A12 Chelmsford to A120 widening scheme TR010060

6.1 ENVIRONMENTAL STATEMENT CHAPTER 5 ENVIRONMENTAL ASSESSMENT METHODOLOGY

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ENVIRONMENTAL STATEMENT
CHAPTER 5 ENVIRONMENTAL ASSESSMENT METHODOLOGY

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5.1 Environmental scoping

Scoping methodology

5.1.1 An Environmental Scoping Report was submitted to the Planning Inspectorate on 28 October 2020 (Highways England, 2020a) and can be viewed on the National Infrastructure Planning website:

https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010060/TR010060-000006-A12%20-%20Environmental%20Scoping%20Report.pdf

5.1.2 The Environmental Scoping Report was produced to document the proposed scope of the Environmental Statement.

5.1.3 On behalf of the Secretary of State, the Planning Inspectorate reviewed and consulted on the Environmental Scoping Report and published a Scoping Opinion on 7 December 2020, and republished with an errata sheet on 15 March 2021, which can be viewed on National Infrastructure Planning website:

https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010060/TR010060-000016-CHLM%20-%20Scoping%20Opinion.pdf

5.1.4 National Highways has maintained ongoing dialogue with the Planning Inspectorate and other statutory consultees to ensure that the scope of the Environmental Statement is proportionate and meets the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations').

5.1.5 The Environmental Statement has been prepared on the basis of the Scoping Opinion. The scope and methodology of the assessment may have been refined since the Scoping Opinion was adopted as additional data and survey information became available, or to address comments raised by stakeholders during the statutory consultation. The scope of the Environmental Statement for each aspect has been discussed and agreed with the relevant statutory consultees, and this is stated within individual aspect chapters where relevant.

5.1.6 Responses to comments raised in the Scoping Opinion, including details of changes to scope and methodology, are included in Appendix 5.1 of the Environmental Statement [TR010060/APP/6.3].

Aspects and matters scoped out of the assessment

5.1.7 The construction and operation of the proposed scheme would not introduce any sources of radiation and would only generate limited amounts of heat from technology. The assessment of heat and radiation is therefore not considered relevant to the proposed scheme and has been scoped out of further assessment. No further environmental aspects have been scoped out of the assessment in their entirety.

5.1.8 Certain matters of environmental aspects have been scoped out of the assessment, in line with the Scoping Opinion. In summary, these are as follows:

- Ecological Sites of Special Scientific Interest (SSSIs) and National Nature Reserves – there are no ecological SSSIs or National Nature Reserves within 2km of the proposed scheme. The Planning Inspectorate agrees that, due to the distance between these sites and the proposed scheme, significant effects on these sites are unlikely and these sites can be scoped out of the Environmental Statement. However, two SSSIs have been considered (one within 200m of the affected road network, and another which is hydrologically linked to the proposed scheme).

- Invasive non-native plant and animal species (INNS) – given the negligible value assigned to INNS, the Planning Inspectorate agrees that any impacts to INNS would not result in significant effects, and therefore impacts to INNS can be scoped out of the Environmental Statement. INNS have been considered in relation to legislative compliance.

- Geological SSSIs – the Marks Tey Brickpit SSSI is located outside the footprint of the proposed scheme. Indirect effects due to dust or leachate can be mitigated through standard construction measures. On this basis, the Planning Inspectorate agrees that effects on the SSSI can be scoped out of the Environmental Statement.

- Effects on the health of site users and the general public during the operational phase – contamination within the proposed scheme area would be removed during construction, reducing the potential for contact with contaminated soil. Furthermore, implementing appropriate site-specific risk assessments and method statements would reduce exposure. The Planning Inspectorate agrees that it is unlikely for the human health of site users and the general public to be significantly affected during the operational phase, and therefore this matter can be scoped out of the Environmental Statement.

- Effects from material assets and waste during the operational phase – the Design Manual for Roads and Bridges (DMRB) LA 110 (Highways England, 2019a) specifies that the assessment should only report on the first year of operational activities (opening year). Any construction phase effects overlapping within this period are captured within the construction phase assessment. It is assumed that the assessment of any environmental impacts and effects associated with material assets and waste during any large-scale future maintenance, renewal or improvement works would be undertaken by National Highways' East of England Delivery Contractor(s) (or equivalent) in accordance with the requirements of DMRB LA 110. On this basis, the Planning Inspectorate agrees that this matter can be scoped out of the Environmental Statement.

- Effects from traffic vibration during the operational phase – DMRB LA 111 (Highways England, 2020b) states that operational vibration should be scoped out of the assessment methodology as a maintained road surface will be free of irregularities, so operational vibration would not have the

potential to lead to significant adverse effects. It is considered that there is nothing within the design of the proposed scheme that would change this assumption. The Planning Inspectorate agrees that significant vibration effects during operation are unlikely to arise and this matter can be scoped out of the Environmental Statement.

- Risk of reservoir flooding – The Planning Inspectorate agrees that flooding due to reservoir failure may be scoped out of the Environmental Statement on the basis that such reservoirs are subject to a monitoring and maintenance regime and the probability of a flooding event is low.
- Risk of coastal flooding – The Planning Inspectorate agrees that coastal flooding can be scoped out of the Environmental Statement as the proposed scheme is not located near the coast, and none of the watercourses within the study area are tidal.

5.1.9 Additional matters were proposed to be scoped out of the assessment but have been scoped back in following feedback from consultees in the Scoping Opinion. These are discussed in the aspect chapters within the Environmental Statement [TR010060/APP/6.1].

5.2 High pressure gas main diversion

5.2.1 During the design-development process, it was identified that the high-pressure gas main Little Braxted to Springfield - AIA2, operated by Cadent Gas Limited (Cadent), would need to be diverted as part of the proposed scheme (the 'gas main diversion'). Due to the scale and location of the gas main diversion, an EIA screening exercise was undertaken by National Highways against the EIA Regulations.

5.2.2 The EIA screening exercise is provided in Appendix 5.2 of the Environmental Statement [TR010060/APP/6.3]. This concluded that the gas main diversion works would give rise to likely significant effects, and would therefore satisfy the criteria to be considered a Nationally Significant Infrastructure Project (NSIP) under Section 20 of the Planning Act 2008 and be treated as an NSIP in its own right.

5.2.3 The Overarching National Policy Statement for Energy (EN-1) and National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) (Department of Energy and Climate Change, 2011a; 2011b) were reviewed to determine if any changes were required to the proposed scheme's Environmental Statement scope and methodology. Draft versions of the updated EN-1 and EN-4 National Policy Statements have also been considered (Department for Business, Energy and Industrial Strategy, 2021a; 2021b).

5.2.4 The review identified that the environmental requirements of EN-1 and EN-4 relating to the EIA of gas main diversion works are not materially different to those set out in the National Networks National Policy Statement (NNNPS) (Department for Transport, 2014). The review concluded that the scope of the Environmental Statement in relation to the topics being assessed, and the methodologies being applied, adequately covered the requirements of EN-1 and EN-4 and that no modifications were required.

5.2.5 Appendices A and B of the Case for the Scheme [TR010060/APP/7.1] highlight the key themes across the NNNPS, EN-1 and EN-4 (including the draft updated versions of EN-1 and EN-4) and confirms accordance with the key requirements relating to EIA.

5.2.6 Besides the gas main diversion, there are four further diversions required for the high and intermediate pressure gas mains as identified in Chapter 2: The proposed scheme, of the Environmental Statement [TR010060/APP/6.1]. These four other diversions are not a Nationally Significant Infrastructure Project, as they would not result in significant environmental effects, and have are therefore not been subject to the EIA screening in Appendix 5.2 [TR010060/APP/6.3].

5.3 Surveys, predictive techniques and methods

Design Manual for Roads and Bridges

5.3.1 The environmental assessments have been undertaken in line with the general standards set out within DMRB LA 104 Environmental Assessment and Monitoring (Highways England, 2020c), as well as the aspect-specific DMRB standards. DMRB is the established guidance for assessing the environmental impacts of highway schemes and has been developed by National Highways in collaboration with relevant stakeholders.

5.3.2 Where relevant, the environmental assessments have drawn on relevant topic guidance and best practice. More details on the methods used are provided in each of the aspect chapters within the Environmental Statement [TR010060/APP/6.1].

Study areas

5.3.3 Various study areas have been used to assess the impact on environmental receptors based on DMRB standards and aspect-specific guidance. Specific study areas are outlined in the individual aspect chapters within the Environmental Statement [TR010060/APP/6.1].

Temporal scope

5.3.4 For the purpose of the Environmental Statement, construction is assumed to start in 2024, the opening year is 2027 and the design year is 2042 (15 years after opening to traffic).

Surveys and assessment

5.3.5 Extensive surveys have been undertaken to inform the aspect-specific environmental assessments, including:

- extended Phase 1 habitat survey and hedgerow survey
- otter and water vole surveys
- badger and dormice surveys
- bat (activity and roost) surveys

- freshwater environment surveys (fish, invertebrates, aquatic plants, white-clawed crayfish)
- great crested newt surveys
- reptile surveys
- wintering birds, breeding birds, and barn owl surveys
- terrestrial invertebrate survey
- landscape winter and summer walkovers
- arboriculture surveys
- air quality monitoring
- ground investigations, including groundwater monitoring and testing for contaminated soils
- geophysical surveys for below ground archaeology
- trial trenching surveys for below ground archaeology
- Agricultural Land Classification soil surveys
- noise monitoring surveys

5.3.6 The above surveys were generally undertaken in 2020–2021. In some instances, surveys were undertaken in 2017–2018 to inform the option development and selection process. In these instances, surveys have either been updated to bring results up to date, or it has been agreed with consultees that updates are not required. More information on surveys and their timeframes is provided in the aspect chapters (Chapters 6 to 15) of the Environmental Statement [TR010060/APP/6.1].

5.3.7 In addition to surveys, other predictive techniques have been used to inform the Environmental Statement, such as air quality, noise and flood risk modelling. Further information on the surveys and assessments that have been undertaken is provided in the individual aspect chapters (Chapters 6 to 15) of the Environmental Statement [TR010060/APP/6.1].

Traffic modelling

5.3.8 Predictions of future traffic levels both with and without the proposed scheme have been produced using a traffic model. A traffic model was created to represent the transport system in this area of north Essex on a typical weekday. It covers the whole of the UK to capture the actual start and end of every trip, but is more detailed in the areas around Chelmsford, Braintree, Colchester, Maldon and the towns and villages in between.

5.3.9 The hours modelled in the traffic model are from 07:30–08:30 in the morning (the morning peak) and 17:00–18:00 in the evening (the evening peak), as these are the busiest times of day on the A12 in this area, confirmed by 2019

traffic count data. A typical hour in the middle of the day was also modelled (the inter-peak).

5.3.10 A traffic model known as the 'base year model' was developed to represent existing traffic conditions as they were in 2019. The information on where people are travelling to and from has been taken from an analysis of the movement of a vast number of mobile phones. This information was then scaled to match traffic counts and merged with other data sources to provide the travel patterns of cars, vans and heavy goods vehicles (HGVs) across the country.

5.3.11 The traffic model was then used to predict how traffic conditions will change in the future. Information on planned future housing and job developments were taken into account, as well as information on predicted growth in population, jobs and traffic provided by the Department for Transport (DfT).

5.3.12 Traffic models were created for two main future scenarios: the Do-Minimum (i.e. without the proposed scheme) and the Do-Something (i.e. with the proposed scheme). Traffic models were developed for 2027 (the expected year of scheme opening) and 2042 (15 years after opening). Traffic flows and speeds on each road in the study area have been provided to inform the environmental assessment.

5.3.13 Full details of how the traffic model was developed are provided in the Combined Modelling and Appraisal Report [TR010060/APP/7.3]. A summary of the output of the traffic model (i.e. the key changes in traffic flow as a result of the proposed scheme) is provided in Section 2.9 of Chapter 2: The proposed scheme [TR010060/APP/6.1].

Future baseline

5.3.14 The baseline conditions used for assessment purposes are the predicted future conditions that would exist in the absence of the proposed scheme either (a) at the time that construction is expected to start, for impacts arising from construction; (b) at the time that the proposed scheme is expected to open to traffic, for impacts arising from its operation; or (c) the design year, 15 years after opening. The future baseline is considered in each of the environmental aspect chapters, as relevant to the assessment in question.

5.3.15 A general description of the baseline scenario is provided in Section 2.4 of Chapter 2: The proposed scheme, of the Environmental Statement [TR010060/APP/6.1].

5.4 General assessment assumptions and limitations

5.4.1 Aspect-specific assumptions and limitations are included within each aspect chapter of the Environmental Statement [TR010060/APP/6.1]. This includes information on any data gaps for establishing baseline conditions, and limitations associated with surveys, modelling, and assessment techniques.

5.4.2 In addition to aspect-specific assumptions, a number of general assumptions and limitations were encountered when preparing the Environmental Statement, as follows:

- The Environmental Statement and Development Consent Order (DCO) application are based on a preliminary design. The design would be refined before construction starts through a process of detailed design. As such, the design assessed includes a degree of flexibility, as represented by the limits of deviation (see Chapter 2: The proposed scheme [TR010060/APP/6.1]). The Environmental Statement has taken into account the limits of deviation shown on the Works Plans [TR010060/APP/2.2], and the potential impacts of a deviation within the permitted limits have therefore been assessed. National Highways would only be permitted to exceed the limits of deviation if it can be demonstrated that no materially new or materially different environmental effects from those reported in the Environmental Statement would arise.

- The construction methodology could change before construction starts, particularly for elements of construction that are dependent on the supply chain (e.g. source of materials, plant, equipment, and the construction workforce), or for elements that are dependent on the detailed design. The description of the proposed scheme, including the Order Limits and the parameters used in the Environmental Statement assessments, is sufficiently wide to ensure that any design within the parameters and description assessed would not give rise to any materially new or materially different environmental effects than those assessed. The construction methodology assessed in the Environmental Statement therefore represents a reasonable worst-case.

- There is some uncertainty relating to existing utilities and the design of statutory undertakers works required as part of the proposed scheme. The preliminary design and Order Limits include all land required for diverting utilities, and realistic worst-case assumptions have been made regarding environmental effects, but the ultimate design of the diversions will be decided by the statutory undertakers.

- The Order Limits include small discrete areas of land on the B1019 (Maldon Road), in Rivenhall End, on Kelvedon Road (off Inworth Road), and in Feering as shown on sheets 5, 11, 14 and 15 of the General Arrangement Plans [TR010060/APP/2.9]. These are included to allow for signage upgrades. The works associated with these areas would be temporary, minimal and would have a negligible impact on the environment. These areas have therefore not been included when setting the assessment study and survey areas for the Environmental Statement.

- Part of the proposed offline A12 alignment at junction 22 passes over Colemans Farm Quarry, which is an existing operational quarry owned and operated by Brice Aggregates. It is anticipated that those voids left by quarrying activities that sit within the footprint of the Order Limits will be backfilled by the operators of the quarry. However, given the criticality of backfilling the quarry voids for the proposed scheme to be constructed, the Environmental Statement has assessed the works required to backfill voids in Colemans Farm Quarry that could be left unfilled after the extraction operations where these would be within the Order limits. This assessment

has been undertaken as a worst case in the event that it became necessary for the Applicant to undertake any such works as part of the construction of the proposed scheme.

- The Order Limits include an existing layby east of junction 26. This is to provide parking space for a small number of emergency response vehicles during the construction phase. The works associated with this area would be temporary, minimal and would have a negligible impact on the environment. This area has therefore not been included when setting the assessment study and survey areas for the Environmental Statement.

- It is assumed that the information provided by third-party sources is accurate at the time of preparing this report. Data sources have been verified and updated throughout the EIA process to date. References are included to provide details of relevant sources.

5.5 Mitigation and enhancement

5.5.1 Mitigation measures aim to avoid, reduce and, where possible, remedy significant adverse environmental effects. The purpose of any mitigation measure is to eliminate the effect, or if not possible, to reduce its significance. Mitigation measures for the proposed scheme have been developed in accordance with the mitigation hierarchy of avoidance, reduction, restoration and compensation.

5.5.2 For the purposes of the environmental assessment, three types of mitigation are described in the Environmental Statement. These are adapted from the Institute of Environmental Management and Assessment (IEMA) (2015) guidance on environmental assessment:

- Embedded mitigation: intrinsic part of design evolution (e.g. reducing the height of an embankment to reduce visual impact), taking into account guidance provided in DMRB GG 103 and LD 117–119 (Highways England 2019b; 2020d–f). This forms part of the proposed scheme description in Chapter 2: The proposed scheme, of the Environmental Statement [TR010060/APP/6.1].

- Standard mitigation: this is required regardless of the EIA process because it is generally imposed through legislative requirements or standard sector practices (e.g. implementing considerate contractor practices to reduce nuisance from site work). These measures are captured in the Register of Environmental Actions and Commitments (REAC), which is within the Environmental Management Plan (EMP).

- Additional mitigation: requires further activity in order to achieve the anticipated outcome. Described in the aspect chapters of the Environmental Statement [TR010060/APP/6.1] and included in the REAC, which is within the EMP.

5.5.3 Standard and additional mitigation make up ‘essential mitigation’ as per DMRB LA 104 (Highways England, 2020c). Essential mitigation is defined as measures critical for the delivery of the scheme which can be acquired through statutory powers.

5.5.4 A first iteration of the EMP has been produced [TR010060/APP/6.5], in line with DMRB LA 120 Environmental Management Plans (Highway England, 2020g), which contains all measures, including the REAC, to manage environmental effects in construction and operation. This first iteration of the EMP has been submitted with the DCO application and provides the framework for the future production of the more detailed second iteration of the EMP prior to construction. A third iteration of the EMP would be produced after construction for the handover stage. Mitigation detailed in the first iteration of the EMP will be secured through requirements within Schedule 2 of the draft DCO [TR010060/APP/3.1].

5.5.5 The first iteration of the EMP [TR010060/APP/6.5] contains outline topic-specific management plans, such as the Landscape and Ecology Management Plan and Site Waste Management Plan. A separate Outline Construction Traffic Management Plan [TR010060/APP/7.7] has also been included in Volume 7 of the DCO application. These specific management plans will be updated and developed into the final management plans by the Principal Contractor prior to construction.

5.5.6 Where effects cannot be mitigated, compensatory measures have been considered, for example providing replacement habitat.

5.5.7 Enhancement measures have also been considered. An enhancement is defined as a measure that is over and above what is required to mitigate the adverse effects of the proposed scheme. Unlike mitigation and compensation measures, enhancements are not factored into the determination of significance; however, the potential benefits of these measures are presented within the relevant aspect chapters, in accordance with the NNNPS (DfT, 2014).

5.5.8 Mitigation and enhancement measures have been outlined in the aspect chapters (Chapters 6 to 15) of the Environmental Statement [TR010060/APP/6.1]. Measures have been developed throughout the EIA process in consultation with statutory consultees and key stakeholders, where appropriate.

5.6 Identifying potential impacts

5.6.1 The aspect chapters identify potential impacts that might occur due to the construction and operation of the proposed scheme. These impacts in turn can lead to environmental effects (defined as the consequence of an impact). Impacts can affect the environment in a variety of ways. Effects may be adverse or beneficial, direct, indirect, secondary or cumulative, temporary or permanent, short, medium or long term.

5.6.2 For an effect to occur, there needs to be an impact source, pathway and receptor.

5.6.3 In EIA, effects are assessed in terms of their significance to give decision makers a measure of the importance, or gravity, of the environmental effect.

5.7 Significance criteria

5.7.1 Significance of effect is derived through a combination of the sensitivity of a receptor affected (value or importance) and the magnitude of the impact (amount of change). A typical matrix for these variables is provided in DMRB LA 104 (Highways England, 2020c) (replicated in Table 5.1, Table 5.2 and Table 5.3) and is shown visually on Plate 5.1.

Table 5.1 Sensitivity criteria (taken from DMRB LA 104)

Value (sensitivity)	Typical descriptors
Very high	Very high importance and rarity, international scale and very limited potential for substitution.
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

5.7.2 Certain aspects do not use a matrix-based approach, because they use calculations to assess effects in numerical terms. This includes the noise, air quality and flood risk aspects.

5.7.3 In all cases, professional judgement is applied to the assessment to underpin the outcomes identified through the matrix or calculation assessments. Where professional judgement is used, this is accompanied by text to explain the reasons and justification.

Table 5.2 Magnitude criteria (taken from DMRB LA 104)

Magnitude of impact	Typical criteria descriptors
Major adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
Moderate adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
Minor adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
Negligible adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Magnitude of impact	Typical criteria descriptors
Negligible beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
Minor beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Moderate beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Major beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.

Table 5.3 Significance matrix (taken from DMRB LA 104)

Environmental value (sensitivity)		Magnitude of impact (degree of change)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

5.7.4 Significance categories are described in Table 5.4 (replicated from DMRB LA 104). This describes effects with a very large or a large significance as being 'material' and 'likely to be material' in the decision-making process respectively. Therefore, large and very large effects are considered 'significant' for the purposes of the EIA Regulations. Moderate effects are described as potentially being material in the decision-making process. Moderate effects are therefore also typically considered as significant.

5.7.5 The significance of effect is only assessed after embedded, standard and additional mitigation have been factored in, in line with DMRB LA 104. This is known as the residual effect. To arrive at a conclusion of significance, the effectiveness of design and mitigation measures have been assessed and described. This has been achieved by, for example, explaining the intended outcomes of the mitigation, and assessing how mitigation affects the magnitude of impacts (including impact probability, duration, scale, frequency and reversibility).

Plate 5.1 Matrix for the assessment of significant effects with professional judgement

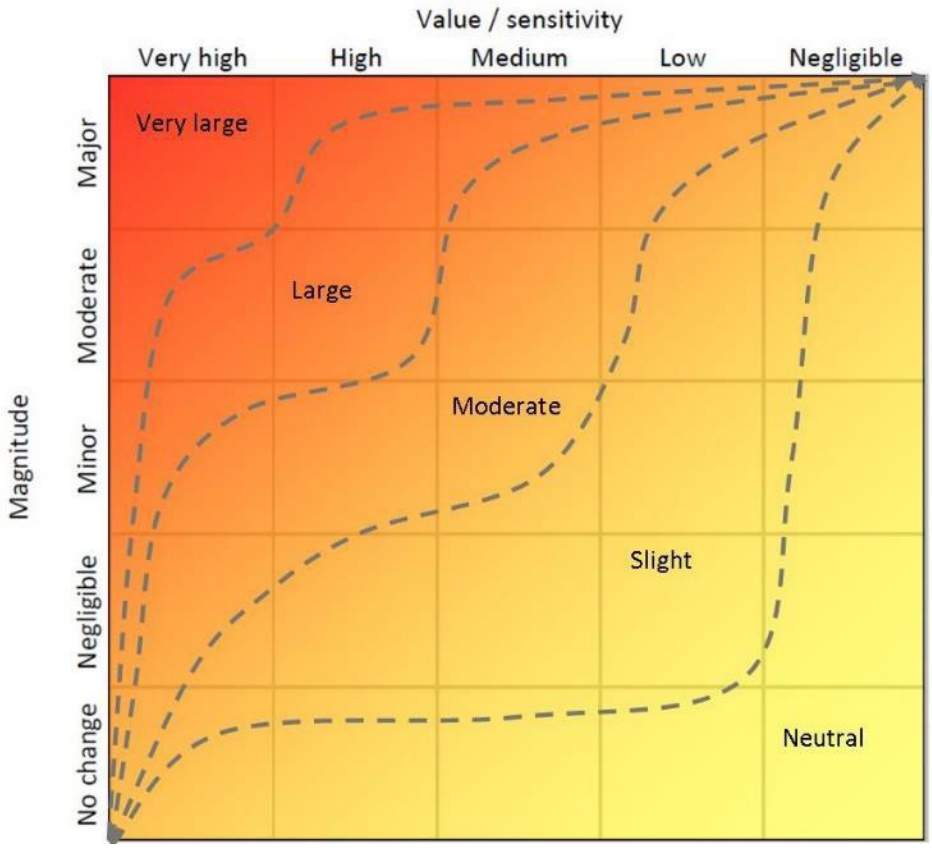

Table 5.4 Significance of effect categories (taken from DMRB LA 104)

Significance category	Typical descriptors of effect
Very large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

5.8 Monitoring of mitigation for significant adverse effects

5.8.1 Where likely significant adverse effects on the environment are predicted, consideration has been given to the appropriateness of monitoring measures. The purpose of monitoring measures is to ensure the mitigation measures required to avoid, reduce and offset significant adverse effects are delivered and perform as intended, in accordance with the requirements of the EIA Regulations.

5.8.2 Monitoring proposals include:

- objectives of any proposed monitoring
- confirmation of existing monitoring regimes which could perform this function
- parameters to be monitored and duration of the monitoring
- delivery mechanism and responsibilities for monitoring
- triggers which would identify a need for remedial action, and the method of defining and agreeing remedial action

5.8.3 Monitoring proposals for mitigation in respect of likely significant adverse effects are detailed in the aspect chapters (Chapters 6 to 15) of the Environmental Statement [TR010060/APP/6.1] and the first iteration of the EMP [TR010060/APP/6.5].

5.9 Assessment of interrelationships

5.9.1 The Environmental Statement considers the interrelationships between environmental effects (intra-project effects). This is defined as the effects of multiple residual effects from the proposed scheme on a receptor (i.e. 'within scheme' effects associated with combined impacts across more than one environmental aspect).

5.9.2 These interrelationships can generally be grouped into four broad categories: the effects on residential receptors and communities; effects on the historic environment; effects on biodiversity; and effects on the water environment. The interrelationships of effects on these receptors are covered in the relevant aspect chapter:

- Effects on residents and communities (e.g. the combined effects from air quality, noise, severance and setting) are covered under Chapter 13: Population and human health [TR010060/APP/6.1].
- Effects on the historic environment (e.g. from noise, vibration, land use change, and changes in setting) are covered under Chapter 7: Cultural heritage [TR010060/APP/6.1].
- Effects on biodiversity (e.g. from noise, light, habitat loss and fragmentation) are covered under Chapter 9: Biodiversity [TR010060/APP/6.1].
- Effects on water quality (e.g. from physical works, road runoff, accidental spillage and contaminated land) are covered under Chapter 14: Road drainage and the water environment [TR010060/APP/6.1].

5.9.3 The four chapters above represent the aspects with receptors likely to experience combined effects. Impacts from other aspects, such as air quality, landscape, geology and soils, and noise and vibration, have the potential to interact with other impacts to result in combined effects. However, using a receptor based approach, these effects are best reported in the four aspect chapters above.

5.9.4 The significance of effect has been determined in line with the relevant aspect assessment methodology, as set out in Chapters 6 to 15 of the Environmental Statement [TR010060/APP/6.1].

5.9.5 The 'in-combination' effect from climate change (i.e. where climate could exacerbate or, conversely, diminish the effect of an existing impact of the proposed scheme) is assessed in the environmental aspect chapters, where relevant, using significance criteria from the respective chapters.

5.10 Cumulative effects

5.10.1 The NNNPS (paragraph 4.16) states that the Environmental Statement should provide information on how the effects of the applicant's proposal would combine and interact with the effects of other development (inter-project cumulative effects). Chapter 16: Cumulative effects assessment [TR010060/APP/6.1] sets out the approach to the cumulative effects assessment and is based on the guidance provided in the Planning Inspectorate's (2019) Advice Note Seventeen.

5.11 Major accidents and disasters

5.11.1 The EIA Regulations require that risks due to accidents and disasters be considered within the Environmental Statement. A two-stage qualitative assessment has been undertaken using technical judgement to identify whether the proposed scheme is at risk from major accidents and disasters. Firstly, a screening matrix was completed detailing a long list of major accidents and disasters that could occur. Accidents and disasters requiring further consideration were subject to a second, more detailed risk assessment (see Appendix 5.3 of the Environmental Statement [TR010060/APP/6.3]). The more detailed risk assessment considered the following:

- The vulnerability of the proposed scheme to risks of major accidents and disasters
- Any consequential changes in the predicted effects of the proposed scheme on environmental aspects from major accidents and disasters

5.11.2 The risk assessment concluded that there is one residual risk remaining that would need to be assessed through the Environmental Statement, relating to inland flooding.

5.11.3 Inland floods are mainly covered under Chapter 14: Road drainage and the water environment, in terms of reducing future flood risk, and partly within Chapter 15: Climate, in terms of climate change adaptation [TR010060/APP/6.1]. Impacts and mitigation associated with these are covered in the relevant aspect chapter.

5.11.4 Risks relating to ground hazards, extreme weather, transport accidents, and critical infrastructure or industrial accidents could result in environmental impacts if the hazard were to occur. However, these risks are mitigated either through designing to industry or regulatory requirements, or by existing emergency procedures; or are unlikely to result in an event that could reasonably be classed as a 'major' accident or disaster. Risk from these hazards were therefore not considered further within the Environmental

Statement (but will be considered in terms of future design-development and construction methodology).

5.12 Transboundary effects

5.12.1 A transboundary effects screening matrix was provided in the Environmental Scoping Report (Highways England, 2020a). This concluded that the proposed scheme is unlikely to give rise to significant effects on any European Economic Area state. Transboundary effects have therefore been scoped out of the assessment.

5.12.2 The screening matrix has been reviewed prior to the submission of the DCO application and included in Appendix 5.4 of the Environmental Statement [TR010060/APP/6.3]. The Planning Inspectorate will use this to undertake a screening assessment to identify if the proposed scheme is likely to have significant effects on the environment in a European Economic Area state in accordance with Regulation 32 of the EIA Regulations.

5.13 Supporting assessments

Habitats Regulations Assessment

5.13.1 The impact of the proposed scheme on European sites of nature conservation, as defined by the Conservation of Habitats and Species Regulations 2017, has been assessed in line with the Planning Inspectorate's (2017a) Advice Note Ten: Habitats Regulations Assessment Relevant to Nationally Significant Infrastructure Projects.

5.13.2 A Stage 1 Habitats Regulations Assessment (HRA) screening exercise was undertaken. This screening exercise identified possible source-receptor pathways to designated sites, as detailed in Chapter 9: Biodiversity, of the Environmental Statement [TR010060/APP/6.1]. The conclusions of the Stage 1 HRA were that no likely significant effects on any European sites are anticipated, when considered alone or in combination with other plans and projects.

5.13.3 The Stage 1 HRA screening report was submitted to Natural England during the statutory consultation to confirm that an Appropriate Assessment is not required. Natural England agreed with the conclusions of the Stage 1 HRA screening report. As no likely significant effects on European sites were identified, the HRA report submitted with the DCO application [TR010060/APP/6.8] takes the form of a No Significant Effects Report.

Water Framework Directive

5.13.4 The impact of the proposed scheme on Water Framework Directive (WFD) objectives has been assessed in line with the Planning Inspectorate's (2017b) Advice Note Eighteen: The Water Framework Directive.

5.13.5 A WFD compliance assessment is included in Appendix 14.2 of the Environmental Statement [TR010060/APP/6.3] and the conclusions summarised in Chapter 14: Road drainage and the water environment [TR010060/APP/6.1].

5.13.6 A preliminary WFD compliance assessment was submitted to the Environment Agency during the statutory consultation. The WFD compliance assessment included in Appendix 14.2 has considered feedback from this consultee.

Flood Risk Assessment

5.13.7 A Flood Risk Assessment (FRA) has been undertaken as part of preparing the Environmental Statement and is included in Appendix 14.5 of the Environmental Statement [TR010060/APP/6.3]. Chapter 14: Road drainage and the water environment [TR010060/APP/6.1] summarises key findings from the FRA where appropriate.

5.13.8 A preliminary FRA was submitted to the Environment Agency and Essex County Council during the statutory consultation. The FRA included in Appendix 14.5 has considered feedback from these consultees.

Health Impact Assessment

5.13.9 The impact of the proposed scheme on health is assessed in Chapter 13: Population and human health, of the Environmental Statement [TR010060/APP/6.1]. A standalone Health Impact Assessment (separate from the EIA) has therefore not be undertaken as health is covered within the Environmental Statement.

Mineral and waste assessments

5.13.10 The proposed scheme would be located in a mineral safeguarding area, and therefore could sterilise mineral resource. It would also be located close to existing mineral and waste infrastructure.

5.13.11 The following assessments have therefore been included as appendices to the Environmental Statement to assess the impact the proposed scheme would have on mineral resource and mineral and waste infrastructure:

- Mineral Resource Assessments, included in Appendix 11.1 [TR010060/APP/6.3] – prepared to establish the existence, or otherwise, of a mineral resource capable of having economic importance within the Order Limits.

- Mineral and Waste Infrastructure Assessments, included in Appendix 11.2 and 11.3 respectively [TR010060/APP/6.3] – prepared to ensure that existing and allocated mineral and waste infrastructure, close to the Order Limits, is protected from inappropriate developments that may prejudice their continuing efficient operation.

5.13.12 Further information can be found in Chapter 11: Material assets and waste, of the Environmental Statement [TR010060/APP/6.1].

5.14 Residues and emissions

5.14.1 The EIA Regulations require an estimate, by type and quantity, of expected residues and emissions. This information is provided in the relevant aspect chapters. Table 5.5 sets out the residues and emissions that must be reported on to satisfy the EIA Regulations, as well as the aspect chapters of the Environmental Statement which cover them [TR010060/APP/6.1].

5.14.2 A Statement of Statutory Nuisance has been produced and submitted with the DCO application [TR010060/APP/6.9]. This explains the impact the proposed scheme would have on statutory nuisance, as defined in Section 79(1) of the Environmental Protection Act 1990, and how these impacts would be mitigated. There is crossover between the Statement of Statutory Nuisance and the residues and emissions set out in Table 5.5.

Table 5.5 Residues and emissions

Residue or emission	Aspect chapter
Water pollution	Chapter 14: Road drainage and the water environment
Air pollution	Chapter 6: Air quality
Soil and subsoil pollution	Chapter 10: Geology and soils
Loss of soil resource	Chapter 10: Geology and soils
Noise	Chapter 12: Noise and vibration
Vibration	Chapter 12: Noise and vibration
Light	Chapter 8: Landscape and visual
Heat	N/A – scoped out of assessment
Radiation	N/A – scoped out of assessment
Types and quantities of waste	Chapter 11: Material assets and waste

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