 June 2020 and 1 September 2020, and subsequently, the final long list of developments was sent to the local planning authorities in September 2020. In accordance with the Inspectorate's *Advice Note Seventeen* (Ref 15-2), regular searches for additional developments or available information will continue in the months leading up to the DCO examination and, if necessary, additional assessments will be completed.

15.4 Assessment assumptions and limitations

15.4.1 The combined and cumulative assessments have been constrained by the limitations, assumptions and uncertainties presented within the individual assessments reported within **Chapters 5 – 14** of the Environmental Statement **[TR010044/APP/6.1]**.

15.4.2 The cumulative assessment has been undertaken using available third-party information relating to the predicted environmental effects of the shortlisted development project. Where a planning application for a development has not been formally submitted for determination, the assessment has been constrained by the limited environmental information available within the public domain.

15.4.3 For the shortlisted development projects that do not comprise development requiring EIA, the cumulative assessment has identified that these developments would not give rise to significant effects. Accordingly, it has been assumed that these developments would also be unlikely to contribute to the effects of the Scheme and result in significant cumulative effects.

15.5 Assessment of combined effects

15.5.1 This section provides a summary of the potential combinations of impacts that have been identified as part of the assessments reported within **Chapters 5 – 14** of the Environmental Statement **[TR010044/APP/6.1]**, and which are considered likely to affect a single receptor. For the assessment of combined construction impacts, visual, noise, vibration, and air quality impacts have been considered. For the assessment of combined operational effects, visual, noise and air quality impacts have been considered. There are no significant adverse vibration effects anticipated to occur during operation of the Scheme.

15.5.2 Account has been taken of the effectiveness of environmental mitigation measures presented in the following:

a. **Chapter 2, The Scheme** of the Environmental Statement **[TR010044/APP/6.1]** describes the embedded mitigation measures incorporated into the design of the Scheme to avoid, prevent or reduce the adverse environmental effects.

b. **Chapters 5 – 14** of the Environmental Statement **[TR010044/APP/6.1]** summarise the essential mitigation measures that would be delivered, these comprising measures and techniques identified to reduce and, where possible, offset the likely adverse effects of the Scheme, the full details of which are presented in the First iteration Environmental Management Plan **[TR010044/APP/6.8]** (EMP).

15.5.3 Given the nature of the identified combined effects, where a range of activities would affect identified receptors in differing ways (such as visual and noise effects), no additional in-combination mitigation measures are considered appropriate to alleviate the temporary construction related combined effects.

Table 15-3: Summary of potential combined construction impacts and effects upon single environmental receptors

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
15 - 39 (even nos.) - School Lane, MK44 3DR Type of receptor**:** residential Landscape receptor: R5 Construction noise receptor: R03	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** No significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
Kelpie Marina, Great North Road, Roxton, Bedford, MK44 3DS Type of receptor: residential Landscape receptor: R7 Construction noise receptor: R07	Medium	**Visual** Large adverse **Noise** Works resulting in major and moderate impacts likely to be of short duration and not result in significant effects. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8].**	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
		dust but these effects would be mitigated.				
Greenacres, Great North Road, Roxton, MK44 3DS Type of receptor: residential Landscape receptor: R8 Construction noise receptor: R06	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8].**	Moderate adverse
17 and Berlo House, Spinney Road Type of receptor: residential Landscape receptor: R10 Construction noise receptor: R08	High	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** No significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8].**	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
7 - 10 Roxton Road, MK44 3BP Type of receptor: residential Landscape receptor: R11 Construction noise receptor: R08	High	**Visual** Very large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse
Field Cottage, Scuttle Cottage, Russet House – Nagshead Lane, MK44 3AN, Type of receptor: residential Landscape receptor: R15 Construction noise receptor: R11	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated at some properties. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Ferndale, Wycombe House, Mandeville House – Chawston Lane, MK44 3BH Type of receptor: residential Landscape receptor: R16 Construction noise receptor: R10	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
8, 9 – Great North Road, MK44 3BD Type of receptor: residential Landscape receptor: R17 Construction noise receptor: R15A & R15B	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
1 - 9 - Great North Road, MK44 3BD Chawston Type of receptor: residential Landscape receptor: R19 Construction noise receptor: R15A & R15B	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
2 Thatch Cottage, Little Thatch, Freora - Nagshead Lane, MK44 3AN Type of receptor: residential Landscape receptor: R20 Construction noise receptor: R11 and R12	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
1 Great North Road, MK44 3AJ Type of receptor: residential Landscape receptor: R21 Construction noise receptor: R11 and R12	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
Wait for The Wagon, Great North Road, Wyboston, MK44 3AJ Type of receptor: residential Landscape receptor: R22 Construction noise receptor: R13	Medium	**Visual** Moderate adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
19 - 25 (odd nos.) - Great North Road, MK44 3AJ 1A, 1 - 4, Waddon Lodge - The Lane, MK44 3AP Type of receptor: residential Landscape receptor: R24 Construction noise receptor: R12 and R13	Medium	**Visual** Moderate adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
1 The Barns, 2 The Barns - Little Barford Road, PE19 6YF Type of receptor: residential Landscape receptor: R36 Construction noise receptor: R16	High	**Visual** Very large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Rectory Farm, Little Barford Road, PE19 6YF Type of receptor: residential Landscape receptor: R37 Construction noise receptor: R17	High	**Visual** Very large adverse **Noise** Significant adverse effects are anticipated. **Vibration** No significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse
Glen Eden, The Bramleys, Parkers Farmhouse, The Bungalow, Eynesbury Warehouse - Potton Road, PE19 6XJ Type of receptor: residential Landscape receptor: R52 Construction noise receptor: R20	High	**Visual** Very large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Rectory Farm Cottage, Potton Road, PE19 6XJ Type of receptor: residential Landscape receptor: R53 Construction noise receptor: R21 & R22	High	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
1 and 2 Rectory Farm Cottage, Potton Road, PE19 6XJ Type of receptor: residential Landscape receptor: R54 Construction noise receptor: R23A & R23B	High	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Greyholme, Tithe Farm, Cambridge Road, PE19 6SW Type of receptor: residential Landscape receptor: R61 Construction noise receptor: R25	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** No significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
1-4 Wintringham Cottages, Toll Gate Cottage, Wintringham Road, PE19 6 SP Type of receptor: residential Landscape receptor: R62 Construction noise receptor: R27	Medium	**Visual** Large adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Wintringham Lodge, Wintringham Farm, Wintringham Farmhouse, Wintringham Hall, Wintringham Road, Wintringham, PE19 6SP Type of receptor: residential Landscape receptor: R63 Construction noise receptor: R28	Medium	**Visual** Moderate adverse **Noise** Works resulting in major and moderate impacts likely to be of short duration and not result in significant effects. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptors would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
Oak Tree Cottage, New Bungalow - St, Neots Road, CB23 3PH Type of receptor: residential Landscape receptor: R105 Construction noise receptor: R42	Medium	**Visual** Moderate adverse **Noise** Significant adverse effects are anticipated. **Vibration** No significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Papworth Hotel / Iway Inn, Ermine Street South, CB23 3PB Type of receptor: commercial Landscape receptor: C29 Construction noise receptor: R40B	Medium	**Visual** Moderate adverse **Noise** Significant adverse effects are anticipated. **Vibration** Significant adverse effects are anticipated. **Air quality** Receptor would potentially be adversely affected by construction dust but these effects would be mitigated.	Temporary	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
Note: The value/ sensitivity of noise receptors is not defined during the assessment of noise and vibration. All potentially sensitive receptors are considered to be of equal value/ sensitivity. The highest value/ sensitivity rating attributed by the relevant environmental topic assessments has therefore been adopted.						

Table 15-4: Summary of potential combined operational impacts and effects upon environmental receptors

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
10 Roxton Road, MK44 3BP Type of receptor – residential Landscape receptor: R11 Air quality receptor: R53	High	**Visual** Large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are anticipated to occur at 10 Roxton Road only. **Air quality** Imperceptible change	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse
1 The Barns, 2 The Barns - Little Barford Road, PE19 6YF Type of receptor – residential Landscape receptor: R36 Air quality receptor: R209	High	**Visual** Large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Small improvement of the NO_2 annual mean concentration experienced at these properties.	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Rectory Farm, Little Barford Road, PE19 6YF Type of receptor – residential Landscape receptor: R37 Air quality receptor: NA	High	**Visual** Very large adverse year 1, large adverse year 15 **Noise** Significant adverse effects are anticipated.	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse
Hill Farm, Station Road, Tempsford, SG19 2BP Type of receptor – residential Landscape receptor: R50 Air quality receptor: N/A	High	**Visual** Moderate adverse year 1, slight adverse year 15 **Noise** Significant adverse effects are anticipated.	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse, reducing to slight adverse at year 15

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Orchard House, Potton Road, PE19 6XJ Type of receptor – residential Landscape receptor: R51 Air quality receptor: R240	High	**Visual** Large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Worsening of the NO_2 annual mean concentration experienced at this property, but below national air quality objective levels (not significant).	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse
Glen Eden, The Bramleys, Parkers Farmhouse, The Bungalow, Eynesbury Warehouse - Potton Road, PE19 6XJ Type of receptor – residential Landscape receptor: R52 Air quality receptor: R240	High	**Visual** Very large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Worsening of the NO_2 annual mean concentration experienced at some properties, but below national air quality objective levels (not significant).	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Rectory Farm and Rectory Farm Cottage, Potton Road, PE19 6XJ Type of receptor – residential Landscape receptor: R53 Air quality receptor: R84	High	**Visual** Large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Worsening of the NO_2 annual mean concentration experienced at some properties, but below national air quality objective levels (not significant).	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse
1-4 Wintringham Cottages, Toll Gate Cottage, Wintringham Road, PE19 6SP Type of receptor – residential Landscape receptor: R62 Air quality receptor: R168	Medium	**Visual** Large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Small improvement of the NO_2 annual mean concentration experienced at these properties.	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Tithe Farm, Cambridge Road, PE19 6SW Type of receptor – residential Landscape receptor: R66 Air quality receptor: R170	High	**Visual** Moderate adverse year 1, slight adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Imperceptible change	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Large adverse, reducing to moderate adverse at year 15.
Weald Farm Cottages, North Farm Cottage, Cambridge Road, PE19 6SR Type of receptor – residential Landscape receptor: R80 Air quality receptor: R167	Medium	**Visual** Large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are expected to occur. **Air quality** Small improvement of the NO_2 annual mean concentration experienced at these properties.	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
North Farm, Cambridge Road, PE19 6SR Type of receptor – residential Landscape receptor: R81 Air quality receptor: R241	Medium	**Visual** Large adverse year 1, moderate adverse year 15 **Noise** Significant adverse effects are expected to occur. **Air quality** Small improvement of the NO_2 annual mean concentration experienced at this property	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse
Whitehall Farm House, Cambridge Road, PE19 6SS Type of receptor: residential Landscape receptor: R82 Air quality receptor: R242	Medium	**Visual** Slight beneficial year 1, slight beneficial year 15 **Noise** Significant beneficial. **Air quality** Small improvement of the NO_2 annual mean concentration experienced at this property	Permanent	Local	No mitigation measures are required for beneficial effects.	Moderate beneficial

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Pastures Farm, Ermine Street, CB23 3PF Type of receptor: residential Landscape receptor: R102 Air quality receptor: NA	Medium	**Visual** Moderate adverse year 1, slight adverse year 15 **Noise** Significant adverse effects are expected at some properties.	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse, reducing to slight adverse at year 15.
Oak Tree Cottage, New Bungalow - St, Neots Road, CB23 3PH Type of receptor: residential Landscape receptor: R105 Air quality receptor: R96	Medium	**Visual** Moderate adverse **Noise** Significant adverse effects are anticipated. **Air quality** Worsening of the NO_2 annual mean concentration experienced at some properties, but below national air quality objective levels (not significant).	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
The Range, Potton Road, Abbotsley, PE19 6XJ Type of receptor: residential properties Landscape Receptor R114 Air quality receptor: R240	High	**Visual** Moderate adverse year 1, slight adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Worsening of the NO_2 annual mean concentration experienced at some properties, but below national air quality objective levels (not significant).	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse, reducing to slight adverse at year 15

Receptor	Value	Potential in-combination impact	Duration	Scale	Mitigation	Combined effect
Papworth Hotel / Iway Inn, Ermine Street South, CB23 3PB Type of receptor: commercial Landscape receptor: C29 Air quality receptor: NA	Medium	**Visual** Moderate adverse year 1, slight adverse year 15 **Noise** Significant adverse effects are anticipated. **Air quality** Worsening of the NO_2 annual mean concentration experienced at this receptor, but below national air quality objective levels (not significant).	Permanent	Local	None considered practical above the measures outlined within the First Iteration EMP **[TR010044/APP/6.8]**.	Moderate adverse, reducing to slight adverse in year 15.
Note: The value/ sensitivity of noise receptors is not defined during the assessment of noise and vibration. All potentially sensitive receptors are considered to be of equal value/ sensitivity. The highest value/ sensitivity rating attributed by the relevant environmental topic assessments has therefore been adopted.						

15.5.4 The assessment has identified a number of receptors where combined effects are predicted, particularly those arising from construction activities where works would be in close proximity to receptors such as residential properties. Due to the nature of the works, there are limited opportunities for additional mitigation measures to reduce these potentially significant adverse effects during construction.

Construction in-combination effects

15.5.5 As reported in **Table 15-3**, the construction of the Scheme is likely to result in significant adverse combined effects for 23 receptors, 19 of these are moderate adverse effects and four are large adverse effects. Thirteen of the affected receptors are located at the western end of the Scheme, in the vicinity of the Black Cat junction and the Roxton Road link.

15.5.6 Of the four receptors which are likely to experience large adverse combined effects, one is located directly to the north of the Roxton Road roundabout (receptor R11 on **Figure 7.11** of the Environmental Statement **[TR010044/APP/6.2]**), two are in proximity to the Barford Road bridge (receptors R36 and R37) and one is to the south of the realigned B1046 (receptor R52). Properties at Roxton Road (receptor R11 on **Figure 7.11** of the Environmental Statement **[TR010044/APP/6.2]**), properties directly to the north of the Barford Road bridge (receptor R36) and the properties to the south-east of the realigned B1046 are all predicted to experience significant adverse visual, noise and vibration effects during construction of the Scheme. The properties to the south of the Barford Road bridge are predicted to experience significant noise and visual effects. These are notable effects on receptors of a high value.

Operation in-combination effects

15.5.7 As reported in **Table 15-4**, the operation of the Scheme is likely to result in significant adverse combined effects at 15 receptors and significant beneficial combined effects at one receptor.

15.5.8 Of the 15 receptors which are likely to experience significant adverse combined effects, seven of these are large adverse and eight are moderate adverse. Four of the receptors likely to experience moderate adverse effects will reduce to slight adverse at year 15 as planting matures. All the receptors where large adverse effects are likely, are receptors of a high value. Of the receptors likely to experience moderate adverse effects, five are of high value, and two are of medium value. All operational in-combination effects are of a permanent nature.

15.5.9 In contrast to the in-combination construction assessment, the affected receptors are not concentrated in one area of the Scheme, and many are isolated properties. However, the majority of the receptors which are likely to experience significant adverse effects (9 out of 14) are adjacent to the Order Limits. The remaining five receptors are all located less than 250 metres (0.16 miles) from the Order Limits.

15.6 Assessment of cumulative effects with other development

15.6.1 A total of five 'other developments' have been shortlisted for inclusion in the assessment of cumulative effects. These developments and their interactions with the Scheme are detailed in **Appendix 15.2** of the Environmental Statement **[TR010044/APP/6.3]** and shown on **Figure 15.2** of the Environmental Statement **[TR010044/APP/6.2]** and include the following:

a. **ID003: Potton Road Housing –** 16/01507/OUT: Residential development of site for up to 79 dwellings and associated open space with all matters reserved except access to be from Potton Road.

b. **ID004: Wintringham –** 17/02308/OUT: Hybrid planning application comprising: 1) Application for outline planning permission for development of a mixed use urban extension to include: residential development of up to 2,800 dwellings (C3), up to 63,500 sqm of employment development (B1-B8).

c. **ID005: Cambourne** – S/2903/14/OL: Development of up to 2,350 residential units including affordable housing; retail, use classes A1-A5 (up to 1.04 ha); offices/light industry, use class B1 (up to 6.25ha); community and leisure facilities, use class D1 and D2 (up to 0.92 ha); Two primary schools and one secondary school (up to 11 ha).

d. **ID007: Loves Farm** – 1300388OUT and 0101550OUT: Phased outline application for the development of up to 1,020 dwellings, up to 7.6ha of mixed uses including a nursery/crèche (Use Class D1), public house (Use Class A4), hotel (Use Class C1), care accommodation (Use Class C2) and employment uses (Use Class B1), a primary school (Use Class D1), formation of new access junctions onto Cambridge Road, connections with Loves Farm, on-site roads and pedestrian / cycle routes and other related infrastructure.

e. **ID011: Bourn Airfield** – S/2953/15/E2/ and S/3440/18/OL: Outline planning permission for a new mixed-use village comprising residential development of approximately 3,500 dwellings; mixed uses comprising employment, retail, hotel, leisure, residential institutions.

15.6.2 Based on the review of environmental information available for the Scheme and these 'other developments', as noted in **Appendix 15.2** of the Environmental Statement **[TR010044/APP/6.3]** the following two developments are not predicted to cause any significant cumulative effects with the Scheme:

a. **ID003: Potton Road Housing** – 16/01507/OUT.

b. **ID011: Bourn Airfield** – S/2953/15/E2/ and S/3440/18/OL.

15.6.3 The following three developments are predicted to cause significant cumulative effects with the Scheme:

a. **ID004: Wintringham** – 17/02308/OUT

i. Temporary **moderate adverse** cumulative landscape effect on the local landscape area. Due to the possible but unlikely overlap of construction activities between the Wintringham development, Loves Farm and the Scheme. If the overlap of construction occurred only between the Scheme and the Wintringham development, and no overlap with Loves Farm arose, this would result in a cumulative landscape effect of slight adverse.

ii. Temporary **moderate adverse** cumulative construction noise effect at Greyholme, Cambridge Road (receptor R25 on **Figure 11.1** of the Environmental Statement **[TR010044/APP/6.2]**). This effect would only occur in the unlikely worst-case scenario that construction of the Scheme and Wintringham Park were to coincide in the vicinity of the receptor.

b. **ID005: Cambourne** – S/2903/14/OL

i. Temporary **moderate adverse** cumulative landscape effect on the local landscape. Due to the possible overlap of construction activities between the Scheme and the Cambourne development.

ii. **Moderate adverse** cumulative visual effect on the residents of Swansley Farm (receptor R104 on **Figure 7.11** of the Environmental Statement **[TR010044/APP/6.2]**) due to the visual effects caused by the Scheme and the Cambourne development. This would reduce to a slight adverse cumulative visual effect by year 15.

iii. Temporary **moderate adverse** cumulative visual effect on the residents of 1 - 4 Common Farm Cottages (receptor R108 on **Figure 7.11** of the Environmental Statement **[TR010044/APP/6.2]**) due to the visual effects caused by the Scheme and the Cambourne development. Reducing to a neutral cumulative effect by year 1 of the Scheme.

c. **ID007: Loves Farm** – 1300388OUT and 0101550OUT

i. **Moderate adverse** cumulative visual effect on the residents of Tithe Farm (receptor R66 on **Figure 7.11** of the Environmental Statement **[TR010044/APP/6.2]**) due to the visual effects caused by the Scheme and the Loves Farm development. This would reduce to a slight adverse cumulative visual effect by year 15.

15.7 Monitoring

15.7.1 For construction related cumulative effects, no additional mitigation measures above those presented within the First Iteration EMP **[TR010044/APP/6.8]** are considered applicable or proportionate for short-term temporary cumulative effects. On that basis, no monitoring of significant effects is proposed.

15.7.2 During operation, no additional mitigation measures specific to the identified in within the First Iteration EMP **[TR010044/APP/6.8]** are considered appropriate or proportionate to reduce the significant adverse cumulative effects. On that basis, no monitoring of significant effects is proposed.

15.8 References

Ref 15-1 Design Manual for Roads and Bridges: LA 104 Environmental assessment and monitoring (Revision 1). Highways England (2020). https://www.standardsforhighways.co.uk/prod/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a

Ref 15-2 Advice Note Seventeen – Cumulative Effects Assessment. The Planning Inspectorate (2015). https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/12/Advice-note-17V4.pdf

Ref 15-3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. HMSO (2017). http://www.legislation.gov.uk/uksi/2017/572/contents/made

Ref 15-4 National Policy Statement for National Networks. Department for Transport (2014). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387223/npsnn-web.pdf

Ref 15-5 Overarching National Policy Statement for Energy (EN-1). Department of Energy & Climate Change (2011). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

Ref 15-6 National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). Department of Energy & Climate Change (2011). https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf

Ref 15-7 A428 Black Cat to Caxton Gibbet: Environmental Impact Assessment Scoping Report. Highways England (2019). https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010044/TR010044-000006-BCCG%20-%20Scoping%20Report.pdf