

15 INTRA-DEVELOPMENT CUMULATIVE EFFECTS

15.1 INTRODUCTION

This chapter of the ES provides an assessment of the potential for intra-development cumulative effects.

15.2 INTRA-DEVELOPMENT CUMULATIVE EFFECTS

The Institute of Environment Management and Assessment (IEMA) [1] Guidance identifies two types of cumulative effects:

- Inter-project (or 'inter-development') effects – incremental changes caused by other existing and/or approved development schemes occurring together with the proposed development and the cumulative effects combining to worsen the effect of a particular impact; and
- Intra-project (or 'intra-development') effects – those effects that occur as a result of impact interaction between different environmental topics within the same project. For example, a project might affect bird species as a result of direct loss of habitat and by noise and light disturbance. Each of these when considered in isolation may have a limited effect but taken together the sum is greater than the parts.

The cumulative schemes considered relevant to this ES are identified within Chapter 2: *EIA Methodology*. The inter-development effects of these schemes have been assessed within each individual technical chapter, as appropriate. Intra-development effects have subsequently been assessed within this chapter.

The assessment of cumulative intra-development effects considers the combination of identified significant effects of more than one technical assessment category which have the potential to affect the same sensitive receptor.

Residual effects of both an adverse and beneficial nature are considered as part of the assessment. When fully and thoroughly considered with all aspects shown, if a receptor has an effect identified from only one topic then the overall effect is considered to remain that identified. If several topics identify effects for a single receptor then they have been considered and the residual effect adjusted according to the collective weight of the effects' significance and nature (adverse/beneficial).

For some environmental aspects, no interactions with other aspects can occur and so no combined cumulative effects could arise. Where this is the case, the assessment states that there is no potential for effect interactions.

Based on the methodology detailed within this chapter, **Table 15.1** and **Table 15.2** present the potential for interactions of individual effects during the construction and operational phases, respectively.

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Table 15.1

Intra-development Cumulative Effects Assessment – Construction Phase

SENSITIVE RECEPTOR/RECEPTOR GROUP	CONSTRUCTION RESIDUAL EFFECTS	INTRA-DEVELOPMENT CUMULATIVE EFFECT POTENTIAL?	POTENTIAL FOR INTRA-DEVELOPMENT CUMULATIVE EFFECT INTERACTION?
Employment	<u>Socio-Economics</u> Generation of construction employment – Negligible (Kent) - Major Beneficial (Application Site and Local Impact Area)	No	No
LCA1: Darent Valley	<u>Landscape</u> Impact on the landscape due to the construction works – Minor Adverse	No	No
3a: Knockholt and Halstead Wooded Downs	<u>Landscape</u> Impact on the landscape due to the construction works – Minor Adverse	No	No
A224 Pole Hill	<u>Views</u> Impact on view due to the construction works – Minor Adverse	No	No
Star Hill (road)	<u>Views</u> Impact on view due to the construction works – Minor Adverse	No	No
Other Public Rights of Way	<u>Views</u> Impact on view due to the construction works – Moderate Adverse	No	No
Fort Halstead, including buildings F2, F3, F4, F5, F6, F7, F8, F9 and the Second World War Firewatcher’s Post	<u>Built Heritage</u> Demolition of existing buildings and consequent loss of historic context – Moderate Adverse	No	No
Building F16 and Building F17	<u>Built Heritage</u> Demolition of existing buildings within the setting of the listed buildings and consequent loss of historic context – Minor Adverse	No	No
Building F11	<u>Built Heritage</u> Demolition of existing buildings within the setting of the listed buildings and consequent loss of historic context – Minor Adverse	No	No
Building F14 and Building F18	<u>Built Heritage</u> Demolition of existing buildings within the buildings’ settings and consequent loss of historic context – Minor Adverse	No	No
Q1, Q3, Q4 and Q4-1	<u>Built Heritage</u> Demolition, which will be mitigated by building recording and dissemination of information – Moderate Adverse	No	No
Building A10, Building A11, Building A13 and Building A14	<u>Built Heritage</u> Demolition of existing buildings within the setting of the buildings and consequent loss of historic context – Minor Adverse	No	No
Building F1, Building F10, Building F12, Building F13, Building F15, Building X2, Building X3, Building X4, Building X5, Building X6, Building X7, Building X11, Building X12, Building X13, Building X8, Building X9, Building X38, Building X44 and Building X45	<u>Built Heritage</u> Demolition of existing buildings within the setting of the buildings, including buildings both within and outside of the Fort. This will lead to the loss of historic context – Minor Adverse	No	No

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SENSITIVE RECEPTOR/RECEPTOR GROUP	CONSTRUCTION RESIDUAL EFFECTS	INTRA-DEVELOPMENT CUMULATIVE EFFECT POTENTIAL?	POTENTIAL FOR INTRA-DEVELOPMENT CUMULATIVE EFFECT INTERACTION?
Fort Halstead Scheduled Monument	<u>Archaeology</u> Physical impact on the scheduled fort may reveal associated archaeological remains – Major Adverse	No	No
Prehistoric trackway	<u>Archaeology</u> Physical impact on a part of the suspected prehistoric trackway – Minor Adverse	No	No
Outfarms south of Polhill Arms Public House and north-west of Dunton Green Lime Works	<u>Archaeology</u> Potential for construction works to impact associated buried archaeological remains, should they survive – Minor Adverse	No	No
As yet unknown buried archaeological remains (associated with Scheduled Monument)	<u>Archaeology</u> Potential for construction works to impact associated buried archaeological remains, should they survive – Major Adverse	No	No
Historic landscape	<u>Archaeology</u> Impacts on historic landscape – Moderate Adverse	No	No
As yet unknown buried archaeological remains –Prehistoric (500,000 BC to AD 43)	<u>Archaeology</u> Potential for construction works to impact associated buried archaeological remains, should they survive – Minor Adverse	No	No
As yet unknown buried archaeological remains – Romano-British (AD 43 to AD 410)	<u>Archaeology</u> Potential for construction works to impact associated buried archaeological remains, should they survive – Minor Adverse	No	No
As yet unknown buried archaeological remains – Early medieval (AD 410 to AD 1066)	<u>Archaeology</u> Potential for construction works to impact associated buried archaeological remains, should they survive – Minor Adverse	No	No
As yet unknown buried archaeological remains – Medieval (AD 1066 to AD 1540)	<u>Archaeology</u> Potential for construction works to impact associated buried archaeological remains, should they survive – Minor Adverse	No	No
As yet unknown buried archaeological remains – Post-medieval (AD 1540 to AD 1901)	<u>Archaeology</u> Potential for construction works to impact associated buried archaeological remains, should they survive – Minor Adverse	No	No
Protected and notable species (bats, dormice, birds, reptiles)	<u>Biodiversity</u> Provision of additional bat, bird and dormice boxes and reptile refugia will increase the available roosting/nesting/refuge habitat – Minor Beneficial	No	No
Residential receptors: NSR A (Armstrong Close); NSR B (Star House, Star Hill Road); NSR C (Rose Cottage Farm, Birchwood Lane); NSR D (The Cottage, Otford Lane)	<u>Noise</u> Noise from demolition works– Moderate Adverse	No	No
Residential receptors: NSR A (Armstrong Close); NSR B (Star House, Star Hill Road); NSR C (Rose Cottage Farm, Birchwood Lane); NSR D (The Cottage, Otford Lane); NSR E (Proposed Residential Development); NSR F (Proposed Mixed-Use Development); NSR G (Proposed Residential Development); NSR H (Proposed School)	<u>Noise</u> Noise from construction works– Moderate Adverse	No	No

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Table 15.2

Intra-Development Cumulative Effects Assessment – Operational Phase

SENSITIVE RECEPTOR/RECEPTOR GROUP	OPERATIONAL RESIDUAL EFFECTS	INTRA-DEVELOPMENT CUMULATIVE EFFECT POTENTIAL?	POTENTIAL FOR INTRA-DEVELOPMENT CUMULATIVE EFFECT INTERACTION?
Population	<u>Socio-Economics</u> Increase in population at the site – Negligible (FEMA/Kent) - Major Beneficial (Application Site and Local Impact Area)	No	No
Employment	<u>Socio-Economics</u> Generation of operational employment – Negligible (FEMA/Kent) - Major Beneficial (Application Site and Local Impact Area)	No	No
Labour Force	<u>Socio-Economics</u> Increase in local resident workforce – Negligible (FEMA/Kent) - Major Beneficial (Application Site and Local Impact Area)	No	No
Housing Supply	<u>Socio-Economics</u> Provision of new housing at the site – Negligible (FEMA/Kent) - Major Beneficial (Application Site and Local Impact Area)	No	No
Post-16 Provision	<u>Socio-Economics</u> Increase in population of students aged 16-18 at the site – Negligible (non-selective schools) - Minor Adverse (selective schools)	No	No
LCA1: Darent Valley	<u>Landscape</u> Impact on the landscape associated with the development, once complete and operational – Major-Moderate Beneficial	No	No
3a: Knockholt and Halstead Wooded Downs	<u>Landscape</u> Impact on the landscape associated with the development, once complete and operational – Moderate Beneficial	No	No
Crow Drive, Armstrong Close and Fort Drive	<u>Views</u> Impact on view associated with the development, once complete and operational – Minor Beneficial	No	No
Star Hill (road)	<u>Views</u> Impact on view associated with the development, once complete and operational – Minor Beneficial	No	No
Other Public Rights of Way	<u>Views</u> Impact on view associated with the development, once complete and operational – Moderate Beneficial	No	No
Fort Halstead, including buildings F2, F3, F4, F5, F6, F7, F8, F9 and the Second World War Firewatcher’s Post and Building F16 and Building F17	<u>Built Heritage</u> Provision of long-term viable use and increased public appreciation, including public access and heritage trail – Moderate Beneficial	No	No
Building F11 and Building Q14	<u>Built Heritage</u> Provision of long-term viable use and increased public appreciation, including public access and heritage trail – Minor Beneficial	No	No
Building F14, Building F18 and A14	<u>Built Heritage</u>	No	No

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SENSITIVE RECEPTOR/RECEPTOR GROUP	OPERATIONAL RESIDUAL EFFECTS	INTRA-DEVELOPMENT CUMULATIVE EFFECT POTENTIAL?	POTENTIAL FOR INTRA-DEVELOPMENT CUMULATIVE EFFECT INTERACTION?
	Provision of long-term viable use and increased public appreciation, including public access and heritage trail – Minor Beneficial		
Building A13, Building A10, Building A11, Building F1, Building F12, Building F13, Building F15, Building Q1, Building Q3, Building Q4, Building Q4-1, Building Q13, Building X2, Building X3, Buildings X4, Building X5, Building X6, Building X7, Building X11, Building X12, Building X13, Building X8, Building X9, Building X38, Building X44 and Building X45	<u>Built Heritage</u> Provision of long-term viable use and increased public appreciation, including public access and heritage trail – Minor Beneficial	No	No
Nature conservation sites (ancient woodland sites) and retained habitats (woodland, grassland hedgerows and trees).	<u>Biodiversity</u> Structural and species diversity within the ancient woodland, other woodland, grassland and hedgerows will be enhanced. Ecological connectivity will also be improved – Moderate Beneficial (ancient woodland) - Minor Beneficial (other habitats)	No	No
Reptiles, dormice and birds	<u>Biodiversity</u> Increased predation by domestic pets, leading to decline in favourable conservation status – Minor Adverse Enhancement of retained habitat and provision of new habitats will provide suitable nesting/refuge/foraging opportunities for a range of species groups – Minor Beneficial	Yes	These effects are considered to have the potential to interact to produce an intra-development cumulative effect. Considering the collective weight of the effects' significance and nature, a Negligible effect is anticipated.
Bats, badgers, hedgehogs, reptiles and invertebrates	<u>Biodiversity</u> Enhancement of retained habitat and provision of new habitats will provide suitable roosting/nesting/refuge/foraging opportunities for a range of species groups – Minor Beneficial	No	No
Surface water drainage at the application site	<u>Water Resources & Flood Risk</u> Increase in capacity of the receiving environment – Moderate Beneficial	No	No
Foul water drainage at the application site	<u>Water Resources & Flood Risk</u> Increase in capacity of the receiving environment – Moderate Beneficial	No	No

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15.3 SUMMARY

From the intra-development cumulative effects assessment, it can be seen that there is the potential for combined effects to arise on reptiles, dormice and birds during the operational phase and there is the potential for those effects to interact with one another to produce intra-development cumulative effects. The anticipated intra-development cumulative effect on these receptors is Negligible. No other intra-development cumulative effects have been identified.

15.4 WORKS CITED

[1] Institute of Environmental Management and Assessment, "The State of Environmental Impact Assessment Practice in the UK," IEMA, 2011.