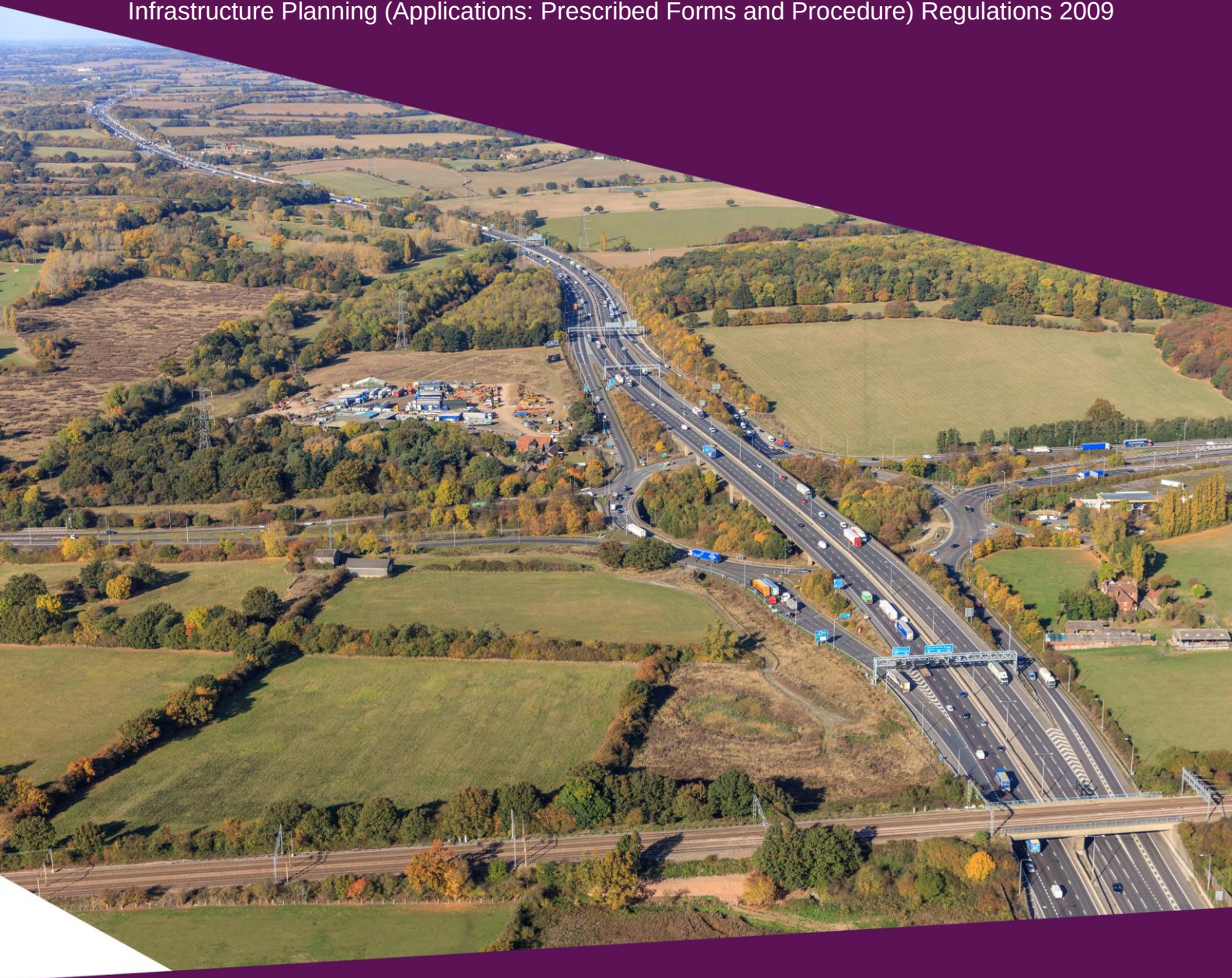
M25 junction 28 improvement scheme
TR010029
6.1 Environmental Statement
Chapter 15: Assessment of cumulative effects

APFP Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009



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Planning Act 2008

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

The M25 junction 28 scheme
Development Consent Order 202[x]

6.1 ENVIRONMENTAL STATEMENT
CHAPTER 15: ASSESSMENT OF CUMULATIVE EFFECTS

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Executive summary

This chapter has assessed the in-combination and cumulative effects of the Scheme. In-combination effects are those which occur between and in conjunction with different environmental topics as a result of the inter-relationship of the impacts identified in the preceding chapters of this Environmental Statement (ES). Cumulative effects are those which occur upon individual environmental receptors as a result of multiple projects, i.e. effects arising from both the Scheme and a nearby 'other development' concurrently.

The in-combination effects have been assessed to the extent of the respective study areas established within each of the preceding topic chapters. This assessment found that there would be adverse effects during construction principally in regard to visual impacts (including some severe localised visual impacts upon residential receptors), land take, localised noise and vibration, ecology and minor disturbance to some heritage assets. There would be adverse in-combination effects in operation relating to ecological assets (principally the loss of veteran trees), landscape and visual effects. The Scheme would bring beneficial in-combination effects upon receptors in regard to road drainage and water environment through improved flooding and drainage management, and for travellers through the reduction in congestion created within and around junction 28.

For the cumulative effects assessment, a total of 22 'other developments' were identified which had the potential to impact upon environmental receptors in conjunction with the Scheme. These developments were identified by consideration of their scale, proximity to the Scheme and overlap in construction period.

Overall there are likely to be cumulative effects during construction in relation to construction noise where construction periods may overlap, biodiversity impacts due to displacement of Site of Metropolitan Importance (SMI) land and disturbance to species, and landscape and visual effects where there would be an increase in urbanisation and inter-visibility.

There are likely to be cumulative effects during operation in relation to landscape effects in combination with large scale urban extensions at land east of Nags Head Lane and Dunton Hills Garden Village due to the loss of the existing rural character.

15 Assessment of cumulative effects

15.1 Introduction

15.1.1 This chapter considers the in-combination and cumulative effects of the Scheme. The Environmental Impact Assessment (EIA) Directive and the Infrastructure Planning (EIA) Regulations 2017 ('EIA Regulations') require an Environmental Statement (ES) to include the assessment of the inter-relationship between environmental topics and an assessment of cumulative effects with other developments.

15.1.2 This assessment draws upon the guidance provided within the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 2, Part 5: Assessment and Management of Environmental Effects' and the Planning Inspectorate (PINS) 'Advice Note Seventeen: Cumulative Effects Assessment' (August 2019), which are considered to represent best practice for cumulative effects assessments.

15.1.3 As set out in IEMA Guidance (2011), in-combination (synergistic) and cumulative (additive) effects are defined as:

- Intra-projects effects or 'in-combination effects' (synergistic): These effects occur between different environmental topics within the same proposal and as a result of the development's direct effects i.e. combined effects from a single project (the inter-relationship between different environmental factors).
- Inter-project effects or 'cumulative effects' (additive): These effects occur as a result of the combined action of a number of different projects (defined as 'other development') cumulatively with the project being assessed and on a single resource or receptor i.e. cumulative effects from the other developments (with the project being assessed).

15.2 Competent expert evidence

15.2.1 This assessment of cumulative effects has been undertaken by

- A Chartered Environmentalist (MSc, BSc, MIEMA, CEnv) and Registered Environmental Impact Assessor with over 10 years of knowledge and experience in cumulative impact assessment within EIA.
- A Licentiate Town Planner (MSc, BA (Hons)), with over 2 years' professional experience in town planning.

15.3 Legislative and policy framework

15.3.1 The Environmental Impact Assessment (EIA) Directive is implemented through the Infrastructure Planning (EIA) Regulations 2017 in relation to Nationally Significant Infrastructure Projects (NSIPs). The EIA Regulations require consideration of the likely significant effects of a development on the environment, including cumulative and in-combination effects.

15.3.2 Schedule 4 paragraph 5 of the EIA Regulations requires 'A description of the likely significant effects of the development on the environment resulting from, inter alia: (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of

natural resources … The description of the likely significant effects on the factors specified in regulation 5(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.'

15.3.3 The need to consider cumulative and in-combination effects in planning and decision-making is also set out in paragraphs 4.16 and 4.17 of the National Policy Statement for National Networks (NPS NN) which states that "*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".* It should also be considered *"how significant cumulative effects and the interrelationship between effects might as a whole affect the environment, even though they may be acceptable when considered on an individual basis with mitigation measures in place."*

15.4 Study area

In-combination (synergistic) effects

15.4.1 The study area for the assessment of in-combination effects of the Scheme reflects the study areas, also termed the spatial Zones of Influence (ZOI), identified within the relevant topic chapters of this ES (Chapters 5 to 14) are summarised in Table 15.1 below.

Table 15.1: Zone of influence/study area

Environmental topic	Zone of influence
Air quality	• For dust effects, 200 m from the area expected to be affected by construction activities. • For local air quality during operation, 200 m from the proposed new roads and other roads affected by traffic changes (the affected road network).
Noise and vibration	• For construction effects, 300 m from the construction footprint of the site and roads used by construction traffic. • For operational effects, 600 m from the carriageway edge of any proposed new routes or existing routes to be bypassed or improved, and 600 m from any other affected routes within 1 km of the proposed new routes or altered existing routes.
Biodiversity	• 30 km from the Development Consent Order (DCO) boundary for Special Areas of Conservation (SACs) where bats are a qualifying feature. • 5 km from the DCO boundary for bats. • 2 km from the DCO boundary for statutory designated sites of nature conservation importance including European designated sites and nationally designated sites (SAC, SPAs, Ramsar, SSSI, NNR, LNR). • 2 km from the DCO boundary for Non-statutory SNCIs, Roadside Nature Reserves and conservation verges. • 1 km from the DCO boundary for notable habitats, ancient woodland, notable or legally protected species and invasive plant species. • 500 m from the DCO boundary for water bodies; and 50 m from the DCO boundary of veteran trees.

Environmental topic	Zone of influence
Road drainage and water environment	• Within 1 km of the DCO boundary.
Landscape and visual	• Visual effects within 2 km of the DCO boundary. • Landscape effects within 2 km of the DCO boundary.
Geology and soils	• Within 250 m of the DCO boundary.
Cultural heritage	• Within 500 m of the DCO boundary.
Materials and waste	• For material resources, the study area includes the demand for key construction materials within the East of England and Greater London. Mineral Safeguarding Areas (MSAs) have been assessed within the DCO boundary. • For non-hazardous waste, the study area for CD&E arisings and infrastructure capacity is the county of Essex. • For hazardous waste, the study area for CD&E arisings is the county of Essex and the study area for hazardous CD&E infrastructure capacity is England.
People and communities	• Private dwellings within 250 m of the DCO boundary. • Community land and facilities, Development land, NMUs and VTs within 500 m of the DCO boundary. • Human health within 1 km from the DCO boundary. • Local economy - Businesses within and adjacent to the DCO boundary, residents in close proximity to the Scheme, local authority labour markets and local authority economy.
Effects on climate and vulnerability to Climate Change	• Climate Change impact is inherently a cumulative effect of all human actions (including development) and is therefore not considered further in this chapter as the assessment of cumulative impacts resulting in Climate Change have been covered in Chapter 14 of this ES in greater depth. • Due to the inherent cumulative effects of Climate Change, in-combination effects will be captured in the individual environmental topic chapters e.g. Ecology, Road Drainage and the Water Environment, and Air Quality assessments. Climate vulnerability is therefore not considered further in this chapter as this vulnerability has already been assessed in topic-specific contexts across the ES.

Cumulative effects

15.4.2 The study area for the identification of ‘other developments’ for inclusion in the assessment of cumulative effects is based upon thresholds and spatial areas. These thresholds and spatial areas are based upon professional judgement and taking into account the nature and location of the Scheme and the ZOIs for individual environmental topics.

15.4.3 The thresholds and spatial areas have been defined, recognising that larger, more significant, developments will have wider ranging environmental effects than smaller and more local developments and it is summarised below:

- NSIPs – All projects listed on the PINS programme of projects - 10 km from the DCO boundary
- Regionally Significant Projects – 3 km from the DCO boundary

- Major development – 1.5 km from the DCO boundary
- Minor development – within or adjacent to the DCO boundary

15.4.4 NSIPs are those that are listed on the PINS Programme of Projects.

15.4.5 The definition of a Regionally Significant Project is 'a project that has been included within the traffic model for the Scheme (methodology is detailed in the Transport assessment (application document TR010029/APP/7.4)) which factors in all developments which would generate significant additional vehicle trips per weekday. This includes individual residential developments of 200 dwellings or more, clusters of smaller developments of more than 200 dwellings cumulatively, and employment developments providing 100 full time equivalent jobs or more.' Only developments in the traffic model within 3 km of the DCO boundary are included in the cumulative assessment as the traffic model incorporates data from a much wider geographic scale where cumulative effects with the Scheme are unlikely to occur.

15.4.6 Major development and minor development are defined in accordance with the criteria provided in Article 2 of the Town and Country Planning Development Management Procedure (England) Order 2015. Thresholds for a major development includes more than 10 new dwellings, a site area of 0.5ha and all mineral and waste developments. Minor developments are defined as developments below these thresholds.

15.4.7 The assessment of cumulative effects is based on a topic-by-topic identification of where the ZOIs for the Scheme and ZOIs for 'other developments' overlap, and therefore have potential for cumulative effects.

15.5 Assessment methodology

In-combination (synergistic) effects

15.5.1 The methodology for the in-combination effects follows DMRB Volume 11, Section 2, Part 5: Assessment and Management of Environmental Effects.

15.5.2 The assessment methodology for in-combination effects requires the identification of impact interactions associated with the Scheme on key environmental receptors. This ensures that the ES is not a series of separate assessments collated into one document, but rather a comprehensive assessment drawing together all the environmental effects of the proposals.

15.5.3 The effects identified within the relevant ES topic chapters (Chapters 5 to 13) have been assessed to identify potential in-combination effects using DMRB guidance, professional judgement and a qualitative assessment approach.

15.5.4 The receptors considered in the ES have been sub-divided into the following groups:

- Human - residents, including community and private assets, sensitive receptors and vulnerable groups
- Human - all travellers, i.e. vehicle travellers, cyclists, and pedestrians
- Ecological receptors – protected species and existing habitats
- The water environment

- Heritage assets
- Geology and soils
- Landscape and townscape

15.5.5 Within these broad groups, individual receptors or groups of receptors that could be affected by the proposals have also been considered. The potential effects acting upon these receptors are primarily changes in traffic, noise, air quality, visual effects, and the physical environment (i.e. water, ecology, heritage). The assessment considers residual effects after mitigation has been taken into account. Receptors that are significantly adversely affected by two or more residual effects have then been identified and the range of effects likely to impact upon specific groups of receptors is described. Combined effects of Moderate Adverse or Beneficial and above are considered significant.

Cumulative effects

15.5.6 An assessment of cumulative effects has been undertaken. Advice Note 17 (PINS, 2015) recommends that: *"Other development' with potential to give rise to cumulative effects should be identified by the applicant… the applicant should obtain available information on 'other development' by reference to planning applications, relevant development plans and any other available sources including stakeholder consultations, in particular with the relevant local planning authority.*"

15.5.7 The principles of the four-stage assessment approach to cumulative assessment, as outlined in Advice Note 17, has been adopted as follows:

- Stage 1: Establish the NSIP's Zone of Influence (ZOI) and long list of 'other development'.
- Stage 2: Identify shortlist of 'other development' - apply threshold criteria based on temporal scope, the scale and nature of other development and any other relevant factors to assist in deciding whether to include or exclude 'other development'.
- Stage 3: Information gathering - compile detailed information on the 'other development' shortlisted, including proposed design and location, programme of construction, operation and decommissioning and environmental assessment information.
- Stage 4: Assessment - assess the cumulative effects of the proposed NSIP with the 'other development' based on factors including duration of effect, extent of effect, type of effect, frequency of the effect, value and resilience of receptors and likely success of mitigation.

15.5.8 To enable a reasonable and proportionate assessment, the following selection criteria has been used to identify and determine 'other development' which could result in potential cumulative effects with the Scheme in accordance with Table 3 in Advice Note 17:

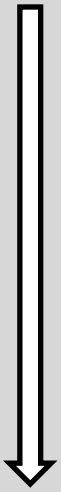
- Projects on the Infrastructure Planning Commission's (IPC) programme of projects.
- Trunk road and motorway projects which have completed the statutory planning processes, including those under construction.

- Other development projects under construction or with valid planning permissions, and for which formal EIA is a requirement or for which non–statutory EIA has been undertaken.
- Applications for consent which have been made, but which have not yet been determined.
- Projects identified in the relevant emerging or adopted Development Plans, with appropriate weight given as they move closer to adoption, recognising that information on these proposals may be limited at present.
- Projects identified in other plans and programmes which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

15.5.9 The developments in the above categories will only be considered in the assessment if they are considered to be 'reasonably foreseeable' and 'committed', in line with the guidance in DMRB Volume 11, Section 2, Part 5 HA 205/08.

15.5.10 The 'other developments' identified will then be grouped into tiers in accordance with PINS Advice Note. This grouping reflects the likely degree of certainty attached to each development, with Tier 1 being the most certain and Tier 3 being the least certain and most likely to have limited publicly available information to guide the assessment. A description of the tiers is provided in Table 15.2.

Table 15.2: 'Other development' for inclusion in the CEA

Tier	Likely degree of certainty	Level of detail
Tier 1	• Under construction*. • Permitted application(s) whether under the Planning Act 2008 or other regimes but not yet implemented. • Submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined.	Decreasing level of detail likely to be available 
Tier 2	• Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.	
Tier 3	• Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has not been submitted. • Identified in the relevant Development Plan (and emerging Development Plans - with appropriate weight being given closer to adoption) recognising that information on any relevant proposals will be limited. • Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals where such development is reasonable likely to come forward.	

* Where other projects are expected to be completed before construction of the proposed NSIP and the effects of these projects are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of the construction and operation assessment.

15.5.11 Rather than reporting every interaction, the methodology for the assessment of cumulative effects concentrates on the main significant effects, and aims to differentiate between permanent, temporary, direct, indirect and secondary effects, positive or negative.

15.5.12 Where significant cumulative effects, beyond those identified as residual effects from the Scheme in isolation, have been identified, additional mitigation measures are recommended.

15.5.13 The significance of cumulative effects on each environmental receptor group has then been made based on the balance of scores and using professional judgement.

15.5.14 Cumulative effects in relation to traffic growth, and its associated air quality and noise effects, across a wider regional study area are inherent within the traffic model and assessed as part of the main impact assessment in the relevant topic chapters. The assessments that make significant use of the traffic model are air quality and noise and vibration (Chapters 5 and 6). Certain information from the traffic model also contributes to the people and communities (Chapter 13) in relation to driver stress calculations.

Significance criteria

15.5.15 The assessment of significance of in-combination and cumulative effects has been undertaken in accordance with guidance in DMRB Volume 11, Section 2, Part 5 (HA 205/08). The value and magnitude of impact has been determined by the criteria set within the individual topic chapters of this ES and applied to any residual effects. The description of significance also takes account of the guidance in PINS Advice Note 17 to consider the capacity of environmental resources and receptors to accommodate any changes that are likely to occur. This guidance states that consideration should be given to the following:

- The duration of effect (temporary or permanent)
- The extent of effect (the geographical area of an effect)
- The type of effect, whether additive (e.g. loss of two areas of woodland of 1 ha, resulting in 2 ha cumulative woodland loss) or synergistic (e.g. two discharges combine to affect a species which is not affected by a single discharge)
- The frequency of the effect
- The value and resilience of the receptor affected
- The likely success of mitigation

15.5.16 Table 15.3 provides typical descriptors of effects in determining the significance of effect category for the combined and cumulative effects assessment. Effects are considered to be significant if Moderate, Large or Very Large.

Table 15.3: In-combination and cumulative effects significance descriptors

Environmental topic	Zone of influence
Very Large (Adverse or Beneficial)	Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised. Effects would be: • Permanent and far reaching for receptors of very high value • Key factor in decision making proves • Damaging impact for site or feature of international, national or regional importance • May include major change in a site or feature of local importance

Environmental topic	Zone of influence
Large (Adverse or Beneficial)	Effects that may become a key decision-making issue. Effects would be: • Permanent and far reaching for receptors of high value • Localised for a receptor of very high value • Temporary for receptor of very high value • Very important consideration and material in the decision-making process
Moderate (Adverse or Beneficial)	Effects that are unlikely to become fundamental issues as to project design selection, but where future work may be needed to improve performance. Effects would be: • Permanent and far reaching for receptors of medium value • Localised for receptors of high value • Temporary for a receptor of high value • Effects may be important, but are not likely to be key decision-making factors
Slight (Adverse or Beneficial)	Effects that are locally significant would be: • Permanent and far reaching for receptors of low value • Localised for receptors of medium value • Temporary for a receptor of medium value • Unlikely to be critical in the decision-making process
Neutral	Where the positive and/or negative effects of the Scheme, or the combined effects of the Scheme in association with other assessed future developments, would be balanced or negate one another. No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table Source: Based on Table 2.6 of DMRB Volume 11 Section 2 Part 5 HA 205/08

15.6 Assumptions and limitations

15.6.1 The assessment requires some application of professional judgement in line with the broad criteria set out in the Assessment Methodology (Section 15.5).

15.6.2 The assessment has been undertaken based upon the information currently available on ‘other developments’ identified in Table 15.4. These ‘other developments’ may be subject to change or amendment as their designs progress towards implementation. It is possible that there will be future planning applications for developments which could result in cumulative effects with the Scheme but, in line with the guidance in DMRB Volume 11, Section 2, Part 5 HA 205/08, only those developments which are ‘reasonably foreseeable’ and ‘committed’ have been included in the assessment.

15.6.3 For both the in-combination and cumulative effects assessments a worst-case approach has been adopted. For in-combination effects this assumes that effects arising from two different topics on one receptor will occur concurrently, unless timing is explicitly mentioned in the assessment e.g. daytime/night-time noise. For cumulative effects, where construction timing and phasing is not known, it has been assessed under the assumption that there is an overlap in the construction phases.

15.7 Baseline conditions

In-combination (synergistic) effects

15.7.1 The baseline for each environmental topic (Air Quality, Noise and Vibration, Road Drainage and the Water Environment, Biodiversity, Landscape and Visual, Geology and Soils, Cultural Heritage, Materials and Waste and People and Communities) is detailed in the ES (Chapters 5 to 13).

Cumulative effects

15.7.2 As part of Stage 1, which comprises the identification of the ZOI and a Long List of 'other development', a provisional list of 'other development' was compiled through searches of local authorities' webpages for planning applications and consents, and a review of allocated and proposed sites in local plans, other higher level plans and policies. In accordance with guidance in the DMRB, the relevant local authorities (Essex County Council, London Borough of Havering and Brentwood Borough Council) were also consulted to determine whether any other developments in the vicinity of the Scheme should be taken into consideration and when they believe these to be likely to come forward. The Stage 1 long list of 'other development' is included in Appendix 15.1 (application document TR010029/APP/6.3) presented in a tabular format in accordance with the methodology in PINS Advice Note 17.

15.7.3 As part of Stage 2 (identify short list of 'other development'), the long list of developments was then reviewed and filtered against the threshold criteria identified in the methodology section above (Section 15.5). The projects shortlisted for further consideration at Stage 2 are indicated in the table in Appendix 15.1 and summarised in Table 15.4 below. The local authorities were then consulted on the proposed Stage 2 short list during March and April 2019, and in August 2019, and finally in February 2020.

15.7.4 In response to the March/April 2019 consultation, the London Borough of Havering suggested several sites for consideration within this chapter, all of which were assessed against the criteria set out above in Section 15.4. Following the assessment they were not advanced to the shortlist for final assessment. Essex County Council and Brentwood Borough Council did not suggest any additional sites.

15.7.5 In response to the August 2019 consultation, the London Borough of Havering suggested several minor developments, which were again not advanced to the shortlist as they did not meet the appropriate criteria. Essex County Council suggested two further draft site allocations within the boundaries of Brentwood Borough, one of which met the criteria to be considered in the assessment. Two recent planning applications were also identified in Brentwood Borough, which have been included within the assessment. These three further developments have been included in the longlist and shortlist, and assessed within this chapter for their cumulative effects.

15.7.6 In response to the February 2020 consultation, the London Borough of Havering sent through a list of all applications in Gooshays and Harold Wood Wards since August 2019, none of which met the thresholds listed in paragraph 15.4.3 above. Essex County Council responded, advising Highways England of several amendments to Brentwood Pre-Submission Local Plan allocations, and

suggesting other strategic sites to be considered. On review, none of these amendments or sites met the thresholds in paragraph 15.4.3 and therefore have not been included in the assessment. No response was received from Brentwood Borough Council before the assessment cut-off date.

15.7.7 The locations of the Stage 2 short list developments, in relation to the Scheme and the respective ZOIs that these developments fall into, are shown on Figure 15.1 (application reference TR010029/APP/6.2).

15.7.8 The list of proposed developments to be considered in the cumulative effects assessment is presented in Table 15.4 below. This has been developed with the knowledge and information available at the time of publishing the ES.

15.7.9 Stage 3 of the cumulative effects assessment process, 'Information Gathering', was undertaken to provide further information on each of the short list developments.

15.7.10 Stage 4 'Assessment' was undertaken to determine if the effects of the Scheme and 'Other Development' are likely to result in combined significant effects. Tables 15.7 to 15.10 below demonstrate the systematic approach to the cumulative effects assessment that has been adopted and detail the potential adverse or beneficial cumulative effects of the project with 'Other Development'. These tables have been formulated in conjunction with the technical experts and authors of the preceding topic chapters, based on their knowledge of the Scheme and the information gathered as part of Stage 3 above. A summary of key findings is provided in section 15.12.

15.7.11 Within Advice note seventeen: *Cumulative effects assessment relevant to nationally significant infrastructure projects,* in paragraph 3.4.9, the Planning Inspectorate acknowledges that applicants are required to stop assessment work at a particular point in time in order to be able to finalise and submit an application. With this in mind, an assessment cut-off date was set at 28 February 2020, allowing time for topic chapter experts to consider the cumulative effects of these 'other developments', and allowing time to finalise the Environmental Statement.

Table 15.4: Shortlist of 'Other development'

Development	Application number	Distance from DCO boundary (km)	Description
Planning Inspectorate			
Lower Thames Crossing	Lower Thames Crossing NSIP	Within DCO boundary	The Lower Thames Crossing (LTC) will be a new road crossing connecting Essex and Kent. Located east of Gravesend and Tilbury, and connecting to the M25 between junctions 29 and 30, this new crossing will offer the improved journeys, new connections and network reliability, and economic benefits that only a new, alternative crossing, away from Dartford, can provide.
Transport for London			
Gallows Corner Reconfiguration	Havering Submission Local Plan Policy 23, TfL Consultations 2016	2.65	Remodelling of Gallows Corner which will involve taking traffic underneath the junction to address congestion and smooth traffic flows at this busy traffic 'hot spot'. The proposal will enable better links Strategic Transport Connection - Reconfiguration of Gallows Corner between Harold Hill and Romford. It has the potential to improve the environment and provide scope for further development.
London Borough of Havering			
Small, Medium, Large Wind Development Sites	Site Allocation - Wind Development Sites in Gooshays Ward (Havering)	3 allocations within DCO boundary (26 allocations within 2 km of the DCO boundary)	The Council will support proposals for wind turbines, in addition to the above criteria for renewable energy developments, where: i. They are located within an 'Area Suitable for Wind Energy Development' as designated on the Proposals Map; ii. The proposal has been subject to meaningful pre-application consultation with the affected local community and the application is supported by a consultation statement; iii. There is no unacceptable impact on residential amenity in terms of noise, shadow flicker, vibration and visual dominance; iv. A noise impact assessment, which considers all relevant National and Local guidance, must be conducted, and identify appropriate noise mitigation measures where required to reduce the impacts on the surrounding occupants; and v. It is in compliance with the Ministerial Written Statement (HCWS42) or subsequent national policy.
Garden of Peace (formerly known as Land at Oak Farm), Maylands Fields	P1742.14	Within DCO boundary	Change of use of land to burial grounds including removal of existing agricultural buildings and erection of two pavilion buildings for associated usage, hard and soft landscaping, new access to A12 and internal roads and paths, parking, and workshop area for storage of associated equipment, tools and materials.

Development	Application number	Distance from DCO boundary (km)	Description
The Caravan Park, Putwell Bridge, Colchester Road	4.12 Site Allocation – Gypsy & Traveller Sites	Within DCO boundary	Addition of Gypsy and Traveller Site at The Caravan Park, Putwell Bridge.
Former Harold Wood Hospital, Gubbins Lane	P0702.08	1.60	Outline application for the redevelopment of the site to provide 810 dwellings including submission of full details in relation to the retention, with alterations, to the Grange listed building within the site to provide 11 flats and a two storey building adjacent to the Grange to provide 4 flats.
Essex County Council			
Cycleway Proposals	Brentwood Borough Cycling Action Plan	Within DCO boundary	Potential and Existing Schemes in Brentwood and Shenfield. (Existing designated cycle path exists crossing the Brook Street Roundabout, and other new cycle paths are proposed within 500 m of the site to the east).
Brentwood Borough Council			
Land East of Nags Head Lane	Brentwood Draft Local Plan Preferred Site Allocations - 032	0.25	Proposal for 125 dwellings.
Boyles Court Farm, Dark Lane	18/01827/FUL	0.45	Change of use, conversion and extension of existing building to provide 13 residential apartments and redevelopment of demolished secure wing and other structures and buildings to provide a courtyard of 17 family dwellings, with parking, garaging, attenuation pond and other associated hard and soft landscaping.
Regent House, Hubert Road	16/00290/PNCOU	1.35	Prior Approval Notification Class O - Change of use of Offices Class B1(a) to form 136 apartments (Class C3).
Regent House, Hubert Road	18/01601/OUT	1.35	Outline application within car park of existing residential block comprising 31 flats, including 11 affordable units and parking provided at a ratio of 0.9 spaces per dwelling.
Essex Police & La Plata House, London Road	16/01805/OUT	1.70	Outline application for demolition of existing police station buildings, conversion of La Plata House to residential use and development of up to 70 new residential dwellings (All matters reserved).
Westbury Road Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 039	1.90	Proposal for 45 dwellings.

Development	Application number	Distance from DCO boundary (km)	Description
141 to 147 High Street	18/00859/FUL	1.95	Mixed use development compromising of commercial unit(s), for Class A1 retail, Class A2 services, Class A3 restaurant, Class D1 non-residential institution or Class D2 assembly and leisure use, together with 19 x one and two bed flats.
Land at Hunter House	Brentwood Draft Local Plan Preferred Site Allocations - 041	2.05	Proposal for 48 dwellings.
Land Formerly Known as NV Tools, St James Road	15/01084/FUL	1.90	Redevelopment for 45 flats, landscaped amenity deck and associated car parking.
William Hunter Way Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 102	2.15	Proposal for 300 dwellings.
Kings House 101-135 Kings Road	16/00606/PNCOU	1.95	Prior Approval Notification Class O - Change of use from office space (B1(a)) to 35-40 residential flats (C3 use class).
Chatham Way/ Crown Street Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 040	2.10	Proposal for 31 dwellings.
Ford Offices, Eagle Way	19/00844/PNCOU	2.05	Notification for Prior Approval class O for a Proposed Change of use of a building from office use (Class B1(a)) to a dwellings (266 units) (Class C3).
Brentwood Enterprise Park	Brentwood Draft Local Plan Preferred Site Allocations - 101A	2.20	Gross area 35.47ha Developable area 25.85ha Opportunity to create a strategic employment site, delivering high quality employment space and significant number of jobs. Potential for bus links to be created. Excellent access to strategic highway network.
Dunton Hills Garden Village	Brentwood Draft Local Plan Preferred Site Allocations - 200	6.40	Proposal for self contained garden village incorporating 2770 dwellings within the plan period (4000 total), and 5.5ha of employment land. Development will also include a new secondary school (Use Class D1), two co-located primary school and early years and childcare nurseries (Use Class D1), and two stand-alone early years and childcare nurseries (Use Class D1),

15.8 Assessment of in-combination effects

15.8.1 Significance of individual effects have been determined in the assessments within the respective topic chapters of this ES. The interaction between these effects is examined below and in Table 15.5 for construction and Table 15.6 for operation, in order to determine an overall combined significance of the impacts of all identified residual effects in interaction. This significance has been determined by professional judgement in line with the significance criteria outlined in Table 15.3, and has been informed by the severity, timescale and localisation of impacts and the value of the assets affected by these impacts.

Construction

15.8.2 Table 15.5 sets out how the residual effects from each topic chapter have been combined to determine the overall significance of in-combination effects during construction. These effects would be temporary in nature.

Human (residents, including community and private assets, sensitive receptors and vulnerable groups)

15.8.3 For residential, business and community receptors in proximity to the site, there would be large adverse in-combination visual impacts during works, as well as temporary and permanent land take affecting four residential and community receptors. Human receptors would be more affected in the north-western quadrant of the junction, where the majority of major works will be undertaken, including large significant effects for Grove Farm, Maylands Cottage, Glebelands Estate and Maylands Golf Club.

15.8.4 To the south of the A12, the Caravan Park, Putwell Bridge would experience significant in-combination adverse effects in terms of visual impact and noise and vibration, and the proposed Gardens of Peace burial grounds would experience moderate adverse effects primarily as a result of visual and amenity effects and temporary land take at the eastern part of the site to accommodate the gas main realignment.

15.8.5 Three residential receptors (Caravan Park, Putwell Bridge, 17 Colchester Road and Maylands Cottage) to the west of the junction would experience slight adverse effects (not significant) during daytime construction due to noise and vibration.

Human (all travellers)

15.8.6 There would be a slight adverse in-combination effect for both vehicle travellers and non-motorised users (NMUs) (including pedestrians), through the junction due to reduced visual amenity, as the Scheme would result in extensive ground works, vegetation removal and construction in a visually prominent location. There would be significant adverse visual effects on some PRoW users in the vicinity as a result of works, most notably of the bridleway adjacent to the M25 northbound carriageway, north of Jermains Wood and south of Nags Head Lane.

15.8.7 Disruption caused to traffic is considered within the People and Communities chapter (Chapter 13), specifically as part of the driver stress assessment. There would be a temporary slight adverse effect due to traffic management resulting in a slowing of vehicular traffic flows across and around the junction. However, it is

not considered to be significant due to the temporary nature of any measures, and the severity of effects due to traffic management are likely to vary over the course of construction.

Ecological receptors

15.8.8 There would be works within the Ingrebourne Valley SMI, and significant works around the Ingrebourne River and areas of woodland priority habitat, as well as permanent land take in some of these areas to accommodate the works. This is likely to result in some disturbance to localised habitats and to priority species, which would not be possible to fully offset with ecological mitigation sites until such sites have been fully established and matured. Moderate adverse in-combination effects are therefore anticipated during construction on ecological receptors.

15.8.9 A combination of landscape changes, removal of vegetation and temporary disruption to species from noise and ground works may result in adverse effects on ecological receptors. However, this has already been assessed within the Biodiversity chapter (Chapter 7) and considered within the mitigation measures proposed therein, therefore these effects are included under the scope of biodiversity effects in the tables below, rather than of landscape. Noise effects on ecological receptors are also considered within the Biodiversity chapter, as it is noted that construction noise may result in temporary disturbance to species.

The water environment

15.8.10 In-combination effects on the water environment are considered not to be significant, due to appropriate mitigation measures to limit the effects of construction works, as discussed within the Road Drainage and Water Environment chapter (Chapter 8).

Landscape and townscape

15.8.11 Landscape and townscape receptors are likely to be subject to moderate adverse in-combination effects, due to the loss of visual amenity during construction, including to several Landscape Character Areas (LCAs) (significant loss of visual amenity to Maylands Golf Club, Alder Wood and the A12 Corridor receptors). Works would require the removal of vegetation, as well as the establishment of construction compounds and heavy machinery within the Green Belt, impacting significantly upon the area of the proposed loop road, as well as potentially introducing new sight lines towards the junction from receptors further afield. Townscape effects are expected not to be significant as the Scheme is not located in an urban area.

Geology and soils

15.8.12 There is potential for slight to moderate adverse effects upon geological receptors in combination with cultural heritage considerations, as the Scheme sits within an area with potential for prehistoric archaeological remains, and the works could potentially result in damage or displacement to such geological deposits. No other significant effects have been identified upon geological receptors, subject to appropriate mitigation measures being put in place.

Heritage assets

15.8.13 Works to realign the Ingrebourne River could result in effects on unknown archaeological assets in the area. In-combination effects with regard to known and unknown heritage asset receptors are considered not to be significant, and any effects upon the Roman Road Archaeological Priority Area (APA) are considered to be only slight adverse due to the scale of this APA as a whole, such that the Scheme would only impact upon a small section of the overall asset. Cultural heritage specific effects and associated mitigation are discussed within Chapter 11.

Conclusion

15.8.14 The overall in-combination effects during construction are therefore considered to be moderate adverse, due to the interaction of several moderate and slight adverse effects in relation to human, ecological, water, landscape and geological receptors, as well as localised large adverse effects on specific residential and business receptors.

Operation

15.8.15 Table 15.6 sets out how the residual effects from each topic chapter have been combined to determine the overall significance of in-combination effects during operation.

Human (residents, including community and private assets, sensitive receptors and vulnerable groups)

15.8.16 During operation, Grove Farm will be significantly adversely affected due to permanent land take, the proximity to the proposed new loop road and due to the inherent landscape, visual and amenity effects of the proposed loop road encircling the receptor. Reduced congestion would have positive effects for local residents and businesses and improved drainage would also prevent any increase in flood risk to human receptors over time. Overall there would be slight adverse in-combination effects upon human receptors due to reduced congestion and improvements to flood risk and landscape and visual effects are localised to Grove Farm.

Human (all travellers)

15.8.17 There would be moderate beneficial effects to vehicular travellers as considered in the driver stress assessment, who would experience improved traffic flow and reduced congestion through the new layout and increased capacity. There would be a neutral effect on non-motorised users. Once planting has become established and matured (after 15 years), residual visual and landscape effects upon travellers through the Scheme area would be neutral.

15.8.18 Overall there would be a moderate beneficial in-combination effect upon human traveller receptors due to the traffic and congestion benefits inherent within the Scheme.

Ecological receptors

15.8.19 The Scheme involves works affecting ecological receptors, with some adverse effects remaining after the completion of the construction phase. The loss of

veteran trees would result in a moderate adverse effect on biodiversity due to the loss of established high-value habitat assets, counteracted in part but not in full by the addition of further compensatory ecological mitigation. Works to watercourses and drainage systems, including the installation of new SuDS ponds and the realignment of the Ingrebourne River and Weald Brook also have the potential to provide new and more suitable long-term habitats than those they replace. On balance, the in-combination effect upon ecological receptors is considered to be slight adverse mainly due to the loss of veteran trees.

Landscape and townscape

15.8.20 There would be a significant increase in the scale of the infrastructure elements in the landscape resulting from the new loop road. This would result in a more prominently visible junction in the proximity, occupying a larger footprint than the existing junction, and detracting from the rural character of the area. It is therefore likely that there would be an adverse visual effect on landscape receptors including large adverse effects on three LCAs and slight adverse setting effects on Dagnam Park. Whilst much of the effects upon landscape will be mitigated through planting, this will take up to 15 years to mature and the overall effect on the local landscape and townscape would be slight adverse.

Other receptors

15.8.21 Receptors for the water environment, geology and soils and heritage assets are unlikely to experience in-combination effects in addition to those effects already assessed in the preceding topic chapters, due to both efficacy of mitigation measures and less than significant effects as previously identified.

Conclusion

15.8.22 Overall, given the slight beneficial effects upon residential, community and business receptors, and slight adverse effects upon landscape and ecological receptors, the in-combination effects of the Scheme as a whole in operation is anticipated to be neutral to slight adverse.

Table 15.5: Potential in-combination effects between topics on receptor groups – Construction

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
Human - residents, including community and private assets, sensitive receptors and vulnerable groups	No significant residual effects	**Slight Adverse** Daytime – No significant adverse residual effect calculated for any receivers. Adverse residual effects predicted at Maylands Cottages, Caravan Park and 17 Colchester Road. Night-time - No significant adverse residual effects.	Not in scope of assessment	**Neutral** With appropriate mitigation measures, no significant residual effects	**Slight Adverse** effects in general across wider study area due to vegetation removal, ground works and increase in built form and visual prominence of the junction. **Very Large Adverse** effects on several residential receptors. (Grove Farm and Maylands Cottages).	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	**Moderate Adverse** effects on residential community and business assets related to land take and visual impacts.	**Large Adverse** – Significant adverse effects due to land take and visual impact, including very large landscape adverse effects upon Grove Farm and Maylands Cottages.
Human - all travellers, i.e. vehicle	No significant residual effects	**Neutral** No significant residual effects.	Not in scope of assessment	**Neutral** With appropriate mitigation measures,	**Moderate Adverse** visual effects on several	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	**Slight Adverse** impact in terms of visual impact.	**Slight Adverse** – Due to visual impacts during

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
travellers, cyclists, and pedestrians				no significant residual effects	Public Rights of Way users of the bridleway adjacent to the M25 northbound carriageway, to the north of Jermains Wood and to the south of Nags Head Lane.				Disruption to traffic during construction would have a temporary slight adverse effect.	construction and adverse landscape effects on PRoW users.
Ecological receptors – protected species and existing habitats	No significant residual effects	**Slight Adverse** Potential temporary disturbance to species	**Moderate Adverse** effects on nature conservation resources during construction period due to disturbance.	**Neutral** With appropriate mitigation measures, no significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	**Moderate Adverse** – Temporary disturbance to protected species and wider habitats/ecological resources including the SMI.
The water environment	Not in scope of assessment	**Neutral** No significant residual effects	**Neutral** With appropriate mitigation measures,	**Neutral** With appropriate mitigation measures,	Not in scope of assessment.	**Neutral** No significant residual effects	**Slight to Moderate Adverse** effects on known and as-yet	**Neutral** No significant residual effects	Not in scope of assessment	**Slight Adverse** – Potential impacts upon as yet unknown

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
			no significant residual effects	no significant residual effects			unknown archaeological assets due to the realignment of Ingrebourne River			heritage in realignment of Ingrebourne River. Other impacts would be negligible with mitigation.
Landscape and townscape	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	Not in scope of assessment	**Large Adverse** effects on several Landscape Character Areas.	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	**Moderate Adverse** effects on landscape.	**Moderate Adverse** – Due to visual impacts during construction on the landscape
Geology and soils	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	**Neutral** With appropriate mitigation measures, no significant residual effects	Not in scope of assessment.	Not in scope of assessment.	**Slight to Moderate Adverse** impacts to geological deposits with potential for early prehistoric archaeological remains	**Neutral** No significant residual effects	Not in scope of assessment	**Slight Adverse** – Impacts to geologic deposits with potential heritage significance. Other impacts would be negligible with mitigation.

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
Heritage assets	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment.	Not in scope of assessment.	Slight Adverse Minor localised impacts upon the Roman Road APA, only affecting a small portion of the larger overall asset.	**Neutral** No significant residual effects	Not in scope of assessment	**Slight Adverse**
Overall in-combination effect for the Scheme during construction									**Moderate Adverse**	

Table 15.6: Potential in-combination effects between topics on receptor groups – Operation

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
Human - residents, including community and private assets, sensitive receptors and vulnerable groups	**Neutral** No significant residual effects	**Neutral** No significant residual effects.	Not in scope of assessment	**Neutral to Slight Beneficial** Works would prevent any increase to flood risk in the area.	**Slight Adverse** effects in general across wider study area due to increase in built form and visual prominence of the junction **Very Large Adverse** localised effects on one residential receptor. (Grove Farm)	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	**Neutral** No significant residual effects.	**Slight Adverse** – Improved drainage management would prevent increase in flood risk over time. Very large adverse effects are observed due to landscape and visual at Grove Farm, however this is a relatively isolated condition, due to the layout of the loop road.
Human - all travellers, i.e. vehicle travellers, cyclists, and pedestrians	**Neutral** No significant residual effects	**Neutral** No significant residual effects.	Not in scope of assessment	**Neutral** No significant residual effects.	**Neutral** No significant residual effects.	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	**Neutral** No significant impact on NMUs. **Moderate beneficial** impact for vehicle travellers	**Moderate Beneficial** –to vehicle travellers through improved traffic flow and reduced congestion.

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
										Neutral impact to NMUs.
Ecological receptors – protected species and existing habitats	**Neutral** No significant residual effects	**Slight Adverse** Potential temporary disturbance to species.	**Moderate Adverse** Loss of veteran trees will result in a residual adverse effect of very large significance due to their value within the national context. Neutral to beneficial residual effects in relation to designated sites and other habitats and species due to proposed mitigation and compensation measures. Overall considered to	**Slight Beneficial** Addition of new ephemeral water habitats, lowering of floodplain, and widespan bridges over watercourses would allow for increased habitats and improved connectivity for terrestrial species.	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	**Slight Adverse** – Adverse effects due to loss of veteran trees, compensated somewhat by mitigation and compensation measures and replacement designated sites, including new habitats alongside drainage systems.

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
			be moderate adverse.							
The water environment	Not in scope of assessment	**Neutral** No significant residual effects	**Neutral** With appropriate mitigation measures, no significant residual effects	n/a	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** – Negligible impacts with appropriate mitigation.
Landscape and townscape	Not in scope of assessment	**Neutral** No significant residual effects	Not in scope of assessment	**Slight Beneficial** SuDS ponds and associated ecology would likely be a slight improvement to existing landscape features	**Moderate Adverse** effects on several Landscape Character Areas.	**Neutral** No significant residual effects	**Slight Adverse** impacts to the setting of Dagnam Park	**Neutral** No significant residual effects	**Moderate Adverse** effects on view from the road	**Slight Adverse –** New loop road would have negative visual impacts from the road and in the setting of Dagnam Park and local Landscape Character Areas, somewhat mitigated by landscaping and drainage features.
Geology and soils	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	**Neutral** No significant residual effects.	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	**Neutral** No significan	Not in scope of assessment	**Neutral** – Negligible impacts with appropriate mitigation.

Receptor	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities	Significance of combined effects
								t residual effects		
Heritage assets	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	Not in scope of assessment	n/a	**Neutral** No significant residual effects	Not in scope of assessment	**Neutral** – Negligible impacts with appropriate mitigation.
Overall in-combination effect for the Scheme during operation									**Slight Adverse to Neutral**	

15.9 Assessment of cumulative effects

Introduction

15.9.1 Tables 15.7 and 15.8 set out the cumulative effects by topic for each of the developments in the construction phase of the Scheme. Table 15.9 and Table 15.10 set out the cumulative effects by topic for each of the developments in the operational phase of the Scheme.

15.9.2 Stages 1 and 2 of the methodology eliminated developments that were not considered to have potential for cumulative effects to arise due to scale, geographical location and any temporal overlap in construction phases. Therefore, only the developments on the shortlist (Table 15.4) are assessed.

15.9.3 The assessments in Table 15.7 to Table 15.10 summarise Stages 3 and 4 of the cumulative effects assessment which considers the interaction of the environmental impacts of these developments with the residual effects of the Scheme as presented in the relevant ES chapters. The long list of developments is provided in Appendix 15.1.

15.9.4 Where entries into the tables below have not been assigned a significance in accordance with the assessment, this is due to the site being located outside of the ZOI for that topic. Justification of the study areas for each topic area is given in the respective preceding topic chapters. For the purposes of this assessment it should be assumed cumulative effects are likely to be negligible where the development sits outside of the respective relevant ZOIs for both the Scheme and the 'other development'.

Construction

Lower Thames Crossing

15.9.5 The proposed Lower Thames Crossing (LTC) NSIP would form a new junction with the M25, 7.5 km to the south of junction 28. The most recent DCO boundary for LTC (from the January 2020 consultation information) overlaps with the Scheme. The main LTC works in proximity to the Scheme proposes the installation/upgrade of gantry technologies on this section of the M25 and includes replacement land between Warley Road and M25 junction 29 for Special Category Land, as a potential receptor site for translocation of protected species and a gas main diversion. At the time of writing this report there is no overlap between the construction programmes of the two schemes. The works proposed by LTC are not considered likely to result in significant cumulative effects between the two schemes.

15.9.6 Dependent on design and proposed mitigation measures, there is potential for slight adverse effects on some common biodiversity receptors, particularly larger strategic resources such Sites of Nature Conservation Importance, or wider clusters of priority habitats and woodland. There is also the potential for slight adverse landscape and visual effects between the two schemes, should the phasing of LTC (in a worst-case scenario) coincide with construction of the Scheme. Effects could result from ground works, construction traffic and potential loss of landscape features along a stretch of the M25 motorway between junction 28 and junction 30 however these are not expected to be significant. It is not yet fully understood how the two schemes may overlap, as

the ES detailing this information for LTC has not yet been finalised, and interim information has been derived from the PEIR and other published consultation material.

Large, medium and small scale wind development sites

15.9.7 The emerging Havering Proposals Map Changes Booklet 2017 (yet to be formally adopted) designated sites as potentially suitable for large-, medium- and small-scale wind development. A number of sites were allocated in Gooshays Ward, including within the DCO boundary.

15.9.8 Construction of wind energy proposals at sites in proximity to the Scheme could cause slight adverse cumulative impacts in terms of noise and vibration and moderate adverse or slight adverse in terms of biodiversity, given that many of the allocations also sit within the Ingrebourne Valley SMI and could affect (depending on detailed design proposals of any wind developments) existing and established habitats and species. The most notable affected species would be bats and great crested newts, which could potentially lose foraging and roosting habitats or be killed by construction machinery. Where these wind development sites to come forward alongside the Scheme, such impacts would need to be appropriately mitigated, however at this stage proposals for the wind development sites are of insufficient detail.

15.9.9 There would be a very large adverse impact in terms of development opportunities in the case of the wind development sites closest to the existing junction 28, as the construction of the new loop road, including temporary and permanent land take associated with the Scheme, would delay or permanently prevent the implementation of any wind development here. However, this is considered to be of low significance given the alternative sites available and the effect is therefore considered to be negligible.

The Caravan Park, Putwell Bridge

15.9.10 The proposed gypsy and traveller site allocation at The Caravan Park, Putwell Bridge (in the draft local plan), would result in temporary slight adverse effects during construction to amenity for residents of the site, which sits adjoining the DCO boundary. Other potential localised cumulative effects, such as air quality and water environment effects are considered to be negligible, so long as the construction of the Scheme adheres to best practice guidance, as specified in the Outline Construction Environmental Management Plan (CEMP) (application document TR010029/APP/7.2) and the Register of Environmental Actions and Commitments (REAC) (application document TR010029/APP/7.3). The inherent environmental effects of the Putwell Bridge allocation would be small and localised due to the nature and scale of the proposal, and so are unlikely to combine to form significant cumulative effects beyond residential amenity issues.

Garden of Peace (formerly known as Land at Oak Farm)

15.9.11 The proposed Gardens of Peace development (formerly known as Land at Oak Farm), south of Colchester Road, would result in slight adverse cumulative effects on biodiversity. Surveys conducted as part of the Scheme concluded that there were great crested newt habitats in proximity to the proposed burial grounds site, but not believed to be within the boundaries of the site due to the natural barrier of the Ingrebourne River at its southern boundary. Both the

Scheme and the proposed Gardens of Peace burial grounds would result in the loss of habitat or changes to habitat, within the northern extent of Ingrebourne Valley SMI. However taking into account the extent of permanent loss (compared to the size of the SMI) and the mitigation and compensation measures to be introduced as part of the Scheme, as well as best practice construction methods as outlined in the Outline CEMP and REAC, the cumulative effect on Ingrebourne Valley remains as slight adverse in the long term and not significant.

15.9.12 The diversion to the high-pressure gas main to run around the proposed loop road and cross the A12, would lead to a requirement for temporary land take at Gardens of Peace however, this would not prevent the development of the proposed burial grounds, for which construction has already begun. This is considered to constitute a minor adverse effect in association with effects identified within the People and Communities chapter (Chapter 13), until such point that the gas diversion works are complete and the land is returned to its previous ownership, although with a permanent easement allowing access to the main for maintenance purposes.

15.9.13 The diversion of the gas main along the eastern part of the Gardens of Peace burial ground site would also have the potential to impact upon heritage assets. A previously unknown archaeological site of early medieval date has been recently identified here, though at the time of publication details as to the value of this asset, and therefore the significance of any cumulative effects upon it, are unclear. Due to insufficient information being available at the time of writing, this site has not been assessed fully within the Cultural Heritage chapter (Chapter 11) of the ES. However, by its nature, the two schemes could result in removal of a larger part of this asset and therefore a slight adverse cumulative effect has been identified however this is not considered to be significant. It is proposed to secure evaluation and assessment of this site through the CEMP and DCO requirements for the Scheme, and any adverse effects from the Scheme that are identified may be mitigated.

General construction effects and other sites

15.9.14 All developments located within 300 m of the DCO boundary may result in some cumulative effects for noise and vibration during construction, if construction periods overlap between these respective developments and the Scheme. As this assessment has been undertaken assuming the worst-case scenario that all developments included will overlap temporally in their construction, the assessment concludes a slight adverse cumulative effect for most sites, although it is likely that this will not occur in practice for all cases.

15.9.15 All developments have the potential for slight adverse impacts to landscape and visual considerations if construction periods overlap between these developments and the Scheme. Possible cumulative visual impacts would be in terms of the wider extent of ground works in the locality and an increase in construction traffic and machinery on local roads. Unless noted as such in Table 15.7, there would be no inter-visibility between the ‘other developments’ and the Scheme, which would limit the magnitude of landscape and visual impacts in the area. Cumulative effects are therefore expected not to be significant, with the exception of LTC, discussed above in paragraph 15.9.6.

15.9.16 All of the ‘other developments’ have been reviewed regarding considerations as to materials and waste. Among the developments reviewed, none included

sufficient information related to waste management to enable assessment for cumulative effects on a case by case basis. It is likely that the waste and materials impact from the LTC may be significant due to the scale of the project, though the start of construction works for the LTC is forecasted towards the end of works for the Scheme. Therefore, it is assumed the cumulative effects could be neutral or slight negative between the Scheme and LTC. If, theoretically, all 'other development' schemes were to be constructed in parallel over a year, there could be a neutral or slight negative effect upon material use and waste generation.

15.9.17 Other sites assessed as part of the short list of 'other developments' for cumulative impacts are likely to result in neutral cumulative effects alongside the Scheme construction due to distance from the Scheme, low magnitude of predicted environmental effects at the 'other development' sites, or effective mitigation measures being implemented.

Operation

15.9.18 'Other development' sites were included within the traffic modelling, and are therefore inherently included within the operational air quality assessment (Chapter 5). As such, assessment of these sites has already been undertaken within Chapter 5, establishing air quality cumulative effects associated with the 'other developments' in operation and so is not included within the cumulative effects assessment below.

Lower Thames Crossing

15.9.19 LTC is anticipated to result in no significant cumulative effects in conjunction with the Scheme once operational. There is likely to be an increase in traffic through the area as a result of the change in road configurations once both schemes are complete. However, ecological receptors sensitive to changes in air pollution (due to increased traffic) have not been identified at junction 28. Once mitigation and compensation measures are established, cumulative effects are not anticipated.

15.9.20 The operational effects study for Air Quality is based on the opening year of the Scheme (2022), whilst LTC would not open until after this date and therefore associated vehicular movements are not included in this assessment. It would be the responsibility of the LTC ES to consider the cumulative effects on air quality of both Schemes in this regard, as it is only after both schemes are open that full cumulative effects on air quality will be felt.

Large, medium and small scale wind development sites

15.9.21 The allocated Large-, Medium- and Small-Scale Wind Development Sites (in the draft local plan) could result in slight adverse effects on biodiversity during operation dependent on the final design of the wind development proposals, due to their positioning alongside the Scheme within the Ingrebourne Valley SMI, and any potential impacts on the habitats of protected species. Some of these impacts upon habitats have the potential to continue beyond construction, particularly upon bat and great crested newt habitats, which will be disrupted by displacement through both the Scheme and any wind development, as well as any potential hazards resulting from turbines. Mitigation measures will be put in

place to provide replacement SMI land, but slight adverse cumulative effects would remain in terms of biodiversity.

15.9.22 There will also be a slight adverse cumulative effect in terms of People and Communities, as land take for the Scheme would prevent some of the wind development sites from coming forward, and therefore restricting development and any benefit to communities or local businesses therein. However, as this is only a small selection of a larger number of identified potential sites, and as this allocation has not yet been fully adopted and therefore has a lower likelihood to come to fruition, this is not considered to result in a significant adverse effect.

Gardens of Peace (formerly known as Land at Oak Farm) and The Caravan Park, Putwell Bridge

15.9.23 Long term habitat management at the neighbouring sites Gardens of Peace and The Caravan Park, Putwell Bridge would result in negligible effects on biodiversity. Suitable mitigation for the water environment through the implementation of appropriate SuDS measures will minimise impacts upon the Ingrebourne River arising from the Scheme and Oak Farm developments.

15.9.24 The sites at Gardens of Peace and Putwell Bridge are not sufficiently large to have any significant long-term impact on the relevant heritage assets, most prominently the Roman Road APA. The identification of a previously unknown medieval heritage asset during works at Gardens of Peace has not been included in this assessment (as discussed in paragraph 15.9.13 above). As such no cumulative effects are anticipated in association with these adjoining sites and the Scheme.

Other sites

15.9.25 There may be slight adverse effects in terms of landscape and visual receptors in combination with developments at Dunton Hills Garden Village and Land East of Nags Head Lane. At Land East of Nags Head Lane, there is potential for some degree of inter-visibility with the Scheme, as it is not known to what degree this site will be landscaped or ecologically mitigated and therefore there may be visual impacts interacting between the two developments. Both Dunton Hills and Nags Head Lane are likely to result in slight adverse cumulative landscape effects due to the gradual urbanisation and loss of Green Belt inherent with such large-scale housing-led developments alongside the intensification of the motorway.

15.9.26 Other sites assessed as part of the shortlist of other developments for cumulative effects are likely to experience negligible or neutral cumulative effects as a result of the implementation of the Scheme during operation due to distance from the Scheme, low magnitude of predicted environmental effects at the ‘other development’ sites, or effective mitigation measures.

Table 15.7: Summary of cumulative effects between 'Other Developments' and the Scheme during construction (Chapters 5-8)

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
Lower Thames Crossing	Lower Thames Crossing NSIP	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the significant works for the Schemes are sufficiently far apart.	Slight Adverse to Neutral LTC is a large scheme that affects similar habitats to the Scheme. The proposed new motorway is close to the Scheme and will affect similar habitats so there is potential for cumulative impacts during construction. However, the LTC works proposed close to the Scheme may include mitigation / replacement land only. LTC will require ecological assessment and mitigation and compensation strategy to be developed prior to DCO application. If advance ecological compensation measures are not undertaken there could be a cumulative loss of biodiversity in the local area until compensation sites fully establish.	**Neutral** During construction adherence to best practice guidance and the adoption of good working practices and strict adherence to the Environment Agency Pollution Prevention Guidance (PPGs) during construction (as outlined in the Outline CEMP, TR010029/APP/7.3 and Register of Environmental Actions and Commitments (REAC) application document, TR010029/APP/7.3) means there should be no significant adverse cumulative effects.
Gallows Corner reconfiguration	Havering Submission Local Plan Policy 23, TfL Consultations 2016	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during	**Neutral** No cumulative construction effects are expected as the Schemes are sufficiently far apart.	**Neutral** Gallows Corner is separated from the Scheme by the urban areas of Harold Hill and Harold Park and therefore there are unlikely to be any	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
		construction are unlikely to overlap.		cumulative impacts on biodiversity.	
Small, medium, large wind development sites	Havering Submission Local Plan – Proposals Map Changes Booklet Site Allocation - Wind Development Sites in Gooshays Ward (Havering)	**Neutral** Construction phase could overlap therefore there is potential for cumulative effects. However, with mitigation in place including adherence to best practice guidance as specified in the Outline CEMP (application document TR010029/APP/7.2), it is considered there would be a negligible cumulative effect.	**Slight Adverse** Construction effects may occur if construction of both schemes take place simultaneously.	**Moderate Adverse to Slight Adverse** (depending on details of development) Construction of a wind energy development within the DCO boundary has the potential for cumulative impacts in combination during construction with the Scheme on designated sites (in particular Ingrebourne Valley SMI), as well as bats and great crested newts. Potential impacts could be through loss and damage of habitats, loss of potential bat roosting and foraging habitat and killing or injury of great crested newts by construction machinery. Construction of a wind energy development within the DCO boundary would also limit the potential mitigation options for the Scheme, due to cumulative habitat loss. If construction of the Scheme and wind development were to take place at the same time Moderate adverse impact	**Neutral** There could be potential cumulative effects to the water environment, particularly to the Weald Brook and drainage channels/tributaries of Weald Brook which are adjacent to the development. During construction adherence to best practice guidance and the adoption of good working practices and strict adherence to the Environment Agency PPGs during construction (as outlined in the Outline CEMP, application document TR010029/APP/7.2 and REAC, application document TR010029/APP/7.3) means there should be no significant adverse cumulative effects.

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				on the Ingrebourne Valley SMI, great crested newts and Slight adverse on bats are possible, although these impacts could be reduced by appropriate mitigation or compensation measures.	
The Caravan Park, Putwell Bridge, Colchester Road	Havering Submission Local Plan – Proposals Map Changes Booklet 4.12 Site Allocation – Gypsy & Traveller Sites	**Neutral** Construction phase could overlap therefore there is potential for cumulative effects. However, with mitigation in place including adherence to best practice guidance as specified in the Outline CEMP (application document TR010029/APP/7.2), it is considered there would be a negligible cumulative effect. Receptors within the caravan park have been included within the construction assessment.	**Slight Adverse** Construction effects may occur if construction of both schemes take place simultaneously.	**Neutral** The Caravan Park is separated from the main area of construction works by the A12. Aerial photographs indicate the site is already hardstanding and therefore there is unlikely to be any cumulative impact on biodiversity.	**Neutral** There could be potential cumulative effects to the water environment, particularly to the Ingrebourne River which is adjacent to the development and groundwater aquifers which are located beneath the development. During construction adherence to best practice guidance and the adoption of good working practices and strict adherence to the Environment Agency PPGs during construction (as outlined in the Outline CEMP, application document TR010029/APP/7.2 and REAC, application document TR010029/APP/7.3) means there should be no significant adverse cumulative effects.
Gardens of Peace (formerly known as Land at Oak Farm), Maylands Fields	Havering planning app reference: P1742.14	**Neutral** Construction has begun at the site, but there is still some potential for overlap with the Scheme.	**Slight Adverse** Construction effects may occur if construction of both schemes take place simultaneously.	**Slight Adverse** Gardens of Peace is separated from the main area of construction works by the A12. Both	**Neutral** There could be potential cumulative effects to the water environment, particularly to the Ingrebourne River which is

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
		However, with mitigation in place including adherence to best practice guidance as specified in the Outline CEMP (application document TR010029/APP/7.2), it is considered there would be a negligible cumulative effect.		developments directly impact the Ingrebourne Valley SMI. The Gardens of Peace proposal is approximately 10 ha in size and long-term management is proposed to off-set habitat losses. Whilst great crested newt surveys undertaken for the Scheme have confirmed the presence of great crested newts in a pond a short distance from the Gardens of Peace an ecological assessment for this development considered the Ingrebourne River to be a significant barrier to dispersal and concluded the species did not use the habitat within Gardens of Peace. Both projects will result in permanent habitat loss from the SMI and therefore there will be cumulative impacts. Taking into account the size of permanent loss, (compared to the size of the SMI) and the proposed mitigation and compensation measures, the cumulative effect remains as Slight Adverse in the long term and not significant.	adjacent to the development and groundwater aquifers which are located beneath the development. During construction adherence to best practice guidance and the adoption of good working practices and strict adherence to the Environment Agency PPGs during construction (as outlined in the Outline CEMP, application document TR010029/APP/7.2 and REAC, application document TR010029/APP/7.3) means there should be no significant adverse cumulative effects.

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
Former Harold Wood Hospital, Gubbins Lane	Havering planning app reference: P0702.08	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Former Harold Wood Hospital is separated from the Scheme by the urban area of Harold Park. Direct effects can be excluded as the site is not adjacent to the Scheme and indirect effects such as water and air quality can be discounted due to the distance and urban habitats between the sites. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Cycleway proposals	Brentwood Borough Cycling Action Plan	**Neutral** Construction phase could overlap therefore there is potential for cumulative effects. However, with mitigation in place including adherence to best practice guidance as specified in the Outline CEMP, it is considered there would be a negligible cumulative effect.	**Slight Adverse** Construction effects may occur if construction of both schemes take place simultaneously.	**Neutral** No cumulative effects on biodiversity are expected as the cycleway proposals are relatively small-scale and are separated from the main area of land take from the Scheme by the M25.	**Neutral** No cumulative impacts to water environment and drainage are expected.
Land east of Nags Head Lane	Brentwood Draft Local Plan	**Neutral** Construction phase could overlap therefore there is	**Slight Adverse** Construction effects may occur if construction of	**Neutral** Land East of Nags Head Lane is separated from the	**Neutral** There could be potential cumulative effects to the

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
	Preferred Site Allocations - 032	potential for cumulative effects. However, with mitigation in place including adherence to best practice guidance as specified in the Outline CEMP (application document TR010029/APP/7.2), it is considered there would be a negligible cumulative effect.	both schemes take place simultaneously.	main area of land take by the A12 and M25 and therefore there are unlikely to be any cumulative impacts on biodiversity.	Ingrebourne River which is approx. 220 m north of Land East of Nags Head Lane and associated tributaries/drains located approx. 200 m south of the development. There is also potential impact to the groundwater aquifers which are located beneath the development. However with the use of appropriate mitigation measures no such impacts are anticipated.
Boyles Court Farm, Dark Lane	Brentwood planning application reference: 18/01827/FUL	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	No cumulative construction effects are expected as the Schemes are sufficiently far apart.	**Neutral** Unlikely to have potential for cumulative effects during construction. No ecological impact assessment or other information is included in the submission for this project. However, scheme is localised redevelopment of existing building which does not overlap with the Scheme.	**Neutral** Although within the 1 km ZOI, this development is 1.6 km upstream of the scheme works. On the assumption that water quality impacts beyond a 1 km will be sufficiently diluted, in conjunction with good site practice, no impacts are anticipated. No WFD impacts or flood risk impacts are anticipated.
Regent House, Hubert Road	Brentwood planning application reference: 16/00290/PNCOU	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Slight Adverse** Construction effects may occur if construction of both schemes take place simultaneously.	**Neutral** Regent House is separated from the Scheme by the urban areas of Brentwood. Direct effects can be excluded as the site is not adjacent to the Scheme and indirect effects, such as water and air quality,	**Neutral** There could be potential cumulative effects to the tributary/drain of the Ingrebourne River which is adjacent to Regent House and indirectly to the Ingrebourne River which is approx. 500 m downstream of the development. Groundwater

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				can be discounted due to the distance and urban habitats between the sites. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	aquifers which are located beneath the development also have the potential to be impacted. However with the use of appropriate mitigation measures no such impacts are anticipated.
Regent House, Hubert Road	Brentwood planning application reference: 18/01601/OUT	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Slight Adverse** Construction effects may occur if construction of both schemes take place simultaneously.	**Neutral** Regent House is separated from the Scheme by the urban areas of Brentwood. Direct effects can be excluded as the site is not adjacent to the Scheme and indirect effects, such as water and air quality, can be discounted due to the distance and urban habitats between the sites. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	**Neutral** There could be potential cumulative effects to the tributary/drain of the Ingrebourne River which is adjacent to the development and indirectly to the Ingrebourne River which is approx. 500 m downstream of the development. Groundwater aquifers which are located beneath the development also have the potential to be impacted. However with the use of appropriate mitigation measures no such impacts are anticipated.
Essex Police & La Plata House, London Road	Brentwood planning application reference: 16/01805/OUT	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Essex Police & La Plata House is separated from the Scheme by the urban areas of Brentwood. Direct effects can be excluded as the site is not adjacent to the Scheme and indirect effects, such as water and air quality, can be	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				discounted due to the distance and urban habitats between the sites. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	
Westbury Road Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 039	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Westbury Road Car Park is separated from the Scheme by the urban areas of Brentwood and therefore there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
141 to 147 High Street	Brentwood planning application reference: 18/00859/FUL	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** 141 to 147 High Street is separated from the scheme by the urban areas of Brentwood and therefore direct effects can be excluded as the site is not adjacent to the Scheme and indirect effects, such as water and air quality, can be discounted due to the distance and urban habitats between the sites. Therefore, there are unlikely to be any	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				cumulative impacts on biodiversity.	
Land at Hunter House	Brentwood Draft Local Plan Preferred Site Allocations - 041	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Land at Hunter House is separated from the Scheme by the urban areas of Brentwood and therefore there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Land formerly known as NV Tools, St James Road	Brentwood planning application reference: 15/01084/FUL	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Land Formerly Known as NV Tools is separated from the Scheme by the urban areas of Brentwood. Direct effects can be excluded as the site is not adjacent to the Scheme and indirect effects, such as water and air quality, can be discounted due to the distance and urban habitats between the sites. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
William Hunter Way Car Park	Brentwood Draft Local Plan	**Neutral** Unlikely to be any potential for cumulative effects given that the	**Neutral** No cumulative construction effects are	**Neutral** William Hunter Way Car Park is separated from the Scheme by the urban areas	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
	Preferred Site Allocations - 102	areas affected during construction are unlikely to overlap.	expected as the schemes are sufficiently far apart.	of Brentwood and therefore there are unlikely to be any cumulative impacts on biodiversity.	
Kings House 101-135 Kings Road	Brentwood planning application reference: 16/00606/PNCOU	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Kings House is separated from the scheme by the urban areas of Brentwood. Direct effects can be excluded as the site is not adjacent to the Scheme and indirect effects, such as water and air quality, can be discounted due to the distance and urban habitats between the sites. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Chatham Way/ Crown Street Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 040	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Chatham Way/Crown Street car park is separated from the Scheme by the urban areas of Brentwood and therefore there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Development or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
Ford Offices, Eagle Way	Brentwood planning application reference: 19/00844/PNCOU	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Unlikely to have potential for cumulative effects during construction. Potential change in use of existing building would be small scale and localised.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Brentwood Enterprise Park	Brentwood Draft Local Plan Preferred Site Allocations - 101A	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Unlikely to have potential for cumulative effects during construction. This development does not overlap in terms of land take with the Scheme.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Dunton Hills Garden Village	Brentwood Draft Local Plan Preferred Site Allocations - 200	**Neutral** Unlikely to be any potential for cumulative effects given that the areas affected during construction are unlikely to overlap.	**Neutral** No cumulative construction effects are expected as the schemes are sufficiently far apart.	**Neutral** Dunton Hills Garden Village is separated from the Scheme by over 6 km and major roads and therefore there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Table 15.8: Summary of cumulative effects between 'Other Developments' and the Scheme during construction (Chapters 9-13)

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
Lower Thames Crossing	Lower Thames Crossing NSIP	**Slight adverse** As the construction periods between the Lower Thames Crossing will coincide with the end of the construction works of the Scheme, there is the potential for there to be some adverse cumulative construction effects if the construction works are phased such that they are in close proximity to one another, in this instance there may be a degree of inter-visibility and therefore a greater significance of effect. If this worst case scenario were to be realised, then it is possible that there would be Slight adverse and not significant cumulative effects.	**Neutral** The very edge of the LTC boundary overlaps the geology and soils study area. The development may have a minor adverse effect on the geology and soils with the potential for cumulative effects. However, best practice measures and appropriate design and mitigation measures will be implemented, and effects are not considered to be significant	**Neutral** Significant works for the LTC are outside of the ZOI for Cultural Heritage for the Scheme. Any works in proximity to the Scheme are expected to be minor and would cause no cumulative impact.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** The construction of the Scheme is expected to be able to take place independent of the construction works to LTC to avoid increased traffic flows during construction.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
Gallows Corner reconfiguration	Havering Submission Local Plan Policy 23, TfL Consultations 2016	**Slight Adverse** Given the distance of the Gallows Corner proposed development from the proposed Scheme, it is unlikely that there would be any degree of inter-visibility between the two projects during construction. Confirmation of the exact construction period for Gallows Corner would be required – as it may be that the two projects do not have any degree of overlap in their programmes. There may be some significant effects to users of the A12 as they travel along this route if construction works were to occur simultaneously – however, due to the low sensitivity of this receptor – the effects are likely to be slight adverse	The Gallows Corner development is outside of the ZOI for Geology & Soils for the Scheme.	The Gallows Corner development is outside of the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** The construction stage of the Scheme is not anticipated to coincide with the Gallows Corner scheme. The impact is therefore considered to be neutral.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		and not significant overall.				
Small, medium, large wind development sites	Havering Submission Local Plan – Proposals Map Changes Booklet Site Allocation - Wind Development Sites in Gooshays Ward (Havering)	As the small, medium and large wind development sites are theoretical in nature, there is insufficient information to determine whether there would be any cumulative effects resulting from construction of the proposals.	**Neutral** The proposed wind farm development sites overlap the DCO boundary and some of the sites overlap the former airfield. The development may have a slight adverse effect on the geology and soils with the potential for cumulative effects. However, best practice measures and appropriate design and mitigation measures will be implemented, and effects are not considered to be significant.	**Neutral** Land allocations for small, medium and large wind energy development sites within the study area have the potential to impact MLO104464, the Post-Medieval Park at Dagnam. The junction 28 Scheme would have a slight adverse effect on the setting of the asset during construction, and a neutral effect during operation. Wind energy developments have the potential to have large impacts on setting and could result in significant adverse effects. As the current Scheme has a neutral residual effect on	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** Figure 13.1 indicated the land which has been identified as having potential for small, medium and large wind development sites and falls within the DCO boundary. The construction of the Scheme would prevent any development coming forward as the land would either be used for Scheme of the loop road itself. There is therefore not expected to be any overlap in the Schemes as wind development would be prevented from coming forward at the identified sites. Therefore there is not considered to be any cumulative effect during the construction phase of the Scheme.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
				the setting of MLO104464, it is not considered to add to any effects the wind energy developments may have. As such, no cumulative effect is anticipated.		
The Caravan Park, Putwell Bridge, Colchester Road	Havering Submission Local Plan – Proposals Map Changes Booklet 4.12 Site Allocation – Gypsy & Traveller Sites	The exact nature of the proposed development at the Caravan Park would be required to determine the significance of the effects in conjunction with the proposed Scheme and whether any mitigation measures are proposed so as to screen the development from any receptors in proximity to it. It is not known whether the construction periods would overlap and therefore, presently, there is insufficient information to determine the	**Neutral** Adjoins Scheme boundary. The Caravan Park development may have a slight adverse effect on the geology and soils if the developments occur concurrently, with the potential for cumulative effects. However, best practice measures and appropriate design and mitigation measures will be implemented, and effects are not considered to be significant.	**Neutral** The proposed development at The Caravan Park at Putwell Bridge includes allocation of two gypsy/ traveller sites to the location. It is not expected that the allocation will impact heritage assets and therefore no cumulative effects are anticipated.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** While it is understood that there are no active plans for the expansion of the Caravan Park, the construction of the Scheme is expected to have a very limited effect on this site. There are not expected to be any significant cumulative effects arising from the construction of both these schemes.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		significance of cumulative effects during construction.				
Gardens of Peace (formerly known as Land at Oak Farm), Maylands Fields	Havering planning app reference: P1742.14	Construction has begun at the site, but there is still some potential for overlap with the Scheme. If the construction programmes were to overlap it is likely that there may be some significant cumulative effects to local road users and residents whilst the works are undertaken.	**Neutral** Mostly within the Scheme boundary. The Oak Farm development may have a slight adverse effect on the geology and soils with the potential for cumulative effects. However, best practice measures and appropriate design and mitigation measures will be implemented, and effects are not considered to be significant.	**Neutral to Slight Adverse** The development has the potential to impact DLO33238, the London to Colchester Roman Road (Archaeological Priority Area), as well as DLO33196, alluvial deposits. Both of these are large assets, extending well beyond the current DCO boundary as well as beyond the area identified as part of the P1742.14 application. When assessed in combination with the proposed development, no significant cumulative effects are anticipated on DLO33238 or	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** While the construction of the Scheme requires temporary land take from the burial ground site, it is not expected to prevent the construction or operation of the burial ground and no significant adverse cumulative effects are expected on people and communities as a result of the construction of the two schemes.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
				DLO33196 due to the limited size and nature of the impacts compared to overall assets. The significance of a previously unknown site of early medieval date is still yet to be established, and so it has not yet been possible to identify appropriate mitigation. Therefore there would be a slight adverse effect on this asset, subject to appropriate mitigation to be secured in the CEMP.		
Former Harold Wood Hospital, Gubbins Lane	Havering planning app reference: P0702.08	**Slight Adverse** The Harold Wood development is currently under construction and this period is likely to run until 2021 – therefore it is likely that there will be some degree of overlap with the Scheme. There is no	The former Harold Wood Hospital allocation is outside the ZOI for Geology & Soils for the Scheme.	The former Harold Wood Hospital allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The former Harold Wood Hospital allocation is outside the ZOI for People & Communities for the Scheme.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		degree of intervisibility between the development and the Scheme, however, there are likely to be some slight adverse but not significant cumulative effects to local road users as a result of the two proposals. These effects would be short-term and temporary in nature.				
Cycleway proposals	Brentwood Borough Cycling Action Plan	As there is limited information regarding the design of the cycle paths and whether they will follow the routes of existing pathways or whether new pathways will cut through the landscape, it is not possible to determine whether there would be any significant cumulative effects resulting from the construction of the proposals in conjunction with the proposed Scheme. It	**Neutral** The Cycleway Proposals partially overlap the study area assessed in the geology and soils chapter for the Scheme. The Cycleway Proposals are considered to have negligible potential for cumulative effects. Best practice measures and appropriate design and mitigation measures will be implemented further reducing	**Neutral** No heritage assets affected by the Scheme would be impacted by the cycleway crossing; no cumulative effects are anticipated.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** Existing PRoWs and NMU routes would remain open during construction, but no new routes are proposed. This would therefore have no impact upon the proposed connectivity of any cycleway Proposals to come forward in Brentwood.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		is also not apparent as to when the construction period for the proposed cycleways are likely to commence. Presently, there is insufficient information to determine the cumulative effects during construction.	the potential for any effects on soils and geology.			
Land east of Nags Head Lane	Brentwood Draft Local Plan Preferred Site Allocations - 032	Presently there is insufficient information available to determine whether there would be any significant cumulative construction effects between the proposed development on land east of Nags Head Lane and the Scheme.	**Neutral** The proposed development on land east of Nags Head Lane is located mostly outside of the geology and soils study area for the Scheme. The development may have a slight adverse effect on the geology and soils with the potential for cumulative effects. However, best practice measures and appropriate design and mitigation measures will be implemented, and	**Neutral** No heritage assets impacted by the Scheme are impacted by the site allocation of land east of Nags Head Lane and no cumulative effects are anticipated.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** The construction stage would not require any land take from the development site. It is therefore considered to have a neutral impact.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
			effects are not considered to be significant.			
Boyles Court Farm, Dark Lane	Brentwood planning application reference: 18/01827/FUL	**Neutral** Development is a sufficient distance away to have no cumulative effect.	Boyles Court Farm is outside the ZOI for Geology & Soils for the Scheme.	**Neutral** As the proposed M25 junction 28 Scheme would not have any impacts on the Boyle's Court Farm complex, including listed buildings, no cumulative impacts are anticipated	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste	**Neutral** The construction stage would not require any land take from the development site. It is therefore considered to have a neutral impact.
Regent House, Hubert Road	Brentwood planning application reference: 16/00290/PNCOU	**Slight Adverse** With overlapping construction programmes, it is possible that there may be an increase in construction traffic using the local road network and therefore there may be some slight adverse but not significant cumulative effects resulting from the overlapping construction programmes. However, there is no	The Regent House site is outside the ZOI for Geology & Soils for the Scheme	The Regent House site is outside the ZOI for Cultural Heritage for the Scheme	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste	The Regent House site is outside the ZOI for People & Communities for the Scheme

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		intervisibility between the proposals and therefore cumulative effects are unlikely to be of significance.				
Regent House, Hubert Road	Brentwood planning application reference: 18/01601/OUT	The proposed Regent House development's planning status is currently 'pending construction'. Therefore there is insufficient information available to determine whether there would be any significant cumulative construction effects between the proposed development and the Scheme. There would be no degree of intervisibility between the proposals, however, if the construction programmes were to occur simultaneously there may be some significant cumulative effects to local road users.	The Regent House site is outside the ZOI for Geology & Soils for the Scheme	The Regent House site is outside the ZOI for Cultural Heritage for the Scheme	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste	The Regent House site is outside the ZOI for People & Communities for the Scheme

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
Essex Police & La Plata House, London Road	Brentwood planning application reference: 16/01805/OUT	**Slight Adverse** Potential for overlapping construction programmes, it is possible that there may be an increase in construction traffic using the local road network and therefore there may be some Slight adverse but not significant cumulative effects resulting from the proposals. However, there is no degree of intervisibility between the proposals and therefore cumulative effects are unlikely to be of significance.	The Essex Police & La Plata House site is outside the ZOI for Geology & Soils for the Scheme.	The Essex Police & La Plata House site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Essex Police & La Plata House site is outside the ZOI for People & Communities for the Scheme.
Westbury Road Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 039	Presently there is insufficient information available to determine whether there would be any significant cumulative construction effects between the proposed Westbury Road Car Park development and the	The Westbury Road Car Park allocation is outside the ZOI for Geology & Soils for the Scheme.	The Westbury Road Car Park allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Westbury Road Car Park allocation is outside the ZOI for People & Communities for the Scheme.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		Scheme. There would be no degree of intervisibility between the proposed development and the Scheme, however, there may be disruption to local road users if the construction works were to occur simultaneously.				
141 to 147 High Street	Brentwood planning application reference: 18/00859/FUL	**Slight Adverse** Potential for overlapping construction programmes, it is possible that there may be an increase in construction traffic using the local road network and therefore there may be some slight adverse but not significant cumulative effects resulting from the proposals. However, there is no degree of intervisibility between the proposals and therefore cumulative	The 141 to 147 High Street site is outside the ZOI for Geology & Soils for the Scheme.	The 141 to 147 High Street site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The 141 to 147 High Street site is outside the ZOI for People & Communities for the Scheme.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		effects are unlikely to be of significance.				
Land at Hunter House	Brentwood Draft Local Plan Preferred Site Allocations - 041	Presently there is insufficient information available to determine whether there would be any significant cumulative construction effects between the proposed development of land at Hunter House and the Scheme. There would be no degree of intervisibility between the proposed development and the Scheme, however, there may be disruption to local road users if the construction works were to occur simultaneously.	The Land at Hunter House site is outside the ZOI for Geology & Soils for the Scheme.	The Land and Hunter House allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Land at Hunter House site is outside the ZOI for People & Communities for the Scheme.
Land formerly known as NV Tools, St James Road	Brentwood planning application reference: 15/01084/FUL	**Slight Adverse** Potential for overlapping construction programmes, it is possible that there	The Land Formerly known as NV Tools site is outside the ZOI for Geology & Soils for the Scheme.	The land formerly known as NV Tools is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects	The land formerly known as NV Tools is outside the ZOI for People & Communities for the Scheme.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		may be an increase in construction traffic using the local road network and therefore there may be some slight adverse but not significant cumulative effects resulting from the proposals. However, there is no degree of intervisibility between the proposals and therefore cumulative effects are unlikely to be of significance.			regarding materials and waste.	
William Hunter Way Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 102	Presently there is insufficient information available to determine whether there would be any significant cumulative construction effects between the proposed William Hunter Way car park development and the Scheme. There would be no degree of intervisibility between the proposed development and the	The William Hunter Way Car Park allocation is outside the ZOI for Geology & Soils for the Scheme.	The William Hunter Way Car Park allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The William Hunter Way Car Park site is outside the ZOI for People & Communities for the Scheme.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		Scheme, however, there may be disruption to local road users if the construction works were to occur simultaneously.				
Kings House 101-135 Kings Road	Brentwood planning application reference: 16/00606/PNCOU	**Slight Adverse** Potential for overlapping construction programmes, it is possible that there may be an increase in construction traffic using the local road network and therefore there may be some slight adverse but not significant cumulative effects resulting from the proposals. However, there is no degree of intervisibility between the proposals and therefore cumulative effects are unlikely to be of significance.	The Kings House site is outside the ZOI for Geology & Soils for the Scheme.	The Kings House site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Kings House site is outside the ZOI for People & Communities for the Scheme.
Chatham Way/ Crown Street Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 040	Presently there is insufficient information available to determine	The Chatham Way/Crown Street car park allocation is outside the ZOI	The Chatham Way/ Crown Street car park allocation is outside the ZOI	Due to current stage of the development, this level of information is currently not available to determine	The Chatham Way/ Crown Street car park allocation is outside the ZOI for People &

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		whether there would be any significant cumulative construction effects between the proposed Chatham way/ Crown Street car park development and the Scheme. There would be no degree of intervisibility between the proposed development and the Scheme, however, there may be disruption to local road users if the construction works were to occur simultaneously.	for Geology & Soils for the Scheme.	for Cultural Heritage for the Scheme.	potential cumulative effects regarding materials and waste.	Communities for the Scheme.
Ford Offices, Eagle Way	Brentwood planning application reference: 19/00844/PNCOU	**Neutral** Development is a sufficient distance away to have no cumulative effect.	The Ford Offices development located along Eagle Way is outside the ZOI for Geology & Soils for the Scheme.	The Ford Motor Company proposal is outside of the Heritage ZOI; no cumulative effects are anticipated.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects. regarding materials and waste	The Ford Offices, Eagle Way site is outside the ZOI for People & Communities for the Scheme.
Brentwood Enterprise Park	Brentwood Draft Local Plan Preferred Site	**Neutral** Development is a sufficient distance	The area for the proposed Brentwood Enterprise Park is outside the ZOI for	The Brentwood Enterprise Park is likewise outside of the Heritage ZOI; no cumulative	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects	The Brentwood Enterprise Park site is outside the ZOI for People & Communities for the Scheme.

Development	Development or application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
	Allocations - 101A	away to have no cumulative effect.	Geology & Soils for the Scheme.	effects are anticipated.	regarding materials and waste.	
Dunton Hills Garden Village	Brentwood Draft Local Plan Preferred Site Allocations - 200	Presently there is insufficient information available to determine whether there would be any significant cumulative construction effects between the proposed Dunton Hills Garden Village development and the Scheme, due to lack of information regarding the construction programme for the proposed development. There would be no degree of intervisibility between the proposed development and the Scheme.	The Dunton Hills Garden Village allocation is outside the ZOI for Geology & Soils for the Scheme.	The Dunton Hills Garden Village allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Dunton Hills Garden Village allocation is outside the ZOI for People & Communities for the Scheme.

Table 15.9: Summary of cumulative effects between 'Other Developments' and the Scheme during operation (Chapters 5-8)

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
Lower Thames Crossing	Lower Thames Crossing NSIP	The LTC is included in the traffic model. However, the opening date for LTC is after the opening year for this Scheme, so air quality impacts arising from traffic generated at LTC fall outside of the scope of this assessment, and instead will be considered under the LTC environmental statement.	**Neutral** Development included in traffic scenarios. Therefore, operational impacts from this development are inherent in the noise modelling results for the Scheme.	**Neutral** A large scheme that impacts on similar habitats and species to the Scheme. LTC will require full ecological assessment and mitigation and compensation strategies to be developed prior to DCO application. The opening date for LTC is after the opening year for this Scheme, so air quality impacts arising from traffic generated at LTC fall outside of the scope of this assessment and would be considered under the LTC environmental statement. Once mitigation and compensation measures are established cumulative impacts are not anticipated.	**Neutral** There could be potential cumulative effects to the water environment, particularly to the Ingrebourne River indirectly (located approx. 1.7 km downstream) from tributaries which are approx. 315 m downstream of the development. Groundwater aquifers which are located beneath the development also have the potential to be impacted. With the adoption of mitigation measures there should be no significant adverse cumulative effects during operation.
Gallows Corner reconfiguration	Havering Submission Local Plan Policy 23, TfL Consultations 2016	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Gallows Corner is separated from the Scheme by the urban areas of Harold Hill and Harold Park and therefore there are	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				unlikely to be any cumulative impacts on biodiversity.	
Small, medium, large wind development sites	Havering Submission Local Plan – Proposals Map Changes Booklet Site Allocation - Wind Development Sites in Gooshays Ward (Havering)	Other development included in traffic model, therefore cumulative effects inherent in operational assessment. Unlikely to be any cumulative effects arising from traffic generation from this development.	**Neutral** The council requires that any proposals include a noise impact assessment, which considers all relevant national and local guidance and that appropriate noise mitigation measures are included to reduce the impacts on the surrounding occupants. Therefore, no residual operational noise impacts are expected, and so no cumulative effects with the Scheme.	**Slight Adverse** (depending on details of development) Construction of a wind energy development within the DCO boundary has the potential for cumulative impacts in combination with the Scheme, even if the wind development is constructed once the new road layout is operational. Any development within the DCO boundary would lead to loss of land required for mitigation for the Scheme. Potential impacts on designated sites (in particular Ingrebourne Valley SMI), as well as bats and great crested newts, through permanent habitat loss and potential killing of bats by wind turbines. Without adequate mitigation there could potentially be an effect on the populations of great crested newts and bats in proximity to the Scheme of slight significance. Mitigation and enhancement measures as	**Neutral** There could be potential cumulative effects to the water environment, particularly to the Weald Brook and drainage channels/tributaries of Weald Brook which are adjacent to the development. With the adoption of mitigation measures there should be no significant adverse cumulative effects during operation.

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				detailed for the Scheme may reduce cumulative effects, especially if additional measures are applied for later developments (and suitable maintenance of habitat areas is ensured), to a level that is not significant.	
The Caravan Park, Putwell Bridge, Colchester Road	Havering Submission Local Plan – Proposals Map Changes Booklet 4.12 Site Allocation – Gypsy & Traveller Sites	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** The Caravan Park is separated from the main area of construction works by the A12. Aerial photographs indicate the site is already hardstanding and therefore there is unlikely to be any cumulative impact on biodiversity.	**Neutral** There could be potential cumulative effects to the water environment, particularly to the Ingrebourne River which is adjacent to the development and groundwater aquifers which are located beneath the development. With the adoption of mitigation measures there should be no significant adverse cumulative effects during operation.
Gardens of Peace, Maylands Fields	Havering planning app reference: P1742.14	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Long-term habitat management to compensate for habitat loss from the Ingrebourne Valley SMI at Gardens of Peace and the mitigation and compensation strategy for the Scheme should off-set significant cumulative impacts on biodiversity.	**Neutral** There could be potential cumulative effects to the water environment, particularly to the Ingrebourne River which is adjacent to the development and groundwater aquifers which are located beneath Gardens of Peace. The proposed development is downstream of Weald Brook (approx. 120 m from Putwell

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
					Bridge) so no impacts are assumed. With the adoption of mitigation measures there should be no significant adverse cumulative effects during operation.
Former Harold Wood Hospital, Gubbins Lane	Havering planning app reference: P0702.08	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Former Harold Wood Hospital is separated from the scheme by the urban areas of Harold Park and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment.
Cycleway proposals	Brentwood Borough Cycling Action Plan	Unlikely to be any cumulative effects on air quality from this development.	**Neutral** No operational noise impact expected.	**Neutral** No cumulative effects on biodiversity are expected as the cycleway proposals are relatively small-scale and separated from the main area of land take from the Scheme by the M25.	**Neutral** **No** cumulative impacts to water environment and drainage are expected.
Land east of Nags Head Lane	Brentwood Draft Local Plan	Other development included in traffic model, therefore cumulative	**Neutral** Development included in traffic scenarios. Therefore, operational	**Neutral** Land East of Nags Head Lane is separated from the main area of land take of	**Neutral** Residential developments will typically have a low pollution risk once constructed and will

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
	Preferred Site Allocations - 032	effects inherent in operational assessment.	impacts from this development are inherent in the noise modelling results for the Scheme.	the Scheme by the A12 and M25 and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	be required to follow well established best practice guidance to mitigate pollutant loading and flood risk. It is considered likely that the development would have appropriate mitigation in place in order to obtain planning permission.
Boyles Court Farm, Dark Lane	Brentwood planning application reference: 18/01827/FUL	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect	**Neutral** Unlikely to have potential for cumulative effects during operation.	**Neutral** Although within the 1 km ZOI, this development is 1.6 km upstream of the Scheme. On the assumption that water quality impacts beyond a 1 km will be sufficiently diluted no impacts are anticipated. No WFD or flood risk impacts are anticipated
Regent House, Hubert Road	Brentwood planning application reference: 16/00290/PNCOU	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Regent House is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents	**Neutral** Residential developments will typically have a low pollution risk once constructed and will be required to follow well established best practice guidance to mitigate pollutant loading and flood risk. It is considered likely that the development would have appropriate mitigation in place

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	in order to obtain planning permission.
Regent House, Hubert Road	Brentwood planning application reference: 18/01601/OUT	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Regent House is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	**Neutral** Residential developments will typically have a low pollution risk once constructed and will be required to follow well established best practice guidance to mitigate pollutant loading and flood risk. It is considered likely that the development would have appropriate mitigation in place in order to obtain planning permission.
Essex Police & La Plata House, London Road	Brentwood planning application reference: 16/01805/OUT	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Essex Police & La Plata House is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				unlikely to be any cumulative impacts on biodiversity.	
Westbury Road Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 039	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Westbury Road Car Park is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
141 to 147 High Street	Brentwood planning application reference: 18/00859/FUL	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** 141 to 147 High Street is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the 141 to 147 High Street development will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
				cumulative impacts on biodiversity.	
Land at Hunter House	Brentwood Draft Local Plan Preferred Site Allocations - 041	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Land at Hunter House is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Land formerly known as NV Tools, St James Road	Brentwood planning application reference: 15/01084/FUL	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Land formerly known as NV Tools is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
William Hunter Way Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 102	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** William Hunter Way Car Park is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the junction 28 Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Kings House 101-135 Kings Road	Brentwood planning application reference: 16/00606/PNCOU	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Kings House is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
Chatham Way/ Crown Street Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 040	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Chatham Way/Crown Street car park is separated from the Scheme by the urban areas of Brentwood and the lack of public access to habitat compensation sites proposed for the scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Ford Offices, Eagle Way	Brentwood planning application reference: 19/00844/PNCOU	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Unlikely to have potential for cumulative effects during operation.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Brentwood Enterprise Park	Brentwood Draft Local Plan Preferred Site Allocations - 101A	Other development included in traffic model, therefore cumulative effects inherent in operational assessment.	**Neutral** The additional traffic accessing this development when operational would not give rise to a significant effect.	**Neutral** Unlikely to have potential for cumulative effects during operation.	The development is outside of the ZOI for Road Drainage and the Water Environment for the Scheme.
Dunton Hills Garden Village	Brentwood Draft Local Plan	Other development included in traffic model,	**Neutral**	**Neutral**	The development is outside of the ZOI for Road Drainage and

Development	Document or application reference	Air quality	Noise and vibration	Biodiversity	Road drainage and the water environment
	Preferred Site Allocations - 200	therefore cumulative effects inherent in operational assessment.	The additional traffic accessing this development when operational would not give rise to a significant effect.	Dunton Hills Garden Village is separated from the Scheme by over 6 km and major roads. This distance and the lack of public access to habitat compensation sites proposed for the Scheme will avoid recreational disturbance from residents of this development. Therefore, there are unlikely to be any cumulative impacts on biodiversity.	the Water Environment for the Scheme.

Table 15.10: Summary of cumulative effects between 'Other Developments' and the Scheme during operation (Chapters 9-13)

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
Lower Thames Crossing	Lower Thames Crossing NSIP	**Neutral** On a regional scale, adverse effects will result from LTC and the Scheme, which will lead to further urbanisation along the M25 corridor and severance of agricultural land and landscape elements, further urbanising the local environment and the regional landscape character. However, due to the nature of the works of the proposed Scheme relative to the LTC proposals, once the proposals are in operation, there is unlikely to be any significant effects regarding inter-visibility, as the proposed works in this area are not significantly different to the existing situation, and therefore, once the mitigation planting has sufficiently established the proposals will likely be of neutral and not significant effect in this localised area adjacent to Foxburrow Wood.	**Neutral** During operation it is considered that there will be no potential for cumulative effects.	**Neutral** Significant works for the LTC are outside of the ZOI for Cultural Heritage. Any works in proximity to the Scheme are expected to be minor and would cause no cumulative impact.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Slight Beneficial** The improvement to traffic flows is expected to complement the improvements anticipated by LTC.

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
Gallows Corner reconfiguration	Havering Submission Local Plan Policy 23, TfL Consultations 2016	**Neutral** Due to the nature of the proposed works at Gallows Corner, once the projects are operational, there is unlikely to be any significant cumulative effects resulting from the proposed development and the proposed Scheme. This is because the works to Gallows Corner would largely maintain the character of the baseline conditions and would blend in with the characteristics features and elements of that location	The Gallows Corner development is outside the ZOI for Geology & Soils for the Scheme	The Gallows corner development is outside of the ZOI for Cultural Heritage for the Scheme	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** The operational phase of the Scheme is not anticipated to affect the Gallows Corner scheme and the impact is therefore considered to be neutral.
Small, medium, large wind development sites	Havering Submission Local Plan – Proposals Map Changes Booklet Site Allocation - Wind Development Sites in Gooshays Ward (Havering)	The extent of the cumulative impact of multiple potential variable-scale wind developments in conjunction with the proposed Scheme is likely to lead to a significant cumulative effect. This is due to the increased sense of urbanisation that the wind turbines presence would contribute, combined with the further urbanisation of the motorway corridor through the proposed Scheme, leading to further erosion of the landscape character of the rural surroundings and a further	**Neutral** During operation it is considered that there will be no potential for cumulative effects.	**Neutral** Land allocations for small, medium and large wind energy development sites within the study area have the potential to impact MLO104464, the Post-Medieval Park at Dagnam. The current Scheme would have a slight adverse effect on the setting of the asset during construction, and a	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** Figure 13.1 indicated the land which has been identified as having potential for small, medium and large wind development sites and falls within the DCO boundary. The construction of the Scheme would prevent any development coming forward as the land would either be used for the loop road itself. There is therefore not expected to be any overlap in the Schemes as wind development would be prevented from coming

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		sense of coalescence / expansion of the urban edge of Romford. However, the extent of this significance is indeterminable due to insufficient information regarding the likelihood of these proposals going ahead and the exact proposals for the wind development sites. The impacts upon visual receptors are indeterminable with the current level of information, however it is likely that there would be significant adverse effects upon sensitive receptors in proximity or with prominent inter-visibility of the proposals.		neutral effect during operation. Wind energy developments have the potential to have large impacts on setting and could result in significant adverse effects. As the current Scheme has a neutral residual effect on the setting of MLO104464, it is not considered to add to any effects the wind energy developments may have. As such, no cumulative effect is anticipated.		forward at the identified sites. There is therefore not considered to be any cumulative effect at operation stage.
The Caravan Park, Putwell Bridge, Colchester Road	Havering Submission Local Plan – Proposals Map Changes Booklet 4.12 Site Allocation – Gypsy & Traveller Sites	Presently, the site for the proposed development adjoining the A12 is already fairly urban and slightly degraded in nature with urbanising, variable-colour steel palisade fencing, caravans, hardstanding and storage containers. If the site were to be developed to provide space for additional caravans there is potential for further degradation of	**Neutral** During operation it is considered that there will be no potential for cumulative effects.	**Neutral** The proposed development at The Caravan Park at Putwell Bridge includes allocation of two gypsy/ traveller sites to the location. It is not expected that the allocation will impact heritage assets and	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding	**Neutral** The improved traffic flows are expected to result in a slight beneficial impact for occupants of the Caravan Park. There are not expected to be any significant cumulative effects on people and communities as a result of the two schemes during operation.

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		this site, however, there is also opportunity to mitigate against this through the provision of screening planting and appropriate/sensitive selection of materials for boundary fencing etc. Without detailed information regarding the proposed development it is not possible to determine whether the cumulative effects resulting from the proposed development and the Scheme during operation would be significant or slightly beneficial in nature.		therefore no cumulative effects are anticipated.	materials and waste.	
Gardens of Peace, Maylands Fields	Havering planning app reference: P1742.14	**Neutral** Once the proposed development and the Scheme are in operation and all mitigation planting has been established, there are unlikely to be any significant cumulative effects resulting from the two proposals.	**Neutral** During operation it is considered that there will be no potential for cumulative effects.	**Neutral** The Gardens of Peace development has the potential to impact DLO33238, the London to Colchester Roman Road (Archaeological Priority Area), as well as DLO33196, alluvial deposits. Both of these are large assets, extending well	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** During operational phase of the Scheme, it is expected that both schemes will be able to operate concurrently. The improvements provided by the Scheme for example reduced road congestion and improved safety in the area, are expected to benefit the burial ground site and no significant cumulative effects on people and communities

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
				beyond the current DCO boundary as well as beyond the area identified as part of the P1742.14 application. When assessed in combination with the proposed development, no significant cumulative effects are anticipated on DLO33238 or DLO33196 due to the limited size and nature of the impacts compared to overall assets.		are expected during operation.
Former Harold Wood Hospital, Gubbins Lane	Havering planning app reference: P0702.08	**Neutral** Once the proposed development and the Scheme are operational it is unlikely that there would be any adverse significant cumulative effects resulting from the two proposals. The proposed development is already in a built-up area adjacent to industrial units and when combined with the Scheme is unlikely to result in any adverse or significant cumulative effects.	The former Harold Wood Hospital site is outside the ZOI for Geology & Soils for the Scheme.	The former Harold Wood Hospital allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Former Harold Wood Hospital site is outside the ZOI for People & Communities for the Scheme

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
Cycleway proposals	Brentwood Borough Cycling Action Plan	The extent of the cumulative impact of additional cycle paths in conjunction with the proposed Scheme is not possible to determine presently as further information is required regarding the nature of the proposed cycleways and their design. The proposed Scheme is likely to lead to an increased sense of urbanisation and cycleways that do not follow existing footpaths / paved areas and encroach upon open rural agricultural or wooded areas would lead to a further sense of urbanisation. However, in this worst-case scenario, given the proximity of the cycleways to the urban edge of Brentwood, it is unlikely that there would be any significant cumulative landscape or visual effects resulting from the proposed cycleways in conjunction with the proposed Scheme.	**Neutral** During operation it is considered that there will be no potential for cumulative effects.	**Neutral** No heritage assets affected by the Scheme would be impacted by the cycleway crossing; no cumulative effects are anticipated.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	**Neutral** No cycling infrastructure would be added to the existing network as part of the Scheme, nor would any be removed. As such there would be no resultant change to the proposed cycling network development under the Brentwood Borough Cycling Action Plan.
Land east of Nags Head Lane	Brentwood Draft Local Plan Preferred Site Allocations - 032	**Slight Adverse** It is possible that there would be a degree of intervisibility between the proposed development and	**Neutral** During operation it is considered that there will be no potential	**Neutral** No heritage assets impacted by the Scheme are impacted by the	Due to current stage of the development, this level of information is	**Slight Beneficial** The improved traffic flows resulting during the operational phase of the scheme are expected to

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		the Scheme, however, due to the insufficient information available regarding the design of the proposed development it is unclear whether there would be any suitable mitigation measures to limit such intervisibility. As the works to the proposed Scheme in proximity to the development are fairly minor in nature, it is unlikely that the Scheme will have any significant effects to the landscape character or to visual receptors within this area. However, the proposed development will further encroach upon the rural landscape – with the loss of additional agricultural land, leading to an expansion of the urban edge of Brentwood, this in conjunction with the expansion of the M5 in proximity to this location will lead to a slight adverse but not significant cumulative effect.	for cumulative effects.	site allocation of land east of Nags Head Lane and no cumulative effects are anticipated.	currently not available to determine potential cumulative effects regarding. materials and waste.	result in a slight beneficial impact
Boyles Court Farm, Dark Lane	Brentwood planning application reference: 18/01827/FUL	**Neutral** Development is a sufficient distance away to have no cumulative effect.	Boyles Court Farm is outside the ZOI for Geology & Soils for the Scheme.	**Neutral** As the proposed M25 junction 28 scheme would not have any impacts on the Boyle's	Due to current stage of the development, this level of information is currently not	**Slight Beneficial** The improved traffic flows resulting during the operational phase of the scheme are expected to

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
				Court Farm complex, including listed buildings, no cumulative impacts are anticipated.	available to determine potential cumulative effects regarding materials and waste.	result in a slight beneficial impact.
Regent House, Hubert Road	Brentwood planning application reference: 16/00290/PNCOU	**Neutral** There is no degree of intervisibility between the two proposals. Given the nature of the proposed development (conversion of an office building to residential) there will be no significant cumulative effects.	The Regent House site is outside the ZOI for Geology & Soils for the Scheme.	The Regent House site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Regent House site is outside the ZOI for People & Communities for the Scheme.
Regent House, Hubert Road	Brentwood planning application reference: 18/01601/OUT	**Neutral** There would be no degree of intervisibility between the two proposals. The proposed development is likely to lead to some enhancements to the existing site through conversion of the carpark into a new residential building and landscaping improvements, these measures would not be out	The Regent House site is outside the ZOI for Geology & Soils for the Scheme.	The Regent House site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Regent House site is outside the ZOI for People & Communities for the Scheme.

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		of keeping with the surrounding built-up area.				
Essex Police & La Plata House, London Road	Brentwood planning application reference: 16/01805/OUT	**Neutral** There is no degree of intervisibility between the two proposals. The proposed development is situated within an existing built-up area comprised of residential properties and therefore would not be out of keeping with the existing situation.	The Essex Police & La Plata House site is outside the ZOI for Geology & Soils for the Scheme.	The Essex Police & La Plata House site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Essex Police & La Plata House site is outside the ZOI for People & Communities for the Scheme.
Westbury Road Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 039	**Neutral** There would be no degree of intervisibility between the proposed development and the Scheme. The proposed development is within an urban area of Brentwood – with existing residential properties opposite and adjacent to the existing car park. The change of use of the car park to provide additional housing is unlikely in conjunction with the proposed Scheme to lead to any significant cumulative effects.	The Westbury Road Car Park allocation is outside the ZOI for Geology & Soils for the Scheme.	The Westbury Road Car Park allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Westbury Road Car Park allocation is outside the ZOI for People & Communities for the Scheme.

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
141 to 147 High Street	Brentwood planning application reference: 18/00859/FUL	**Neutral** There is no degree of intervisibility between the two proposals. The proposed development is situated within an existing built-up area comprised of mixed-use buildings including buildings of a similar height, and therefore would not be out of keeping with the existing situation.	The 141-147 High Street site is outside the ZOI for Geology & Soils for the Scheme.	The 141 to 147 High Street site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The 141 to 147 High Street site is outside the ZOI for People & Communities for the Scheme.
Land at Hunter House	Brentwood Draft Local Plan Preferred Site Allocations - 041	**Neutral** There would be no degree of intervisibility between the proposed development and the Scheme. The proposed development is within an urban area of Brentwood – with existing residential properties including flats and houses within proximity of the development. The addition of more dwellings within this location is unlikely in conjunction with the proposed Scheme to lead to any significant cumulative effects.	The Land at Hunter House allocation is outside the ZOI for Geology & Soils for the Scheme.	The Land at Hunter House allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Land at Hunter House site is outside the ZOI for People & Communities for the Scheme.
Land formerly known as NV Tools, St James Road	Brentwood planning application reference: 15/01084/FUL	**Neutral** There is no degree of intervisibility between the two proposals. The proposed development is	The land formerly known As NV Tools is outside the ZOI for Geology & Soils for the Scheme.	The land formerly known As NV Tools is outside the ZOI for Cultural	Due to current stage of the development, this level of information is	The land formerly known As NV Tools is outside the ZOI for People & Communities for the Scheme.

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		situated within an existing built-up area comprised of residential and industrial units, and therefore would not be out of keeping with the existing situation.		Heritage for the Scheme.	currently not available to determine potential cumulative effects regarding materials and waste.	
William Hunter Way Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 102	**Neutral** There would be no degree of intervisibility between the proposed development and the Scheme. The proposed development is within an urban area of Brentwood – with existing residential properties opposite and adjacent to the existing car park. The change of use of the car park to provide additional housing is unlikely in conjunction with the proposed Scheme to lead to any significant cumulative effects	The William Hunter Way Car Park allocation is outside the ZOI for Geology & Soils for the Scheme.	The William Hunter Way Car Park allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The William Hunter Way Car Park site is outside the ZOI for People & Communities for the Scheme.
Kings House 101-135 Kings Road	Brentwood planning application reference: 16/00606/PNCOU	**Neutral** There is no degree of intervisibility between the two proposals. The proposed development is situated within an existing built-up area comprised of mixed-use buildings including buildings of a similar height, and therefore	The Kings House site is outside the ZOI for Geology & Soils for the Scheme.	The Kings House site is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative	The Kings House site is outside the ZOI for People & Communities for the Scheme.

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		would not be out of keeping with the existing situation.			effects regarding materials and waste.	
Chatham Way/ Crown Street Car Park	Brentwood Draft Local Plan Preferred Site Allocations - 040	**Neutral** There would be no degree of intervisibility between the proposed development and the Scheme. The proposed development is within an urban area of Brentwood – with existing residential properties opposite and adjacent to the existing car park. The change of use of the car park to provide additional housing is unlikely in conjunction with the proposed Scheme to lead to any significant cumulative effects.	The Chatham Way/Crown Street car park allocation is outside the ZOI for Geology & Soils for the Scheme.	The Chatham Way/ Crown Street car park allocation is outside the ZOI for Cultural Heritage for the Scheme.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Chatham Way/ Crown Street car park allocation is outside the ZOI for People & Communities for the Scheme.
Ford Offices, Eagle Way	Brentwood planning application reference: 19/00844/PNCOU	**Neutral** Development is a sufficient distance away to have no cumulative effect.	The Ford Offices development located along Eagle Way is outside the ZOI for Geology & Soils for the Scheme.	The Ford Motor Company proposal is outside of the Heritage ZOI; no cumulative effects are anticipated.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Ford Offices, Eagle Way site is outside the ZOI for People & Communities for the Scheme.

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
Brentwood Enterprise Park	Brentwood Draft Local Plan Preferred Site Allocations - 101A	**Neutral** Development is a sufficient distance away to have no cumulative effect.	The area for the proposed Brentwood Enterprise Park is outside the ZOI for Geology & Soils for the Scheme.	The Brentwood Enterprise Park is likewise outside of the Heritage ZOI; no cumulative effects are anticipated.	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Brentwood Enterprise Park site is outside the ZOI for People & Communities for the Scheme.
Dunton Hills Garden Village	Brentwood Draft Local Plan Preferred Site Allocations - 200	**Slight Adverse** Without a definitive masterplan for the Dunton Hills Garden Village it is difficult to determine the likely impact of the proposed Scheme, however, it is reassuring to see that the eastern section and areas within the scheme will be set aside for landscape / habitat allocation. However, this is a significant residential scheme that will essentially lead to further urban expansion of the town of Basildon, encroaching on agricultural land and important habitats / landscape elements. Although there is no degree	The Dunton Hills Garden Village allocation is outside the ZOI for Geology & Soils for the Scheme	The Dunton Hills Garden Village allocation is outside the ZOI for Cultural Heritage for the Scheme	Due to current stage of the development, this level of information is currently not available to determine potential cumulative effects regarding materials and waste.	The Dunton Hills Garden Village allocation is outside the ZOI for People & Communities for the Scheme

Development	Application reference	Landscape	Geology and soils	Cultural heritage	Materials and waste	People and communities
		of intervisibility between the proposed development and the Scheme, on the regional landscape there are likely to be some significant cumulative effects on the wider landscape due to the loss of green belt. At a local scale the cumulative effects are likely to be slight adverse but not significant as the two proposals have no degree of intervisibility and are not in close proximity.				

15.10 Mitigation

15.10.1 Details on mitigation measures to address any potential cumulative effects are included within the topic chapters. Cumulative effects result from the combination of individual effects, and so implementing mitigation for each individual effect would also serve to reduce the potential for a cumulative effect to occur. Where possible, mitigation measures during construction will be aligned and programmed with those proposed for other major developments taking place in the vicinity of the Scheme in consultation with the other developers to minimise their cumulative effects.

15.10.2 Due to uncertainties with the progression of other schemes, the assessment significantly relies on assumptions on the timing and nature of other development.

15.10.3 The cumulative effects assessment has adopted a conservative approach and therefore represents a worst-case scenario which assumes all shortlisted developments would be concurrent, which is unlikely to occur in practice.

15.11 Monitoring

15.11.1 As set out in Outline CEMP (application document TR010029/APP/7.2) and to be secured through the CEMP, monitoring will be required, particularly during construction in relation to noise, air quality, the water environment and biodiversity. These would consider cumulative effects and undertake regular reporting and reviews to ensure effects are minimised and action taken to preserve and enhance assets and limit impact on receptors. The establishment of mitigation planting will be monitored once construction has been completed, this will consider cumulative effects from other completed developments and those in construction.

15.12 Summary

15.12.1 The in-combination effects during the construction period are principally related to visual impacts, land take, localised noise and vibration impacts, temporary disturbance to ecological receptors, and potential localised disturbance to some heritage assets. The overall in-combination effect is considered to be moderate adverse, with large adverse effects on localised human (residential, community and business) receptors and landscape receptors primarily due to the visual and amenity impacts of works.

15.12.2 The in-combination adverse effects during operation are principally related to biodiversity (significantly with regard to loss of veteran trees) and landscape and visual effects. Road drainage and water environment works, as well as improved vehicular traffic flows would generally result in beneficial in-combination effects. The overall in-combination effect during operation is considered to be neutral to slight adverse, with slight adverse effects upon human (residential, community and business) receptors, ecological receptors and landscape receptors.

15.12.3 Overall there are likely to be the following cumulative effects during construction due to the combination of effects of all the shortlisted projects:

- Slight adverse cumulative effects in relation to construction noise should construction periods overlap with the Scheme at several sites.

- Slight adverse cumulative effects between the Scheme and several sites in relation to biodiversity impacts, due to disturbance to species and displacement of SMI land.
- Slight adverse cumulative effects for various sites in relation to landscape and visual effects, assuming overlapping construction, due to inter-visibility between schemes or due to an increase in construction traffic in the area.

15.12.4 Overall there are likely to be the following cumulative effects during operation due to the combination of effects of all the shortlisted projects:

- Slight adverse cumulative effects in relation to landscape effects at Land East of Nags Head Lane and Dunton Hills Garden Village, where proposals could combine with the Scheme to have an urbanising effect on the existing rural character.

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