



## **Thurrock Flexible Generation Plant**

**Preliminary Environmental Information Report  
Chapter 17: Summary of Inter-Related Effects**

**Date:** September 2018

**Environmental Impact Assessment**  
**Preliminary Environmental Information Report**

**Volume 4**  
**Chapter 17**

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## Summary

This chapter summarises the inter-related effects taking into account project lifetime and receptor-led effects. The chapter has considered the effects reported in each environmental topic assessment in Volume 3 of the Preliminary Environmental Information Report and assessed whether effects are likely to be significant in combination.

## Qualifications

This document has been prepared by Natalie Brisland, a Senior Environmental Consultant with a BSc in Physical Geography. Natalie has six years' experience of EIA experience as a project manager and technical author and has contributed to a number of large scale and Nationalally Significant Infrastructure Projects.

It has been checked by Tom Dearing, a Chartered Environmentalist and full Member of the Institute of Environmental Management and Assessment, who has eight years' experience of environmental impact assessment.

# 1. Introduction

## 1.1 Purpose of this chapter

- 1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the findings of Environmental Impact Assessment (EIA) work undertaken to date concerning potential inter-related effects of Thurrock Flexible Generation Plant on environmental receptors.
- 1.1.2 The PEIR is being published to inform pre-application consultation. Following consultation, comments on the PEIR will be reviewed and taken into account in preparation of the Environmental Statement (ES) that will accompany the application to the Planning Inspectorate (PINS) for development consent.
- 1.1.3 This chapter considers the combined effects of the environmental topics covered in Volume 3, Chapters 6 to 16 of this PEIR on single receptors or receptor groups. Inter-related effects are effects on receptors or receptor groups, such as local residents, users of local rights of way or services, which may be affected by different environmental effects generated by the proposed development simultaneously or concurrently. This assessment includes consideration of particular locations where several effects, for example noise, air quality and visual change, may all occur.
- 1.1.4 In particular, this PEIR chapter considers:
- the effects of environmental topics over the lifetime of the project including the construction, operation and decommissioning phases; and
  - the receptor-led effects which result as a combination of multiple environmental effects on a single receptor or receptor groups.

## 1.2 Planning policy context

- 1.2.1 Planning policy for energy generation Nationally Significant Infrastructure Projects (NSIPs), specifically in relation to inter-related effects, is contained in the Overarching National Policy Statement (NPS) for Energy (EN-1; DECC, 2011a).
- 1.2.2 NPS EN-1 includes guidance on what matters are to be considered in the assessment. NPS EN-1 also highlights a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 1.1.

Table 1.1: Summary of NPS EN-1 policy on decision making relevant to this chapter.

Summary of [NPS EN-1 and NPS EN-2] policy on decision making (and mitigation)	How and where considered in the PEIR
<b>Inter-related Effects</b>	
<i>“The IPC [Infrastructure Planning Commission: now PINS] should consider how the accumulation of, and interrelationship between, effects might affect the environment, economy or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.”</i> (paragraph 4.2.6).	Topic-specific chapters have been prepared for Thurrock Flexible Generation Plant in Volume 3, chapters 6 to 16. The assessment of inter-related effects is presented in this chapter.

## 1.3 Consultation

- 1.3.1 Key issues raised during scoping and consultation to date specific to inter-related effects are listed in Table 1.2, together with how details of how these issues have been considered in the production of this PEIR and cross-references to where this information may be found.

Table 1.2: Key points raised during scoping and consultation to date.

Date	Consultee and type of response	Points raised	How and where addressed
September 2018	PINS Scoping Opinion	PINS identified that in order to assist in the decision making, the application should use tables to identify and collate the relevant inter-related effects.	This chapter of the PEIR reports the inter-related effects likely to occur as a result of the proposed development with use of tables where appropriate.

## 2. Assessment Approach

### 2.1 Guidance

2.1.1 It is good practice to consider the inter-relationships between topics that may lead to environmental effects. For example, the separate impacts of noise and habitat loss may have an effect upon a single ecological receptor.

2.1.2 The following guidance documents have been considered as part of this assessment:

- Advice Note 9: Rochdale Envelope (PINS, 2018).
- Design Manual for Roads and Bridges (DMRB) HA205/08 (Highways Agency *et al.*, 2008).

#### PINS Advice Note 9

2.1.3 The PINS Rochdale Envelope Advice Note (PINS, 2018), states that the ES should:

*"...ensure that the assessment of the worst case scenario(s) addresses impacts which may not be significant on their own but could become significant when they inter-relate with other impacts alone or cumulatively with impacts from other development (including those identified in other aspect assessments)."*

#### Design Manual for Roads and Bridges

2.1.4 The DMRB states that type (i) effects are those that arise from the combined action of a number of different environmental topic-specific impacts from a single scheme upon a single receptor / resource. The guidance states that, when considered in isolation, the environmental effects upon any single receptor / resources may not be significant. However, when all effects from a single scheme are considered together, the resulting combined effect may be significant.

2.1.5 The guidance sets out factors to be considered in the assessment of such effects:

- Which receptor / resources are affected?
- How will the activity or activities affect the condition of the receptor/resource?
- What are the probabilities of such effects occurring?
- What ability does the receptor / resource have to absorb further effects before changes become irreversible?

2.1.6 The DMRB guidance states that it is important that there is good co-ordination and sharing of results between topic areas to ensure a comprehensive identification and understanding of the interaction between effects.

### 2.2 Study area

2.2.1 The study areas or Zones of Influence (Zoi) for the assessment of inter-related effects have been informed by the study areas used in the topic specific assessments. Due to the differing spatial extent of effects experienced by different receptors, the Zoi for potential inter-related effects varies according to topic and receptor. The potential inter-related effects considered in this chapter are therefore limited to the study areas defined in each of the topic specific chapters included in Volume 3, Chapters 6 to 16 of this PEIR. Table 3.2 identifies the study areas and how they relate to each other.

### 2.3 Inter-related effects methodology

2.3.1 The approach to assessing inter-related effects has followed a four staged process as summarised in Table 2.1 and discussed in the following paragraphs.

**Table 2.1: Summary of staged approach to the inter-related effects assessment**

Stage	Description
1	Assessments undertaken for individual EIA topic areas within Volume 3, Chapters 6 to 16.
2	Review of the likely receptor(s)/resource(s) affected by more than one impact through analysis of the assessment of effect sections undertaken for individual EIA topic areas.
3	Identification of potential combination effects on these receptor groups through review of the topic specific assessments in the PEIR chapters.
4	Assessment undertaken on how individual effects may combine to create inter-related effects on each receptor group for: <ul style="list-style-type: none"> <li>• 'project lifetime effects', i.e. during construction, operational and decommissioning phases; and</li> <li>• 'receptor-led effects', i.e. multiple simultaneous effects on a single receptor/resource.</li> </ul>

#### Stage 1: topic-specific assessments

2.3.2 The first stage of the assessment of inter-related effects is presented in each of the individual onshore topic chapters and comprises the individual assessments of effects on receptors across the construction, operation and maintenance, and decommissioning phases of the proposed development.

2.3.3 The findings of these assessments are presented in Volume 3, Chapters 6 to 16 of the PEIR.

### Stage 2: identification of receptor groups

2.3.4 Stage 2 involved a review of the assessments undertaken in the topic-specific chapters to identify 'receptor groups' requiring assessment within the inter-related effects assessment. The term 'receptor group' is used to highlight that the approach taken for the inter-related effects assessment does not assess every individual receptor assessed at the EIA stage, but rather potentially sensitive groups of receptors. The receptor groups assessed can be broadly categorised as follows:

- landscape and visual resources: designated sites; landscape character; visual receptors (residents; users of public rights of way [PRoWs]; other visual receptors);
- historic environment: buried archaeology; designated heritage assets; settings of heritage assets;
- land use and recreation: agricultural land; farm businesses; users of PRoWs and common land;
- socio-economics: employment levels, housing and other local services; tourism;
- ecology and nature conservation: ecologically designated sites; important habitat features; protected species;
- traffic and transport: road users, residents; pedestrians/cyclists; sensitive local uses (e.g. schools, hospitals, local facilities);
- noise and vibration: residents, users of PRoWs; users of other land uses (e.g. places of work);
- air quality: residents; places of public amenity/public attractions; places of work; schools/hospitals; species/habitats;
- health: residents in the local area;
- climate change: global climate;
- hydrology and flood risk: surface water bodies; flood risk (residents; other land uses); and
- geology and ground conditions: geologically designated sites; land/soils; groundwater (including aquifers and Source Protection Zones).

2.3.5 The potential for inter-related effects was considered in further detail at Stage 3.

### Stage 3: identification of potential inter-related effects on receptor groups

2.3.6 Consideration was given to the potential for inter-related effects to arise for each of the identified receptor groups across the three project phases (i.e. project lifetime effects) as well as the interaction of multiple effects on a receptor (i.e. receptor-led effects), as defined in Table 2.2. Effects related to the construction and decommissioning phases are considered to be similar in nature, so these effects are considered together.

**Table 2.2: Definitions of project lifetime and receptor led inter-related effects**

Effect Type	Definition
Project lifetime effects	Assessment of the scope for effects that occur throughout more than one phase of the project (construction, operation and maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor than if assessed in isolation.
Receptor-led effects	Assessment of the scope for multiple effects to interact, spatially and temporally, to create inter-related effects on a receptor or receptor group. As an example, multiple effects on a given receptor such as local residents – construction dust and noise, increased traffic and visual change etc. may interact to produce a greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short term, temporary, or incorporate longer term effects.

2.3.7 A scoping exercise has been undertaken to identify those topics which are unlikely to result in further inter-related effects due to their nature, location or previous assessment.

### Stage 4: assessment of the inter-related effects on each receptor group

2.3.8 Individual effects on each of the receptor groups identified above have been considered. It is important to note that the inter-related effects assessment considers only effects produced by the Thurrock Flexible Generation Plant and not from other projects, which are summarised in Volume 4, Chapter 18: Summary of Cumulative Effects.

2.3.9 A descriptive assessment of the scope for these individual effects to interact to create a different or greater effect has then been undertaken. The assessment has been undertaken qualitatively and professional judgement has been used to identify whether significant inter-related effects are considered likely.

### **Assessment criteria and assignment of significance**

- 2.3.10 The assessment does not aim to assign significance levels. Instead the assessment is to be used to identify where there is the potential for inter-related effects. A statement is made as to whether the inter-related effects would be worse or better than the effects considered alone, and if so, whether this would be adverse or beneficial.

### 3. Inter-related effects assessment

#### 3.1 Introduction

3.1.1 This assessment considers receptors or receptor groups, such as local residents, users of local rights of way or services that may be affected by different environmental effects generated from the proposed development simultaneously or concurrently. This may include, for example, particular locations where noise, air quality and visual change may all occur at the same time. All of these effects would be derived from the proposed development.

#### 3.2 Scoping of receptors / resources

3.2.1 This chapter presents those inter-related effects not explicitly addressed elsewhere in the PEIR. The majority of the PEIR topic assessments consider the effects of the proposed development on receptors or receptor groups and, as such, many of the inter-related impacts on those receptors are considered within the topic chapters.

3.2.2 For instance, effects on ecological receptors arising from noise, visual disturbance, air quality impacts and water quality impacts are assessed within Volume 3, Chapter 9: Ecology. As such, the potential for inter-related effects is inherent within some topic assessments and these effects are not repeated in this chapter. The topics where this applies are shown in Table 3.1. All other topics are considered within this chapter.

Table 3.1: PEIR topics excluded from further inter-related effects assessment

Topic receptor / resource	Scoped out of project lifetime inter-related effects	Scoped out of receptor-led inter-related effects	Justification for exclusion from further inter-related assessment
Landscape	Yes	Yes	The landscape and visual resource is assessment in Volume 3, Chapter 6: Landscape and Visual Resource. This assessment includes the consideration of all potential impacts on landscape character and landscape quality, therefore no additional inter-related effects are considered likely to occur beyond those identified within the chapter.

Topic receptor / resource	Scoped out of project lifetime inter-related effects	Scoped out of receptor-led inter-related effects	Justification for exclusion from further inter-related assessment
Historic Environment	Yes	Yes	The assessment of effects on historic environment is provided in Volume 3, Chapter 7: Historic Environment. This assessment considers all potential effects on the relevant receptors, namely heritage assets. This topic has drawn from coordination with other topics such as landscape and visual and noise assessment for consideration of potential impacts on heritage asset setting.
Land-use and Agriculture	No	Yes	The effects on land use and agriculture are considered in Volume 3, Chapter 8. The effects on agricultural land and farm holdings is likely to permanent and occur during the construction phase. Therefore further inter-related effects from other topic areas are unlikely to result in any greater effect than those assessed within Chapter 8.
Ecology	No	Yes	The assessment of inter-related effects (is central to the assessment of potential impacts on ecological receptors and the integrity of designated sites and, as such, has already been assessed within Volume 3, Chapter 9: Ecology. No additional effects are therefore, considered likely to occur beyond those identified in the assessment in Chapter 9. This topic draws from co-ordination with other topics to understand the variety of impacts on ecological receptors.
Traffic and Transport	Yes	No	The effects presented in Volume 3, Chapter 10: Traffic and Transport during construction are not considered to be significant. The effects in relation to the operational phase have been scoped out of the assessment therefore project lifetime effects are not considered to be greater than the effects presented in Chapter 10.
Human Health	No	Yes	The nature of the human health assessment presented in Volume 3, Chapter 13: Human Health draws from all of the other environmental and socio-economic pathways that have the potential to affect determinants of health. Therefore, all potential inter-related effects in relation to human health are considered within Chapter 13.
Climate Change	No	Yes	The effects in relation to climate change could occur across the lifetime of the project. However, it is not likely that the effects of other topics considered in this PEIR would contribute to climate change and the release of greenhouse gas (GHG) emissions. Therefore receptor-led effects are not considered further.
Hydrology and Flood Risk	Yes	Yes	All the potential impacts on hydrology and flood risk are assessed in Volume 3, Chapter 15: Hydrology and Flood Risk.



Topic receptor / resource	Scoped out of project lifetime inter-related effects	Scoped out of receptor-led inter-related effects	Justification for exclusion from further inter-related assessment
Geology and Ground Conditions	Yes	Yes	All the potential impacts on geological receptors and soils have been assessed within Volume 3, Chapter 16: Geology, Hydrogeology and Ground Conditions.

3.3.3 For example, the proposed development site includes areas of agricultural land which are also located within the Zol for dust and noise effects and thus could experience inter-related or combined effects. Conversely, areas of the ZTV which extend up to 10 km from the site boundary are unlikely to experience air quality and noise effects as the construction-phase Zol for these topics only extends 350 m and 1 km from the site boundary respectively, and no inter-related effects are likely in that example.

3.3.4 Table 3.3 lists the lifetime inter-related effects that are predicted to arise during construction / decommissioning and operation of the proposed development.

### 3.3 Identification of receptors/resources

3.3.1 The potential for inter-related effects (other than those already inherently forming part of the topic-specific assessments where specified in Table 3.1) is limited to the Zol presented in Table 3.2 and shown in Figure 3.1.

**Table 3.2: Zones of influence for construction/decommissioning and operational effects**

Topic	Construction / decommissioning Zol	Operational Zol
Landscape and Visual Resources	Zone of Theoretical Visibility (ZTV): 10 km buffer from proposed development site (based on a 40 m stack height)	
Land Use, Agriculture and Socio-Economics	Land use: land that would be occupied by, or immediately adjacent to the proposed development Agriculture: farm holdings as a whole which may be affected by the development, based on known ownership boundaries Socio-economics: local authority area of Thurrock.	
Traffic and Transport	Sections of the public highway affected by the proposed development and the Station Road railway level crossing	N/A
Noise and Vibration	Proposed development site boundary plus a 1 km buffer	
Air Quality	Proposed development site boundary plus 350 m buffer and up to 50 m from roads within 500 m of the site boundary	Selected sensitive receptors properties where pollutant concentrations and/or changes in pollutant concentrations are predicted to be greatest
Human Health	Local authority area of Thurrock and district level	
Climate Change	No specific geographical study area is defined	

3.3.2 Table 3.2 identifies overlaps between the defined Zol of environmental topics. Inter-related effects have been considered where the study areas of the respective assessments are shared.

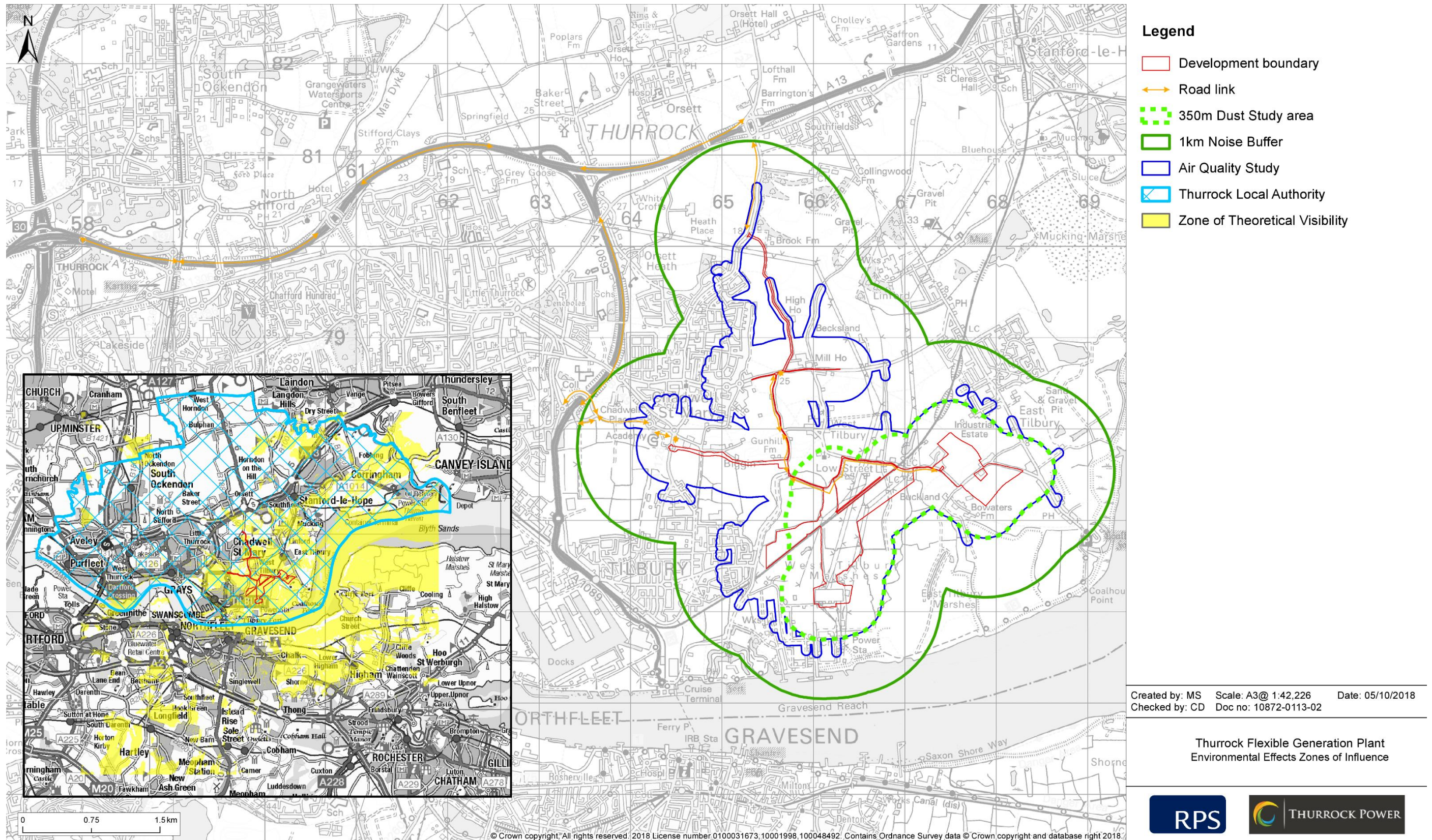


Figure 3.1: Environmental effects zones of influence

**Table 3.3: Summary of the potential project lifetime inter-related effects**

Topic area	Source of impact	Significance of individual effect with mitigation during construction/decommissioning	Significance of individual effect with mitigation during operation and maintenance	Project lifetime inter-related effects
Visual resources	Visual effects on residential receptors	No change to Moderate adverse	No Change to Moderate adverse	The visual effects considered in Volume 3, Chapter 6: Landscape and Visual Resources relate to a number of different receptors and the effects vary widely depending on the distance from the development and the sensitivity of the receptor. Over the lifetime of the project, the visual receptors with views to the main development site would see the landscape transform from open fields (with electricity pylons) to the Flexible Generation Plant. Considering the inter-relation of effects during project lifetime stages, the greatest effect is likely to be in construction when both the partially-completed Flexible Generation Plant itself and other construction activity within the application boundary such as gas pipeline trenching and construction haul roads would be visible.
	Visual effects on access land, public open space and PRowS	Minor to Moderate/Major adverse	No Change to Moderate/Major adverse	
	Visual effects on tourist attractions and recreation	No change to Moderate adverse	No change to Minor adverse	
Land use, agriculture and socio-economics	Loss of agricultural land	Minor adverse	Negligible	The effects assessed in Volume 3, Chapter 8: Land Use, Agriculture and Socio-Economics are not considered to be significant during each of the proposed development phases. With the exception of the creation of jobs, the effects mainly occur during the construction phase and are permanent, therefore the lifetime inter-related effects would be no greater than the individual phase effects. The creation of jobs would likely occur throughout the lifetime of the project, albeit a limited number during the operational phase. However, the combined effect over the lifetime of the proposed development is not likely to be greater than the minor beneficial effect assessed for the construction and decommissioning phase.
	Impact on farm holdings	Negligible	Negligible	
	Loss of common access land	Minor adverse	N/A	
	Creation of jobs	Minor beneficial	Negligible	
Noise and vibration	Construction activity	Moderate adverse	N/A	Noise sensitive receptors in the vicinity of the proposed development are likely to receive an effect throughout the lifetime of the project. The largest effect is likely to occur during the construction phase with no significant effects are predicted to occur during the operational and decommissioning phases. As the moderate adverse and significant effect is only likely to occur during the construction of the haul road, the temporary nature of the effect would mean that the lifetime inter-related effects are not likely to be larger than moderate adverse.
	Construction traffic noise	Minor adverse		
	Operation of the proposed development	N/A	Minor adverse	
	Decommissioning noise	Minor adverse	N/A	
Air quality	Construction/decommissioning dust	Negligible	N/A	The types of effects related to air quality differ across the lifetime of the project. During construction and decommissioning the main effects would be related to dust while during operation they would be due to NO <sub>2</sub> emissions from the gas engines. These effects have been assessed in Volume 3, Chapter 12 as negligible and minor adverse respectively and not significant. Due to the differing nature of the impacts and the small effect they would have it is not likely that over the lifetime of the proposed development the inter-related effects on receptors would be greater than minor adverse.
	Operational NO <sub>2</sub> concentrations	N/A	Minor adverse	
Human health	Changes to air quality	Minor adverse	Minor adverse	The combined effects of air quality, noise, transport and socio-economics over the lifetime of the project could result in inter-related effects. The health effects from these sources are likely to differ between the construction and operational phases. Traffic and socio-economic effects are likely to occur principally during the construction phase and air quality emissions from the proposed development would occur principally during the operational phase; therefore resulting in no significant additional project lifetime effects. Noise effects could occur throughout the lifetime of the project however the noise health effects are not considered to be greater when considered across the lifetime of the project compared to the construction and operational phases in isolation.
	Changes to noise exposure	Minor adverse	Minor adverse	
	Changes to transport nature and flow rate	Minor adverse	Minor adverse	
	Changes to income and employment generation	Minor beneficial	Minor beneficial	
Climate change	Direct and indirect emission of greenhouse gases (GHGs)	Negligible	Beneficial	Construction and decommissioning-phase impacts are considered to be <i>de minimis</i> at less than 1% of operational phase impacts, and therefore no significant additional project lifetime inter-related effect is predicted.

### 3.4 Receptor-led inter-related effects

3.4.1 Table 3.1 identifies those receptor groups which are unlikely to result in receptor-led inter-related effects or where such inter-related effects have already inherently been assessed through the methodology of the respective topic chapter. Many receptor groups have already been considered within the relevant chapters of the PEIR. The remaining topics which could result in additional inter-related effects are:

- visual resource;
- socio-economics;
- traffic and transport;
- noise and vibration; and
- climate change.

3.4.2 The effects identified for these topics have the potential, when occurring at the same time, to affect the same receptors, which could result in a greater effect than if they occurred on their own. The receptor groups that are likely to experience multiple effects are limited to the receptors located in the Zol identified in Table 3.2. Based on the assessments included in Volume 3, Chapters 6 to 16 the following receptor groups have been identified which could experience effects from multiple environmental topic areas:

- Humans (residents, users of schools and community facilities, places of work). These are likely to be long term receptors in that they are likely to experience the effects over a longer period of time.
- Humans (traveller, pedestrians/cyclists, users of PRow and common land). These are likely to be short term or intermittent receptors as they are only likely to experience effects for a short period of time while passing through.

3.4.3 For each receptor group Table 3.4 lists the potential effects on these receptors.

**Table 3.4: Receptor groups and potential impacts**

Receptor Group	Potential Impacts
Long term receptors: people living at dwellings and users of schools and work places	<ul style="list-style-type: none"> <li>• Potential impacts from dust soiling surfaces, particularly window sills, cars and laundry</li> <li>• Change to the level of traffic</li> <li>• Changes to the noise environment and vibration</li> <li>• Changes to views</li> </ul>

Receptor Group	Potential Impacts
Short term or intermittent receptors: people using PRow and common land and local road network	<ul style="list-style-type: none"> <li>• Changes to the PRow network and other linear routes;</li> <li>• Change to the level of traffic;</li> <li>• Changes to the noise environment</li> <li>• Changes to views</li> </ul>

#### Long term receptors

3.4.4 There are a number of residential areas and properties within the Zol of the proposed development. The eastern edge of Tilbury is approximately 750 m west of the main development site, the village of West Tilbury is approximately 1.25 km to the north and East Tilbury village is approximately 2.1 km to the east. In addition, there are a number of individual or small groups of houses within around 800 m of the main development site, the nearest being:

- Walnut Tree Farm and Low Street (600 m north east);
- Condovert Cottages (715 m north east);
- Polwicks (750 m north east);
- West Cottages (790 m north east);
- St James Church (790 m north);
- Byron Gardens (700 m west);
- Brennan Road (750 m west); and
- Sandhurst Road (770 m west).

3.4.5 The Gateway Academy school is located approximately 150 m from the boundary of Zone J and St James' Church is located approximately 250 m from the boundary of Zone I.

#### Construction

3.4.6 The greatest scope for potential inter-related effects is predicted to arise through the interaction of effects during the construction phase due to the number of receptors potentially affected by construction activities / traffic and due to the number of environmental pathways with the potential to interact.

- 3.4.7 Noise: the noise assessment has considered receptors within 1 km from the site boundary. The assessment identified that the highest predicted noise increase is likely to occur at properties along Biggin Lane as a result of traffic using the construction haul road (Zone J). All other receptors (including residential properties, Gateway Academy school and St James' Church) have been assessed as receiving a negligible increase. Works would be undertaken in accordance with the Code of Construction Practice (CoCP, at Volume 5, Appendix 2.2) which requires best practicable means to be used to control construction noise.
- 3.4.8 Dust: the study area for the dust assessment is 350 m from the construction activities and 50 m from roads. No significant dust effects were identified within this area with management in accordance with the CoCP.
- 3.4.9 Visual: the closest residential properties to the proposed development site are Walnut Tree Farm and Low Street and Condovers Cottages. The largest visual impacts likely to be experienced are from receptors located on the Chadwell St. Mary - West Tilbury – East Tilbury ridgeline, residents of properties along Biggin Lane and the farm track to Gun Hill lane, residents on the eastern edge of Tilbury and properties that line the waterfront at Gravesend.
- 3.4.10 Traffic and transport: four road links have been assessed in detail for the construction phase due to the increase in HGV and total traffic flow: Linford Road, Turnpike Lane, Gun Hill and A1089. The assessment concluded that the effects on these links are considered to be negligible (Linford Road, Turnpike Lane and Gun Hill) and minor adverse (A1089).
- 3.4.11 Socio-economic: the construction phase is likely to result in the creation of local jobs, however this is not considered to result in a significant effect for the economy and labour force in the study area overall.
- 3.4.12 Taking into account the above, there is some potential for residents of the closest properties to the construction areas and haul road to experience inter-related noise, traffic and visual effects during construction, albeit none significant individually save for visual effects from certain non-residential viewpoints and temporary noise effects as certain residences during haul road construction.
- 3.4.13 Construction effects would be temporary and occur intermittently. Overall, while additional adverse inter-related effects may arise at some locations these are considered unlikely to alter the significance of effects predicted individually and would be managed through measures set out in the CoCP.

### Operation

- 3.4.14 Visual: the visual effects on residential receptors during operation are likely to be similar to the construction phase, with the same receptors experiencing the greatest effect.
- 3.4.15 Noise: the impact of the proposed development at long term receptors during the day has been assessed as negligible increasing to minor during the evening and night time. The resultant effect is considered to be minor adverse at the closest receptors and no adverse effects in relation to sleep disturbance have been identified.
- 3.4.16 Air quality: emissions from the Flexible Generation Plant have been assessed for both long term and short term periods. The minor adverse effects predicted are not considered to be significant.
- 3.4.17 Traffic and socio-economic: the operation of the proposed development would not result in a significant increase in traffic movements or job opportunities and therefore traffic and transport and socio-economic related effects are not likely to contribute to any inter-related effects.
- 3.4.18 Taking into account the above, the main inter-related effects are likely to result from noise, visual and air quality effects. It is not considered that the minor adverse noise and air quality effects would increase the significance of minor to moderate adverse visual effects, nor that non-significant noise and air quality effects at the closest residential receptors would become significant in combination.

### Short term or intermittent receptors

#### Construction/Decommissioning

- 3.4.19 Visual: The visual effects likely to occur at PRow's, common access land and recreational areas have been assessed in Volume 3, Chapter 6: Landscape and Visual and range from no change to moderate or major, with significant adverse effects for users of access land to the north of the proposed development. The effects vary considerably depending on the location of the receptors.
- 3.4.20 Noise: it is considered that noise impacts from construction activity associated with the proposed development on users of PRow's would be negligible resulting in a minor effect. Users of the PRow's would only experience transitory exposure to elevated noise levels from construction activity.

- 3.4.21 Traffic and transport: the number of HGVs using the local road network would increase during the construction phase but the effect on driver and pedestrian delay has been assessed as negligible and is not likely to contribute to inter-related effects. The effect on pedestrian amenity has been assessed as minor adverse.
- 3.4.22 Taking into account the above, the main inter-related effects on short term receptors are likely to arise from visual, noise and traffic impacts. Taking into account the nature of the baseline views experienced by PRow users, the introduction of construction activities into the view on a temporary basis as they pass through the area is not considered to be significant at the great majority of locations, with the exception of views from access land to the north of the main development site. Users of PRow and access land are likely to also experience intermittent noise from construction activities and traffic, which would further reduce the amenity, but as each would be intermittent, receptors may not experience these all at the same time. Inter-related effects are not considered likely to be of greater significance than the effects considered by the PEIR chapters in isolation.

#### **Operation**

- 3.4.23 Visual: the visual effects on PRow, common land and tourist attraction receptors during operation on is likely to be similar to the construction phase, with the same receptors experiencing the greatest effect.
- 3.4.24 Noise: noise impacts from the operation of the proposed development on users of PRow would be negligible. While users of these PRow might experience elevated noise levels for short periods when walking within these areas, this is not considered a mechanism for significant effect.
- 3.4.25 Air quality: No significant effects have been identified in relation to air quality during the operational phase. Emissions from the proposed development are therefore not likely to contribute to inter-related effects for short term or intermittent receptors.
- 3.4.26 Traffic and socio-economic: the operation of the proposed development would not result in a significant increase in traffic movements or job opportunities and therefore traffic and transport and socio-economic related effects are not likely to contribute to any inter-related effects.

- 3.4.27 Taking into account the above, inter-related effects on short term or intermittent receptors using the area around the proposed development could arise from combined noise and visual effects. Volume 3, Chapter 11 considers that although users of the PRow and access land might experience some adverse noise effects they are not likely to be significant. Combined with the change in views which, although would differ from the baseline and could be considered significant at some receptors, taken in context of the local area, the change in amenity of short term receptors is not likely to be greater than the effects already assessed in the PEIR chapters.

## 4. Summary and conclusions

- 4.1.1 This chapter considers the potential for inter-related effects arising from the construction, operation and maintenance and decommissioning stages of Thurrock Flexible Generation Plant on a range of receptor groups. It draws from the assessments of individual effects presented in the topic-specific PEIR chapters in Volume 3. The identification of potential inter-related effects has been based on a largely qualitative assessment using expert judgement, and noting that inter-related effects have already been accounted for, in many instances, within the assessments in the topic chapters. The following conclusions arise in the context of physical and human environments.
- 4.1.2 There is scope for project lifetime effects to occur over the course of the construction, operation and decommissioning of the proposed development. The inter-relation of effects in the construction or decommissioning and operation phases (project lifetime inter-relationships) is not considered to increase the significance of effects, mainly arising due to noise and visual impacts, that are reported for each of these phases.
- 4.1.3 With regard to receptor-led inter-related effects, i.e. the combination of multiple environmental effects on a single receptor group, the combined impact of environmental pathways on ecology, heritage and landscape receptors and human health is inherently considered in the topic-specific assessments in Volume 3. Long- and short-term inter-related effects have been further considered for human receptors (including local residents, users of schools and work places).
- 4.1.4 While additional adverse inter-related effects may arise at some locations from noise, traffic and visual effects during construction, these are considered unlikely to alter the significance of effects predicted individually and would be managed through measures set out in the Code of Construction Practice. The main inter-related effects in operation are likely to result from noise, visual and air quality effects. It is not considered that the minor adverse noise and air quality effects would increase the significance of minor to moderate adverse visual effects, nor that non-significant noise and air quality effects at the closest residential receptors would become significant in combination.

## 5. References

Department for Energy and Climate Change (2011a) Overarching National Policy Statement for Energy (EN-1)

Highways Agency, Scottish Government, Welsh Assembly Government, The Department for Regional Development Northern Ireland (2008) Design Manual for Roads and Bridges HA205/08. Volume 11, Section 2, Part 5.

Planning Inspectorate (2018) Advice Note Nine: Rochdale Envelope