

22. Inter-relationships

22.1 Introduction

- 22.1.1 This chapter summarises the potential for likely significant environmental effects to occur on a receptor(s) arising from an interaction between two or more effects from different environmental disciplines. These inter-relationships may occur, for example, where a residential property or location (which represents the people who live there) is subject to both air quality and noise effects, or air quality and visual effects, or even effects with respect to all three of these environmental topics. This is also valid for receptors based on habitats and species. This inter-relationship between the two or more effects may result in no greater level of effect than for the individual component parts. However, it may be considered the effects are greater in combination when the inter-relationship between them on that receptor are assessed in the round and this may be regarded by the environmental assessor as being '*potentially significant*', despite each element having been assessed as '*not significant*' in its own right.
- 22.1.2 The likely significant effects of the whole of the Moorside Project, together with the '*cumulative effects*' of the Moorside Project in combination with '*other developments*', have been considered in sub-sections 9 and 10 of each environmental topic chapter.
- 22.1.3 It should also be noted that, in certain situations where there is a clear overlap between different environmental topics, or where two or more subjects might share a common receptor, this will have been covered as part of one or other environmental topic based assessments. Examples, which are therefore not set out in this chapter, are given in paragraph 22.3.1.

22.2 Policy context

Policy

- 22.2.1 NPS EN-1 (Reference 1) provides guidance on inter-relationships at Section 4.2.6, which states that:

"The [Secretary of State] 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."

Guidance

- 22.2.2 The Planning Inspectorate Advice Note Nine: '*Rochdale Envelope*' (Reference 2), addresses how an assessment could be undertaken using a worst case scenario of design (the Rochdale Envelope) when the design is at an initial, high level stage. A Rochdale Envelope assessment therefore looks at

the potential effects of a project using the enveloped parameters of the proposed scheme and the advice note identifies that:

“Matters that could affect the maximum adverse impact¹ are:

- *topic (or aspect) specific impacts;*
- *inter-relationships between topics (or aspects); and*
- *cumulative impacts.*

The ES should not be a series of separate unrelated topic reports. The inter-relationship between aspects of the proposed development should be assessed and careful consideration should be given by the developer to explain how inter-relationships have been assessed in order to address the environmental impacts of the proposal as a whole. It need not necessarily follow that the maximum adverse impact in terms of any one topic impact would automatically result in the maximum potential impact when a number of topic impacts are considered collectively. In addition, individual impacts may not be significant but could become significant when their inter-relationship is assessed...”

22.3 Scope of the assessment

Inter-relationships considered elsewhere in the PEIR

- 22.3.1 Further to paragraph 22.1.3, the following inter-relationships have already been considered within the subject chapters in the PEIR and will therefore not be covered in this chapter:
- Air quality effects (assessed in **Chapter 6**) arising from road, rail and marine transportation movements (described in **Chapter 4**);
 - Airborne noise and vibration effects (assessed in **Chapter 5**) arising from road, rail and marine transportation movements (described in **Chapter 4**);
 - Visual effects (assessed in **Chapter 8**) on countryside access and recreation receptors (described in **Chapter 9**);
 - Indirect effects on historic environment assets (assessed in **Chapter 12**) from changes to the landscape (described in **Chapter 7**), and from visual and noise impacts (described in **Chapters 8** and **5** respectively);
 - Freshwater (groundwater and surface water) effects (assessed in **Chapters 13** and **14**) from changes to soils and geology (described in **Chapter 11**);
 - Freshwater (surface water) effects from changes to groundwater and vice versa and assessed and described in **Chapters 13** and **14**);
 - Effects on marine ecology (assessed in **Chapter 17**) from:

¹ The term ‘*impact(s)*’ has used interchangeably with the term ‘*effect(s)*’ in this context.

- water or sediment quality (described in **Chapter 16**);
- marine and coastal processes (described in **Chapter 15**); and
- noise and vibration (described in **Chapter 5**).
- Marine water and sediment quality effects (assessed in **Chapter 16**) from:
 - changes to freshwater (surface water) (described in **Chapter 14**); and
 - marine and coastal processes (described in **Chapter 15**).
- Effects on terrestrial ecological and ornithological receptors (assessed in **Chapters 18 and 19** respectively) from:
 - changes to the freshwater environment (groundwater/surface water) (described in **Chapters 13 and 14** respectively); and
 - changes to noise and vibration (described in **Chapter 5**), air quality (described in **Chapter 6**) and soils and geology (described in **Chapter 11**)
- Effects on ornithological receptors (assessed in **Chapter 19**) from:
 - changes to marine water and sediment quality and marine ecology (described in **Chapter 16**); and
 - changes to terrestrial ecology (described in **Chapter 18**).

22.3.2 In addition, all potential effects arising from radiological impacts and how other subjects relate to radiological issues are assessed within **Chapter 21, Radiological**. The effects of climate change are also considered within the appropriate chapters, such as increased risk of flooding in **Chapter 14 Freshwater environment - Surface water**.

22.3.3 In terms of the scope of the inter-relationships assessment, and whether receptors are best placed to be dealt with in the individual subject assessments or within this assessment, this will be kept under consideration and fully reported in the ES for the DCO submission in 2017.

Inter-relationships considered in this chapter of the PEIR

22.3.4 As discussed in paragraph 22.3.1, the majority of the environmental inter-relationships that have been considered in this PEIR have already been considered within the individual topic chapters of this PEIR. However, the main exception to this is the potential for inter-relationships to occur between those topics that have an impact on human amenity and/or wellbeing. In this context the key technical topics where human receptors are most likely to experience inter-related effects are the following:

- Noise and (to a lesser extent) vibration;
- Air quality; and
- Visual amenity.

22.3.5 It is proposed that the receptors that are common to these subjects would ultimately form part of the detailed inter-relationships assessment undertaken for the Environmental Statement (ES) that will accompany the DCO application in 2017. It is not possible to carry out a robust inter-relationships assessment for this PEIR, because the detailed assessment work for each of these subjects is at a preliminary stage. However, it is possible to set out in this PEIR the methodology that it is proposed to adopt for the full ES assessment, based on the inter-relationship between the topics of noise and air quality and a preliminary assessment, with reference to how these might be predicted to interact across the Moorside Project Sites, is therefore set out below. It should be noted that this assessment has not included visual amenity receptors, because the visual Zols for the Moorside Project Sites are too large at this preliminary stage, and the assessment not sufficiently far advanced, to accurately identify those receptor locations that are potentially likely to be significantly affected by the development proposals.

22.4 Assessment methodology

- 22.4.1 The assessment of inter-related effects will be undertaken in accordance with the policy and guidance identified in **Section 22.2**, with reference to **Section 3.4**. The effects from different stages of the Moorside Project will be considered, as will whether the effects are direct or indirect; permanent or temporary; short, medium or long term. As with the assessments undertaken in the individual subject chapters, all effects are considered to be negative unless otherwise stated.
- 22.4.2 The geographical scope of potential inter-relationships is defined by the Zols for each subject, and how these Zols overlap to create zones where potential inter-relationships could occur. Relevant receptors can then be identified from within these overlap zones for the key phases of the development, i.e. construction, operation and decommissioning.
- 22.4.3 With respect to the decommissioning of the Moorside Project, potential effects associated with decommissioning are likely to be similar to or less than the effects arising from the construction phase. It is not anticipated that additional receptors would be affected beyond those identified for the construction phase assessment, as this assessment has assumed a reasonable worst case. It is anticipated that the decommissioning works would occupy more limited footprints than those currently assumed for construction of the relevant facilities. Subject to further design and delivery details, and for the purposes of this PEIR, a worst case scenario has been applied, i.e. it has been assumed that the effects would be the same (rather than less) as those identified for the construction phase. Decommissioning is therefore not considered further in the assessment tables below that address the construction and operational phases.
- 22.4.4 To illustrate how the inter-relationship between noise and air quality might affect receptors, their respective Zols are shown on **Figure 22.1**, which focuses on the development at the Moorside Site, Egremont Site and the St. Bees Railway Site, and on **Figure 22.2**, which shows the Zols for the

development at the Corkickle Site, Mirehouse Site and Corkickle to Mirehouse Railway Site.

- 22.4.5 The visual assessment Zols for the development at the various Moorside Project Sites have not been included for the purposes of preliminary assessment because of the constraints that currently apply to the determination of receptors, notably in respect of the Moorside Accommodation and to some extent the Railway Sites.

Identifying Inter-relationship Zones of Influence

- 22.4.6 In respect of the noise assessment, the Zols extend to a 2 km radius around the development at the Moorside Site, 600 m radius around the Corkickle to Mirehouse Railway and St. Bees Railway Sites and a 500 m radius around each of the Accommodation Sites. These Zols are shown outlined in green on **Figures 22.1 and 22.2.**
- 22.4.7 For air quality, the Zols are based on a 5 km radius around the development at the Moorside Site (for human receptors); and a 500 m radius around each of the Accommodation Sites and Railway Sites. These Zols are shown outlined in purple on **Figures 22.1 and 22.2.**
- 22.4.8 At this stage, and with reference to paragraph 5.2.1 of this PEIR, there is insufficient information to provide an assessment for the Highways Improvements regarding noise and vibration and therefore they have not been included as part of the inter-relationships assessment of this PEIR.
- 22.4.9 **Figure 22.1** illustrates the receptors located within the noise and air quality Zols of the development at the Moorside Site, Egremont Site and St. Bees Railway Site that would potentially be subject to inter-related noise and air quality effects as follows:
- From the development at the Moorside Site within a 2 km radius of its site boundary, i.e. for the entire noise Zol, because it is situated entirely within the 5 km radius air quality Zol;
 - From the development at each of the Egremont Site and St. Bees Railway Site within 500 m of their respective boundaries, i.e. for the entire air quality Zol for these sites, because it coincides entirely with the 500 m noise Zol for the Egremont development and is situated entirely within the 600 m radius noise Zol for the St. Bees Railway development;
 - From a combination of air quality potential effects from development at the Moorside and potential noise effects from development at the Egremont Sites within 500 m of the Egremont Site boundary;
 - From a combination of noise potential effects from development at the Moorside Site and air quality potential effects from development at the Egremont Site within the purple shaded zone;
 - From a combination of air quality potential effects from development at the Moorside Site and potential noise effects from the St. Bees Railway within the green shaded zone;

- 22.4.10 **Figure 22.2** illustrates the receptors located within the noise and air quality Zols of the development at the Corkickle Site, Mirehouse Site, and Corkickle to Mirehouse Railway Site that would potentially be subject to inter-related noise and air quality effects.
- 22.4.11 Since the Zol for noise and air quality are predominantly the same, it is only some of the margins (unshaded) of the noise Zol for the development at the Corkickle to Mirehouse Railway Site (i.e. located between 500 m and 600 m of its boundary), where potential receptors would be scoped out of this assessment.

Identifying receptors

- 22.4.12 For the ES that is submitted in 2017, it is proposed that a common list of receptors, which would potentially be subject to noise and air quality effects, would be identified from within the overlapping Zols areas shown on **Figures 22.1 and 22.2**. However, it should be noted that not every receptor location within these Zols would be subject to the same level of effects (whether considered on an individual topic or an inter-relationship basis) or indeed to potentially significant effects, not least because existing mitigating features or factors, such as intervening topography or structures, could reduce the effects from development related activities.
- 22.4.13 With reference to **Figure 22.1**, and by way of example at this stage, it is considered that the following receptor locations represent example areas that could be subject to inter-related noise and air quality effects from the Moorside Project in the vicinity of the Moorside and Egremont Sites. In the ES that is submitted in 2017, a full assessment regarding inter-relationship effects will be reported on. This will confirm whether or not any or all of the below are in fact subject to any likely significant effects from the inter-relationship between the different topics of air quality, noise and any topics that are relevant:
- Within 2 km of Moorside:
 - Beckermeth (south, centre and north);
 - Braystones;
 - Blackbeck and Moss Side;
 - Calder Bridge;
 - Properties around the Sella Park House Hotel.
 - Within 500 m of Egremont:
 - Thornhill: e.g. Dent Road; Thorny Road; The Knoll; High Road; Woodow Road; and The Crescent;
 - Egremont South: e.g. Vale View, Uldale View, Dale View Gardens and Pickett How Farm;
 - Scurgill: e.g. to the east of the A595(T) and the Parkhead Inn).

- 22.4.14 A similar receptor identification exercise, in respect of all Moorside Project Sites will be undertaken in due course, so that an assessment of the inter-relationships of all effects can be undertaken and reported on as part of the ES.

Assessing potential inter-related effects

- 22.4.15 There is no standard methodology for assessing the inter-related effects of a proposed development. This is because each environmental topic has a different basis for determining the criteria that are used to assess whether the environmental effects would be significant or not in EIA terms.
- 22.4.16 With respect to the inter-relationship between noise and air quality effects, whilst there are similarities in the way in which receptor sensitivity is determined, by the very nature of the topics under consideration, there are differences in the way in which the magnitude of change is assessed. It is therefore inevitable that any assessment of inter-related effects between these topics has to be subjective and relies on the application of professional judgement as to how the individual effects would interact and therefore whether the effects would be judged to be '*significant*' or '*not significant*' in EIA terms.
- 22.4.17 It is the subjectivity referred to above that, in the absence of detailed assessment work for all topic chapters (as assessment is currently at a preliminary stage), makes it very difficult to undertake a full assessment of the inter-related effects at present. There are too many variables within each assessment that may change as the EIA process continues and the detailed assessment of inter-relationships is therefore only considered appropriate when more of these variables have been confirmed.
- 22.4.18 This PEIR therefore does not contain a detailed assessment of inter-relationships between the various environmental topics. Instead, in **Section 22.5**, we have provided a commentary on how combining the noise and quality effects that would potentially be experienced by receptor locations in the vicinity of the Moorside and Egremont Sites (on the basis of existing assessment information from the individual technical chapters) may result in potential inter-related effects.
- 22.4.19 Notwithstanding the above, within the ES to be submitted with the DCO submission in 2017, the comprehensive information that would underpin all of the individual subject chapter assessments will be available and will be supported by a complete suite of baseline evidence and assessment workings. It will therefore be possible at that stage for the inter-relationship assessment to draw into this detail for each effect, on each receptor, to consider how the various different subjects could interact.

22.5 Preliminary assessment of inter-relationship effects

- 22.5.1 An assessment of the inter-related effects between the relevant environmental topics from the various elements of the Moorside Project during

the construction and operation phases of the development will be included in the ES in 2017.

22.5.2 For the purposes of this PEIR, due to the limitations set out above, this preliminary assessment is based on how noise and air quality effects might potentially inter-relate for receptor locations in the vicinity of the Moorside and Egremont Sites. This is summarised with respect to the construction phase for the common receptor groups identified in Section 22.4 above in Table 22.1.

Table 22.1 Preliminary inter-relationships assessment during the construction period

Receptor group	Noise & Vibration Effects	Air Quality Effects	Potential Inter-related Effects
Braystones	Potentially Significant	Potentially Significant	Potentially Significant
Beckermeth South	Significant	Potentially Significant	Significant
Beckermeth Centre	Potentially Significant	Potentially Significant	Potentially Significant
Beckermeth North	Not Significant	Potentially Significant	Potentially Significant
Blackbeck	Potentially Significant	Potentially Significant	Potentially Significant
Moss Side	Significant	Potentially Significant	Significant
Calder Bridge	Not Significant	Potentially Significant	Potentially Significant
Properties around the Sella Park Hotel	Potentially Significant	Potentially Significant	Potentially Significant
Sellafield	Potentially Significant	Potentially Significant	Potentially Significant
Thornhill	Potentially Significant	Potentially Significant	Potentially Significant
Egremont	Potentially Significant	Potentially Significant	Potentially Significant
Scurgill	Potentially Significant	Potentially Significant	Potentially Significant

22.5.3 Table 22.1 shows that, based on the preliminary assessments that have been undertaken with respect to noise and air quality, for most receptors significant and potentially significant adverse effects are respectively predicted during the construction phase.

22.5.4 Given such an outcome, it is reasonable to assume that significant inter-related effects would be expected at the same receptors. However, as mentioned previously, it is important to remember that this preliminary assessment is based on a conservative approach and that aspects are likely to change once the individual assessments (notably in terms of noise) are undertaken on the basis of the availability of more detailed design and phasing information, which in turn will facilitate the consideration of the incorporation

into the design of further mitigation measures, which could reduce the magnitudes of change and offset the prediction of significant adverse effects.

22.6 References

1. Department of Energy and Climate Change. (2011). *Overarching National Policy Statement for Energy (EN-1)*. The Stationary Office, London.
2. The Planning Inspectorate (2012) Advice note nine: Rochdale Envelope. *Using the 'Rochdale Envelope'*. Bristol.