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## 17. CUMULATIVE AND COMBINED EFFECTS

### 17.1 Introduction

17.1.1 This chapter of the Preliminary Environmental Information (PEI) Report addresses the potential for combined or cumulative effects to occur as a result of the Proposed Development. It draws on the assessment of impacts provided in Chapters 6 to 16 of this PEI Report, and information relating to other known developments that are proposed within the study area. This assessment does not consider developments that are already constructed and operating for the assessment of cumulative effects, as existing operational facilities are accounted for in the baseline conditions established for the main assessments referred to above.

17.1.2 Within this Chapter, the following terms have their associated definitions:

- **Combined effects** may arise where several different effects resulting from the Proposed Development (e.g. decrease in air quality, increase in noise disturbance) have the potential to affect a single receptor.
- **Cumulative effects** have the potential to arise where two or more developments are proposed within close enough proximity to lead to effects of the same type (e.g. air quality) on the same receptor.

17.1.3 The cumulative effects assessment therefore considers other proposed developments that are in the public domain, such as planning applications registered with the local planning authorities and already consented developments, but which are not yet constructed or operational.

17.1.4 The chapter is supported by Figure 17.1 (PEI Report Volume II).

### 17.2 Legislation and Planning Policy Context

17.2.1 The requirement for cumulative and combined impact assessments is clearly stated in the relevant European Directive and domestic legislation as detailed below:

- European Directive 2011/92/EU on the assessments of effects of certain public and private projects on the environment requires an assessment of; *“the direct effects and any indirect, secondary, cumulative, short, medium and long term, permanent or temporary, positive and negative effects of the project”*; and
- Paragraph 5 of Schedule 4 to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (‘the EIA Regulations’) requires:  
*“A description of the likely significant effects of the development on the environment resulting from [...] –*  
  
*(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources”*

17.2.2 In addition, National Policy Statements (NPS) are, where in place, the primary basis for the assessment and determination of applications for nationally significant infrastructure projects (NSIPs), such as the Proposed Development. The Overarching National Policy Statement on Energy EN-1 (NPS EN-1) states that:

*“In considering any proposed development, and in particular when weighing its adverse impacts against its benefits, the [Secretary of State] should take into account:*

- *its potential benefits including its contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits; and*
- *its potential adverse impacts, including any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.”*

17.2.3 Section 4.2 of NPS EN-1 continues:

*“When considering cumulative effects, the ES should provide information on how the effects of the applicant’s proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence). [...]*

*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.”*

17.2.4 Further guidance on the process for the cumulative effects assessment (CEA) for NSIPs is provided by; “*Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects*” (December 2015).

## **17.3 Assessment Methodology and Significance Criteria**

### **Impact Assessment and Significance Criteria**

17.3.1 There is no standard methodology for assessing cumulative and combined effects and the extent to which the effects of other developments can be assessed quantitatively depends on the level of information available about the other developments. Such effects are, therefore, assessed by professional opinion, although matrices and modelling are used where appropriate and where enough information regarding the other developments exists. Where environmental assessment information regarding other developments is not available or uncertain, the assessment is necessarily qualitative.

17.3.2 When considering cumulative and combined effects, the mitigation measures as set out in Chapters 6 to 16 have been taken into account i.e. only residual (after mitigation) effects are discussed in this Chapter.

17.3.3 Cumulative and combined effects are assessed to be neutral, minor, moderate or major. Moderate or major effects are considered to be significant, using the methodologies outlined in each technical Chapter.

### *Cumulative Effects*

- 17.3.4 Cumulative effects are those that accrue over time and space from a number of developments.
- 17.3.5 The Planning Inspectorate Advice Note 17 'Cumulative effects assessment relevant to nationally significant infrastructure projects' (Ref 17-1) sets out a four stage approach to assessment of cumulative effects:
- Stage 1: identify the Zone of Influence and identify long list of other developments;
  - Stage 2: identify short list of other development for cumulative assessment;
  - Stage 3: information gathering; and
  - Stage 4: assessment.
- 17.3.6 This approach has been followed in undertaking the cumulative effects assessment presented in this chapter.
- 17.3.7 In order to assess the potential for cumulative effects to arise in relation to these developments, where a planning application has been made, information presented within the environmental statement or environmental reports for the development has been gathered and reviewed. For developments that are known to be proposed (either via screening or scoping opinion requests submitted to the local authority/ Planning Inspectorate or following presentation of information in the public domain) but where an ES (or other environmental reports) has not yet been prepared or submitted, any readily available information has been utilised. This includes communication with local authorities, public consultation material and material available via the internet.
- 17.3.8 Following information gathering from available sources, the effects of the Proposed Development have been considered in conjunction with the potential effects from other projects or activities that are both reasonably foreseeable in terms of delivery (e.g. have planning consent or are in the planning process) and are geographically located in a position where environmental impacts could act together to create an effect that is more (or less) significant overall than the effect of individual developments alone.
- 17.3.9 Operational impacts are generally long-term, and whilst construction impacts are often short term and temporary, they can potentially be of a large magnitude. Consequently, when cumulative effects that could be associated with construction at one site and operation at another are considered, the difference in duration and reversibility is considered within the assessment.
- 17.3.10 In assessing cumulative effects, it is appropriate to also acknowledge the relative contributions that different projects make to a cumulative effect, and carefully consider whether a cumulative effect occurs at all. For example, effects associated with a large scale project may be significant, and whilst a smaller project may contribute to this effect, the cumulative effect of the smaller project and the larger

project is only considered to be significant if it is of greater significance than the effect of either project in isolation.

- 17.3.11 Where applicable, the assessment considers all other known developments that have potential for cumulative effects with the Proposed Development together, as a worst case.

### ***Study Area***

- 17.3.12 Cumulative effects are generally unlikely to arise unless the other development sites are in close proximity to the Site, recognising that the appropriate distance varies with the nature of the potential effect and the nature of the receptor, e.g. cumulative air quality effects could occur for developments a greater distance apart than noise effects. Construction projects are, as a matter of routine, required to employ regulatory and managerial controls and employ good practice to mitigate construction impacts wherever possible. Nevertheless, consideration has been given to the presence of common pathways from nearby developments to a single receptor, and whether there is potential for impacts of a sufficient magnitude whereby a particular receptor could experience cumulative effects.
- 17.3.13 The study area for the consideration of cumulative and combined effects has been developed taking into account the predicted extent of impacts associated with the Proposed Development, and with the point at which the associated effects become insufficient to contribute in any meaningful way to those of another proposed development.
- 17.3.14 The study area for each environmental assessment topic is defined in the relevant technical Chapter (Chapters 6 – 16). Information on the likely extent of impacts associated with other developments in the area has also been considered. The zones of influence (ZOIs) adopted for the purposes of the Chapter are shown in Table 17.1 below.

**Table 17.1: Zone of Influence Table**

Environmental Topic	Zone of Influence
Air Quality	Construction: 350m ZOI for emissions and construction dust (and 500m along roads from the site entrance, for dust trackout). Operation: 15km ZOI for international statutory designated ecology sites 2km for non-statutory designations Refer to Chapter 6: Air Quality for more information.
Noise and Vibration	Construction and Operation: 1km ZOI Refer to Chapter 8: Noise and Vibration for more information.
Ecology and Nature Conservation	Construction and Operation: A maximum ZOI of 15km has been applied: 15km for air quality impacts to international statutory designated sites; 2km ZOI for national and locally designated sites; and 500m for ponds. Refer to Chapter 9: Ecology for more information.
Landscape and Visual Amenity	Construction and Operation: 2km (landscape) and 5km (visual amenity) Refer to Chapter 9: Landscape and Visual Amenity for more information.
Cultural Heritage	Construction: On site. Operation: 2km Refer to Chapter 11: Cultural Heritage for more information
Ground Conditions and Hydrogeology	Construction and Operation: 2km ZOI Refer to Chapter 12: Ground Conditions and Hydrogeology for more information.
Water Resources, Flood risk and Drainage	Construction and Operation: 2km ZOI Refer to Chapter 13 Surface Water, Flood Risk and Drainage for more information

- 17.3.15 The largest study area, for the air quality and ecology assessments, has defined the ‘zone of influence’ within which the search for other developments has been undertaken for the cumulative assessment. In accordance with the approach discussed in that Chapter; other developments that could impact on receptors identified within a 15km zone of influence of the Proposed Development Site have been identified (as appropriate to the environmental aspects listed above).
- 17.3.16 Regarding climate change, Paragraph 5(f) of Schedule 4 to the EIA Regulations, requires a description of the likely significant effects resulting from the “*nature and magnitude of greenhouse gas emissions...*” Chapter 15 of this PEI Report provides details of the initial lifecycle assessment of the greenhouse gas emissions for the construction and operation of the Proposed Development. Cumulative impacts in this regard (i.e. the consequences of the emissions of greenhouse gases from multiple projects) are well-documented and are thus not considered within this Chapter.
- 17.3.17 Cumulative impacts relating to “*the vulnerability of the project to climate change*” are similarly not considered here. Chapter 15 of this PEI Report outlines the measures undertaken to ensure the climate change resilience of the Proposed Development.

There are no other developments that are considered to have the potential to impact on the resilience of the Proposed Development, which has been designed (to date) with allowances for climate change built in to the relevant assumptions (e.g. flood risk assessment). Such allowances are guided by the relevant authorities (e.g. Environment Agency) and therefore it can reasonably be assumed that any other development will also be required to make appropriate provisions such that the potential for cumulative effects will be negligible.

## 17.4 Consultation

17.4.1 A summary of consultation relevant to the cumulative and combined effects assessment is provided in Table 17.2 below.

**Table 17.2: Consultation Summary**

Consultee	Date	Summary of Response	Addressed
Secretary of State	Scoping Opinion (July 2018)	<p>The Applicant's attention is drawn to the Inspectorate's Advice Note 17: Cumulative Effects Assessment, which sets out the recommended approach to such assessments.</p> <p>The Scoping Report does not explain or justify the method used to identify other projects for consideration in the cumulative assessment. The Inspectorate notes that the Applicant has only included other generating stations in this list, suggesting it has not considered other types of development for the assessment.</p> <p>For example, Able Marine Energy Park DCO, the Able Logistics Park and a planning application for a car storage facility on land north of Marsh Lane (PA/2017/2141) are developments which are likely to generate HGV traffic and should be included.</p>	<p>Used as the basis for this assessment</p> <p>Methodology included as part of this Chapter</p> <p>These developments have been included as part of the cumulative assessment</p>

Consultee	Date	Summary of Response	Addressed
Secretary of State	July 2018	<p>In order to determine whether the Proposed Development shares common sensitive receptors with other projects, it is recommended that the ES establishes zones of influence for each aspect considered in the ES.</p> <p>The Inspectorate recommends that the list of plans and other development to be considered within the assessment is agreed with the local authority.</p> <p>The Applicant intends to mitigate the cumulative effects arising from the construction of the VPI Energy Park 'A' through construction scheduling. The ES should include a full description and assessment of efficacy of the mitigation measures, and any plans should be sufficiently developed and secured in order to provide confidence in the assessment conclusions in the ES.</p>	<p>The Zones of Influence are included within each chapter where cumulative effects have been considered.</p> <p>Consultation with the local authority is currently on-going. Once complete, the list of projects referred to in this section, and the potential for cumulative effects, will be reviewed. If required, the relevant assessments will be updated prior to submission of the application.</p> <p>While the construction schedules for VPI Immingham Energy Park A and the Proposed Development are not anticipated to overlap, consideration has been given in this chapter to the efficacy of mitigation measures in the unlikely event that overlap does occur</p>
C.GEN Killingholme	July 2018	<p>It is important that the effects of construction traffic for the proposed development are properly assessed given existing HGV traffic in the area. Aside from impacts on existing road users (particularly given high numbers of HGV movements), there is the potential for cumulative impacts as development is carried out on sites in the area which have consent or are pending determination, and which could be built out concurrently.</p>	<p>C.GEN Killingholme has been included as a cumulative scheme</p>

## 17.5 Cumulative Effects Assessment (Stages 1-3)

### Identification of Short List of Other Developments for Assessment

- 17.5.1 An initial screening exercise (Stage 1 of the cumulative effects assessment) was undertaken to identify potential major developments within the vicinity of the Proposed Development for consideration within the cumulative effects assessment. This process identified potential major developments that have the potential to impact on receptors within a 15 km radius of the Proposed Development to create an initial long list for consideration. The long list was subsequently screened based on the potential for impact and a refined short list was developed for further, more detailed consideration (Stage 2 of the cumulative effects assessment). The initial short list was presented in the Scoping Report (Appendix 1A in PEI Report Volume III) and has been revisited for this PEI Report to reflect the latest information available on other developments.

17.5.2 The initial short list of other developments identified at Stage 2 of the cumulative effects assessment, as included in the Scoping Report (Appendix 1A in PEI Report Volume III), and updated based on comments received to date, are presented in Table 17.3 below, with details of their current status and comments regarding their temporal scope in relation to the temporal scope of the Proposed Development.

**Table 17.3: Cumulative Scheme Short list**

Scheme	Distance from Site	Status	Description
VPI Energy Park 'A'	Adjacent	Consented	Gas-fired power station of up to 49.9MW
Able Marine Energy Park	Adjacent	Under construction	Port development
Marsh Lane Car Storage	Adjacent	Pending decision	Car storage facility
Killingholme PS	1.5 km	Consented	14 gas reciprocating engine generators and ancillary equipment
North Killingholme Power Project	2 km	Consented	470 MW power station
Able Logistics Park	2.5 km	Consented	Site for warehousing, external storage
AMP Energy Services Ltd	5 km	Consented	Standing reserve power plant
North Beck Energy Ltd	5 km	Pending decision	Energy recovery facility

17.5.3 All the developments identified in Table 17.3 are considered to be of such a nature and proximity to the Site to have the potential to generate significant cumulative effects when considered in context with the Proposed Development and the zones of influence defined in Table 17.1. The location of the other developments in relation to the Site is shown in Figure 17.1 (PEI Report Volume II).

17.5.4 The developments identified above have been, or will be, subject to assessment for the environmental topics in Section 17.6 for which there is a potential for a cumulative effect in conjunction with the Proposed Development. Other developments included in the assessments presented in this Chapter are identified in the relevant section.

17.5.5 This PEI Report presents preliminary findings of the environmental assessments undertaken to date. This allows consultees the opportunity to provide informed comment on the Proposed Development, the assessment process and preliminary findings prior to the finalisation of the DCO application and the Environmental Statement (ES). Consultation with the local planning authorities is on-going and the list of developments presented in Table 17.3 will be reviewed and updated should additional developments be identified. The final list of considered projects, which

will be agreed with the local planning authorities, will be included within the ES for the Proposed Development (that will be submitted as part of the DCO application). The cumulative assessment that will be included within the ES will include consideration other developments additional to those identified above, together with the assessment of those not explicitly mentioned in the assessment sections presented below.

## **17.6 Cumulative Effects Assessment (Stage 4)**

### **Air Quality**

#### **Construction Effects**

17.6.1 The assessment of construction air quality effects at sensitive receptors has considered the emissions associated with the Proposed Development together with construction of the other proposed developments listed in Table 17.3 including:

- The emissions from dust generated by demolition and construction activities;
- The emissions from construction Non Road Mobile Machinery (NRMM); and
- The emissions from construction road traffic.

17.6.2 The ZOI for construction dust and NRMM is limited to within 350m of the Proposed Development.

17.6.3 The construction phases of the VPI Immingham Energy Park A and the Proposed Development will not occur concurrently and both are controlled by the same parent company entity that can manage the timings of the two developments. Even if the construction phases were to overlap, similar Construction Environmental Management Plans (CEMP) would be utilised to manage and control air emissions during construction such that the potential cumulative effects would be not significant.

17.6.4 Given the distances from the Proposed Development to the other developments identified in Table 17.3, and the distances to identified sensitive receptors, there are no planned developments which could have cumulative effects.

17.6.5 The impacts of construction traffic emissions to air from the Proposed Development have been assessed and concluded to be imperceptible with a negligible adverse effect. Given the magnitude of the predicted impacts, it is therefore considered that the cumulative impacts with other developments would be minimal.

#### **Operational Effects**

17.6.6 The impacts of the Proposed Development have been assessed through dispersion modelling, together with the impacts of the adjacent VPI Immingham Energy Park A (as reported in the associated ES), in order to determine the overall impacts of both developments.

17.6.7 Receptors R1 to R11 (identified in Table 6A.7 of Appendix 6A (PEI Report Volume III)) are common between the, in-isolation, air quality assessments for the Proposed

Development and the VPI Immingham Energy Park A. The scope of this cumulative effects assessment has therefore considered the potential impacts to these receptors.

- 17.6.8 The potential short term cumulative effects, at all receptors, are dominated by the emissions from the gas engine sources of the VPI Immingham Energy Park A, due to their lower stack heights, lower emission temperature and higher NO<sub>x</sub> emission concentration. For example, the maximum predicted short term process contribution of NO<sub>2</sub> for the Proposed Development is 3.6 µg/m<sup>3</sup> (at R1, Hazeldene) compared with the equivalent prediction of 29.2 µg/m<sup>3</sup> from the worst case operation of the VPI Immingham Energy Park A.
- 17.6.9 The short term impacts of the gas engines resulted in a minor adverse effect at the worst case human health receptor, based on the effect descriptors used in the ES for the VPI Immingham Energy Park A<sup>1</sup>, however in combination with background concentrations there was no exceedance of the short-term NAQS objective predicted and it was considered that the effects were not significant.
- 17.6.10 Whilst, given the differing dispersion parameters (e.g. temperature, volume) of the emissions from each of the Proposed Development and the VPI Immingham Energy Park A, it is unlikely that the maximum process contribution from each development would occur at any receptor simultaneously, a worst case assessment of the addition of the two predicted maximum contributions can be undertaken through the addition of the individual predicted process contributions at each common receptor.
- 17.6.11 For all common receptors, the effect descriptor will not change from those determined for the VPI Immingham Energy Park A through the addition of the process contribution from the Proposed Development. Therefore, the cumulative effect of the operation of the two developments will result in no additional impact over that described in the ES submitted for the VPI Immingham Energy Park A is predicted for the Proposed Development.
- 17.6.12 The long term impacts show an imperceptible increase over the results predicted for the Proposed Development, in isolation, and there is no overall increase in the Predicted Environmental Concentration over that predicted for the VPI Immingham Energy Park A, in isolation, which is a negligible effect that is considered to be not significant.
- 17.6.13 An assessment has been made of the operational Proposed Development air quality effects at sensitive receptors in combination with other proposed developments, through consideration of the nature, location and scale of these other developments.
- 17.6.14 The Killingholme Power Station gas engines are located approximately 1.5km to the North of the Site, and are anticipated to run for a maximum of 1,500 hours per year.

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<sup>1</sup> Identical effects descriptors have been used for the air quality assessment for the Proposed Development, as presented in Chapter 6 of this PEI Report.

- 17.6.15 Due to the prevailing wind coming from a south-westerly direction, the separation of the two sites and the proposed stack heights for each development, the area of peak impact from both developments will not occur at the same location. The dispersion pattern from the stack of the Proposed Development, as shown in Figure 6.3, shows that the impacts from the Proposed Development are negligible at the point of maximum impact from the Site and therefore will not coincide with impacts from the Killingholme Power Station.
- 17.6.16 In terms of the potential human health impacts, the Old Vicarage Receptor (R4) was also included in the Killingholme Power Station gas engines Air Quality Assessment. Predicted long term NO<sub>2</sub> concentrations arising from the Killingholme Power Station at this receptor were 0.08µg/m<sup>3</sup>, with impacts from the Proposed Development predicted to be 0.003µg/m<sup>3</sup>. The cumulative concentration would therefore be 0.083µg/m<sup>3</sup>, which represents 0.2% of the relevant AQS, and therefore would be considered to be imperceptible.
- 17.6.17 In terms of the ecological impacts, as with the Proposed Development, the impacts from the Killingholme Power Station gas engines were predicted to be insignificant at all ecological receptors (and well below the 1% threshold for insignificance), therefore it is considered that the cumulative impacts with the Proposed Development would not be significant.
- 17.6.18 The consented North Killingholme Power Project is located approximately 2km north of the Proposed Development Site and comprises a 470MWe CCGT. Again due to the location of this plant, the prevailing wind direction and the much higher stack, it is considered that cumulative impacts with the Proposed Development would be minimal. The Environmental Statement submitted for the North Killingholme Power Project states that the maximum predicted annual average concentration of NO<sub>2</sub> is 0.2µg/m<sup>3</sup>. This was predicted to occur approximately 1.5km to the northeast of the stack. Concentrations in the vicinity of the Proposed Development area of influence would be considerably lower and therefore it is again considered that the cumulative impact would be insignificant.
- 17.6.19 The two developments off Queens Road, Immingham (Energy Recovery Centre and the 12 reciprocating engines), are approximately 5km from the Proposed Development site, and therefore it is considered that the cumulative impacts would be insignificant based on the separation distances involved.
- 17.6.20 It should be noted that in terms of the N-depositional impacts on the Humber Estuary receptor, the habitat type closest to the Proposed Development is saltmarsh, which is located approximately 1.5km from the Proposed Development. The existing nitrogen deposition rate at the closest area of saltmarsh is 15.0kgN/ha/yr, and the process contribution from the Proposed Development represents <0.1% of the lower end of the critical load at the worst case location. Given that the sizes of the Queens Road developments are of a similar scale, and therefore are likely to have a similar level of impact at their worst case points, it is considered highly unlikely that the cumulative increase in nitrogen deposition would push the baseline above the minimum critical load. Also considering the locations of the other developments, and the prevailing wind direction, the worst case impacts for all the developments will occur at different locations and therefore the in combination impacts of the other developments would be lower at the point of worst case impact for the Proposed Development. Moreover, twice daily tidal inundation

will bring much more nitrogen than would ever deposit from atmosphere, therefore the process of tidal inundation will have a much greater role influencing vegetation composition.

### **Noise and Vibration**

#### **Construction Effects**

- 17.6.21 Of the other developments identified in Table 17.3, only the proposed VPI Immingham Energy Park A is located with the zone of influence of the Proposed Development for noise and vibration. The construction of the two developments will not run concurrently, and both are ultimately under the control of the same Applicant parent company entity that can manage the timings of the two developments. Even if the construction phases were to overlap, the same (or similar) Construction Environmental Management Plans (CEMP) would be utilised to manage and control noise emissions during construction, so as to maintain noise effects on identified sensitive receptors that are not significant.
- 17.6.22 The operation of the VPI Immingham Energy Park A may occur during the construction of the Proposed Development. The predicted construction sound level (as a result of the construction of the Proposed Development) at this NSR is 47 dB,  $L_{Aeq}$ .
- 17.6.23 The worst case predicted operational noise level of the VPI Immingham Energy Park A at the noise sensitive receptor (NSR) at Hazeldene (as per the associated ES) is 44 dB,  $L_{Aeq}$ .
- 17.6.24 Therefore, should operation of the VPI Immingham Energy Park A coincide with the worst case indicative construction noise levels of the Proposed Development (i.e. during the construction of the power generation plant and transformers), the total sound level at Hazeldene would be less than 49 dB,  $L_{Aeq}$ .
- 17.6.25 Chapter 8: Noise and Vibration identifies that the ambient (night time) sound level at Hazeldene is 53 dB,  $L_{Aeq}$ . In accordance with the relevant criteria, the resultant, worst case, cumulative impact would be minor and thus not significant.
- 17.6.26 In addition, the VPI Immingham Energy Park A is intended to run intermittently and occasionally in response to peak load demand. Therefore, whilst there is the potential for cumulative effects during the construction of the Proposed Development, this is short-term only and, in any event, is not considered to be significant.

#### **Operational Effects**

- 17.6.27 There is potential for cumulative effects to be generated by the operational phase of the Proposed Development in combination with the VPI Immingham Energy Park A.
- 17.6.28 A cumulative BS 4142 assessment has been carried out using the predicted operating scenarios from each development that result in the highest operational sound levels, in order to assess a worst case cumulative scenario. The assessment has considered the NSR at Hazeldene identified in Chapter 8 of this PEI Report.

17.6.29 Table 17.4 presents the results of the BS 4142 cumulative assessment, .

**Table 17.4: BS 4142 Assessment Results for the Proposed Development operating at the same time as the VPI Immingham Energy Park A**

Parameter	Value
OCGT Site 'worst case' Specific Sound Level, Ls (LAeq,Tr), dB	47
VPI Immingham Energy Park A 'worst case' Specific Sound Level, Ls (LAeq,Tr), dB	44
Cumulative Specific Sound Level, Ls (LAeq,Tr), dB	49
Acoustic feature correction, dB	+5
Rating Level (LAR,Tr), dB	54
Representative Background Sound Level, (LA90,T), dB	49
Excess of rating level over background sound level, (LAR,Tr - LA90,T), dB	+5
Magnitude of impact (from Chapter 8: Noise and Vibration)	Low
Classification of effect (from Chapter 8: Noise and Vibration)	Minor

17.6.30 BS 4142 states that a difference of around +5 dB or higher is likely to be an indication of an adverse impact, depending on the context; a +5 dB is considered to be minor adverse based on the EIA assessment criteria outlined in Chapter 8 of this PEI Report.

17.6.31 This level of effect meets the local authority agreed criterion for minor adverse (not significant) effects (+5 dB) even when based on worst case assumptions.

## Ecology

### Construction Effects

17.6.32 Chapter 9 of this PEI Report states that the potential effects of the Proposed Development to ecological receptors, during construction, will be limited to the potential for direct, on-site, habitat loss and off-site disturbance (due to increased noise, vibration, lighting). Air quality impacts on statutory and non-statutory designated sites arising from dust deposition were scoped out because all such sites are beyond the zone of influence in which dust deposition during construction.

17.6.33 Habitat loss would result from on-site construction activities only; therefore none of the other developments identified in Table 17.3 would result in a cumulative effect in this regard.

17.6.34 Potential disturbance effects to ecological receptors as a result of the construction of the Proposed Development are assessed in Chapter 9 of this EIA Report. That Chapter concludes that the potential for noise and visual disturbance from the construction works would have a neutral effect, given the existing soundscape, landscape and land use in the vicinity of the Proposed Development. As defined in Table 9.2 of this PEI Report, a neutral effect is one that will have no effect on the structure/function or conservation status of an ecological receptor.

17.6.35 It is therefore considered that, during construction, there is no potential for significant cumulative effects of the Proposed Development and any of the other developments identified in Table 17.3.

### **Operational Effects**

- 17.6.36 Potential effects of the operation of the Proposed Development on ecological receptors are identified from emission to air potentially leading to adverse effects on sensitive habitats, through increased nitrogen and acid deposition, and increased levels of disturbance (noise, vibration, artificial lighting), potentially resulting in adverse effects on ecological features.
- 17.6.37 The potential cumulative effects on ecological receptors of the emissions to air from the Proposed Development are considered above (Air Quality). Given the locations of the other developments, their distance from the site, and that the associated locations of maximum impacts are unlikely to coincide, no significant cumulative effects are anticipated.
- 17.6.38 There is the potential for noise/ visual disturbance during the operation of the Proposed Development. However, given the industrial nature of the surrounding land use, it is reasonable to assume that the potentially relevant species identified in Chapter 9 of the PEI Report (e.g. birds) that use the land in and around the Proposed Development are habituated to the type of development and that the operation of the Proposed Development is likely to result in a neutral effect.
- 17.6.39 It is therefore considered that, during operation, there is no potential for significant cumulative disturbance effects.

### **Water Resources, Flood Risk and Drainage**

#### **Construction Effects**

- 17.6.40 With the exception of the VPI Immingham Energy Park A, there is a lack of hydrological connectivity between the schemes listed in Table 17-2 and the Site. The construction phases of the VPI Immingham Energy Park A and the Proposed Development will not occur concurrently and both are controlled by the same parent company entity that can manage the timings of the two developments. Even if the construction phases were to overlap, the same (or similar) CEMPs would be utilised to manage and control the potential water resource and flood risk/drainage impacts arising from the two developments, during construction. Therefore no significant cumulative impact on surface water, flood risk and drainage receptors would occur.

#### **Operational Effects**

- 17.6.41 With the exception of the VPI Immingham Energy Park A, there is a lack of hydrological connectivity between the schemes listed in Table 17-2 and the Site therefore the potential for cumulative effects on surface water, flood risk and drainage receptors are limited.
- 17.6.42 The Proposed Development would, subject to agreement with the NEL IDB, discharge only clean surface water runoff to the existing land drain between the Proposed Development and the existing CHP plant. Surface water would drain from the Site at a restricted greenfield rate, with excess runoff above this rate stored within the Site boundary. The potential impacts of this discharge are, for all receptors, considered to be of very low magnitude of negligible significance.

17.6.43 Minimal contaminated wastewater is anticipated to be generated from the Proposed Development during operation and this would be managed through on-site storage prior to being tankered off-site for treatment, or the use of a septic tank, as appropriate. Therefore there will be no direct discharge of contaminated water from the Proposed Development. Chapter 12 of this PEI Report considers the potential impacts of leaks etc. as a worst case and concludes that, for all receptors, that such impacts would be localised, and of very low magnitude/ negligible significance.

17.6.44 Therefore, as only clean surface water will be discharged from the Proposed Development, there is no potential for cumulative effects. Where leaks etc. do occur, these will be localised and of very low magnitude/negligible significance, with no potential for the production of any significant cumulative effect.

### **Ground Conditions and Hydrogeology**

#### ***Construction Effects***

17.6.45 With the exception of the VPI Immingham Energy Park A, none of the other developments identified in Table 17.3, have the potential to effect ground conditions on the Site and there is no hydrogeological connectivity between these and the Proposed Development.

17.6.46 The construction phases of the VPI Immingham Energy Park A and the Proposed Development will not occur concurrently and both are controlled by the same parent company entity that can manage the timings of the two developments. Even if the construction phases were to overlap, the same (or similar) CEMPs would be utilised to manage and control the potential impacts to the local ground conditions or hydrogeology arising from the two developments, during construction.

17.6.47 Therefore no significant cumulative effects on groundwater would occur during the construction of the Proposed Development.

#### ***Operational Effects***

17.6.48 With the exception of the VPI Immingham Energy Park A, there is a lack of hydrological connectivity between the schemes listed in Table 17-2 and the Site therefore the potential for cumulative effects on groundwater is limited. Both the Proposed Development and the VPI Immingham Energy Park A will incorporate suitable impermeable site surfacing, surface water design and management and appropriate bunding in accordance with the requirements of the respective environmental permits in order avoid direct discharges to the land beneath either site.

17.6.49 Therefore it is considered that no significant cumulative effects on groundwater would occur from operation of the Proposed Development.

### **Cultural Heritage**

#### ***Construction Effects***

17.6.50 The potential impacts to archaeology as a result of construction of the Proposed Development could only occur within the area used for the construction works (i.e

the red line boundary). No cumulative effects to archaeology from other developments are therefore considered possible.

### Operational Effects

17.6.51 The presence of the Proposed Development would increase the number of built structures which are similar in scale and form to existing structures in the area. It is not anticipated that the operation and maintenance of the Proposed Development will result in any adverse effect on cultural heritage assets.

17.6.52 Therefore it is considered that no cumulative effects on cultural heritage assets would occur from operation of the Proposed Development.

### Traffic and Transportation

#### Construction Effects

17.6.53 The proposed Marsh Lane Car Storage is on the east side of Rosper Road close to the site. If consented, this development is forecast to be operational by 2021 and access will be taken from an improved Marsh Lane. As part of the development proposals the Marsh Lane / Rosper Road will be improved to provide a dedicated ghost island right turning lane for vehicles turning right into Marsh Lane from Rosper Road. The forecast traffic flows associated with this car storage development were included in the development's ES Report and are summarised below in Table 17.5.

**Table 17.5: Committed Development Traffic Flows – Car Storage**

Link	Development Traffic (Total Vehicles)	Development Traffic (HGV)
Rosper Road (North of Marsh Lane)	1400	0
Rosper Road (South of Marsh Lane)	1710	50

17.6.54 Using the base AAWT traffic flows given in the Baseline data above, with growth factors applied to 2021 and with committed development flows added on, the percentage traffic impact on the surrounding roads as a result of the Proposed Development construction traffic is shown below in Table 17.6.

**Table 17.6: Percentage Impact due to Additional Construction Traffic**

Link description	2021 Flows + Committed Developments (AAWT Traffic)	2021 Flows + Committed Developments + Temporary Proposed Development Construction Traffic (AAWT Traffic)	Difference	% Impact Total vehicles
Rosper Road North of Marsh Lane	7,926	8,122	196	2.5%
Rosper Road South of Marsh Lane	8,391	8,587	196	2.3%
Marsh Road	1,940	1,940	0	0.0%
A160 just West of Manby Roundabout	13,286	13,378	92	0.7%

Link description	2021 Flows + Committed Developments (AAWT Traffic)	2021 Flows + Committed Developments + Temporary Proposed Development Construction Traffic (AAWT Traffic)	Difference	% Impact Total vehicles
A180 - west of A160 Interchange	37,796	37,888	92	0.2%
Manby Road - East of Manby Roundabout	11,164	11,267	103	0.9%

17.6.55 The table above shows that the percentage increase in traffic resulting from the temporary construction traffic would be below 5% on all links. This is well below the thresholds for significant impact detailed in Section 7.3 above.

17.6.56 There is also a North Killingholme Power Project proposed by C.GEN Killingholme Ltd which is located further north on Rosper Road. From information provided in the Environmental Statement and Transport Assessment reports, the worst case scenario for the peak of construction (Scenario C) would result in the following additional traffic flows.

**Table 17.7: Committed Development Traffic Flows – North Killingholme Power Project**

Link	Development Traffic (2-way Total Vehicles)	Development Traffic (2-way HGVs)
Additional traffic flows from C.Gen	2720	1000 (37%)

17.6.57 Distributing the above traffic in the same way as stated in the supporting ES and TA Report, the resulting cumulative traffic flows with both of the above committed developments included would be as shown in Table 17.8 below.

**Table 17.8 Percentage Impact on surrounding roads due to additional construction traffic (all 2-way flows – AAWT and daily HGV)**

Link description	2021 with all comm. AAWT Traffic	2021 with all comm. HGVs	2021 + comm. + CCGT Const. Traffic AAWT	2021 + comm. + CCGT Const. Traffic HGV	Diff. Total Veh.	% Impact Total vehs.	Diff HGV	% Impact HGV
Rosper Road North of Marsh Lane	10,646	3,004	10,842	3,056	196	1.8%	52	1.7%
Rosper Road South of Marsh Lane	11,111	3,060	11,307	3,112	196	1.8%	52	1.7%
Marsh Lane	1,940	59	1,940	59	0	0.0%	0	0.0%
A160 just West of Manby Roundabout	14,921	6,490	15,013	6,522	92	0.6%	31	0.5%

Link description	2021 with all comm. AAWT Traffic	2021 with all comm. HGVs	2021 + comm. + CCGT Const. Traffic AAWT	2021 + comm. + CCGT Const. Traffic HGV	Diff. Total Veh.	% Impact Total vehs.	Diff HGV	% Impact HGV
A180 - west of A160 Interchange	39,431	12,533	39,523	12,564	92	0.2%	31	0.2%
Manby Road - SE of Manby Roundabout	12,249	2,979	12,352	3,000	103	0.8%	21	0.7%

17.6.58 The committed developments add significant traffic to Rosper Road. As shown in Table 17.8 above the forecast 2021 daily flow with all committed developments is 11,111 total vehicles with 3,060 HGVs (28%). This compares with current 2018 flows of around 6,200.

17.6.59 Typical capacities for a variety of road types are provided within the Dft's Technical Advice Note (TA) 79/99 "Determination of Urban Road Capacity" (Ref 17-2). The assumed capacities, which are quoted in the TA as one-way flows, are typically between 1,110 to 1,470 vehicles per hour in each direction (depending on road width and road type). This is equivalent to between 1850 and 2450 vehicles two-way per hour based on the 60/40 directional split used in TA 79/99. Scaling this up for 12 hours per working day in two directions for single carriageway roads gives a theoretical range of between 22,200 and 29,400 vehicles for single carriageway roads.

17.6.60 For dual carriageways (i.e. the A160 and A180) the road class is slightly higher due to less side roads, no waiting or parking etc and the capacities are correspondingly higher. The hourly capacity in TA 79/99 for the A160 and A180 would be around 3,600 vehicles per hour in each direction which is equivalent to 7,200 veh/hr two-way. The corresponding theoretical 12-hour two-way capacity is therefore around 86,400 vehicles.

17.6.61 By comparing the forecast daily flows in columns 2 and 4 of Table 7.14 with the capacity limits indicated above, it is apparent that the roads within the vicinity of the Site would still be operating below the TA79/99 capacity limits, even at peak times.

17.6.62 Given that the committed developments are now consented, the forecast baseline flows with committed developments have been accepted by the highway authorities. The resulting percentage traffic impacts resulting from the Proposed Development construction traffic are therefore further reduced after adding these committed developments, becoming less than 2% on all links which remains negligible. Therefore no significant cumulative effects are predicted for traffic.

### Landscape and Visual Amenity

17.6.63 The potential landscape impacts of the Proposed Development relate to the loss of existing landscape features and the visibility of new landscape features (temporary and permanent). The topography of the land within the zone of influence is a

considerable factor in defining the character of the area with the relatively flat landscape enabling wide, open and often long distance views.

17.6.64 However, as assessed in Chapter 10 of this PEI Report, the magnitude of the effects on the local landscape from the Proposed Development is 'very low' due to the industrial nature of the local landscape and that the Proposed Development is of a similarly industrial nature. The significance of all the potential effects is expected to be negligible.

17.6.65 Similarly, the low/ very low visual effects assessed for views of the Proposed Development from indicative viewpoints will be minor/ negligible.

17.6.66 Therefore, whilst a cumulative effect may be possible for any of the other developments identified in Table 17.3, this will be subject to the location and direction of the receptor in relation to these developments. Nevertheless, the contribution of the Proposed Development to any cumulative effect will be negligible and thus not significant.

## **17.7 Combined Effects Assessment**

17.7.1 Combined effects may arise where several different effects resulting from the construction works or operation of the Proposed Development, which might in themselves be non-significant, together have the potential to affect a receptor significantly. In practice these combined effects do not normally occur during the operational phase when the potential effects on amenity such as construction traffic, construction noise and dust from the construction works are no longer a factor.

17.7.2 The potential environmental aspects that are considered to have the potential to result in combined effects, and thus considered within the combined effects assessment are:

- Air quality;
- Traffic and transport;
- Noise and vibration; and
- Landscape and Visual.

17.7.3 Combined effects from the Proposed Development can only occur where there are receptors that are sensitive to changes in more than one of the above environmental aspects. Therefore, the combined effects assessment has reviewed each of the relevant chapters in this PEI Report in order to determine common receptors.

### **Identification of Receptors with potential for Combined Effects**

#### ***Air Quality***

17.7.4 For both human health and ecological receptors, Chapter 6 of this PEI Report predicts that the magnitudes of the potential impacts from operation of the Proposed Development are considered to be 'imperceptible'. Therefore, it is considered that

the potential impacts to air quality resulting from operation of the Proposed Development will not contribute to any combined effect.

- 17.7.5 Only one human health receptor (R1, Hazeldene) lies within the potential zone of influence for air quality impacts arising for construction. No ecological receptors are within the potential zone of influence.

#### **Traffic and Transport**

- 17.7.6 Chapter 7 of this PEI Report indicates that where the anticipated change traffic volume as the result of a development would result in an increase of less than 30% of either the total traffic and/or HGV traffic, then the magnitude of that change can be considered to be negligible. The Chapter continues that this assessment also includes effects on severance, amenity, fear and intimidation, accidents and safety and driver delay.

- 17.7.7 Table 7.12 in Chapter 7 provides details of the potential changes to total traffic and HGV volumes as a result of the construction of the Proposed Development. The anticipated changes would be less than 5% on all road links assessed. This level of change is significantly less than the threshold above which impacts may be considered more than negligible. Therefore, it is considered that the potential traffic and transport impacts during the construction of the Proposed Development will not contribute to any combined effect.

#### **Noise and vibration**

- 17.7.8 Chapter 8 of this PEI Report states: *“It has been agreed in consultation with NLC that there is only one [noise sensitive receptor] with the potential to be significantly impacted by the Proposed Development.”*

- 17.7.9 This receptor is NSR1, Hazeldene, therefore there is the potential for combined effects between the process contributions to air quality and the sound levels experienced at this location. This combined effect would only occur during construction, given that the air quality impact from the operation of the Proposed Development would be imperceptible.

#### **Landscape and Visual**

- 17.7.10 There are eight representative viewpoints identified within Chapter 10 of this PEI Report, as shown in Figure 10.4. Of these eight, only one (Viewpoint 2, PRoW 50) is considered to have the potential for significant cumulative effects, based on the discussions above regarding receptors for other impacts.

- 17.7.11 As assessed in Chapter 10 of this PEI Report, the magnitude of the effects on the local landscape from the Proposed Development is ‘very low’ due to the industrial nature of the local landscape and that the Proposed Development is of a similarly industrial nature. The significance of all the potential effects is expected to be negligible.

- 17.7.12 It is therefore considered that the potential landscape and visual impacts will not contribute to any combined effect.

### **Combined Effects**

- 17.7.13 The receptors considered for potential combined effects assessment are shown in Figure 6.1 (human health) and Figure Whilst there is considered the potential for combined effects to impact a single receptor, Hazel Dene (R1 under Chapter 7: Air Quality, NSR 1 under Chapter 8: Noise and Vibration and VP2 under Chapter 10: Landscape and Visual), each of the relevant assessments have not identified a significant impact at this receptor.
- 17.7.14 Therefore, potential combined effect at this location is considered to be not significant.

### **17.8 Conclusions**

- 17.8.1 The assessment of cumulative impacts has considered a number of other developments within the vicinity of the Site and the potential for cumulative impacts to arise from one or several of the other developments together with the Proposed Development.
- 17.8.2 Cumulative impacts with existing developments have been accounted for through establishing the current baseline for each technical assessment (presented in Chapters 6 to 16).
- 17.8.3 All assessment topics have concluded that there is no potential for significant cumulative effects to arise from the construction or operation phases of the Proposed Development when considered alongside other developments proposed within the vicinity of the Site.
- 17.8.4 The assessment of combined effects has not identified any significant combined effects.

### **17.9 Limitations**

- 17.9.1 Any limitations that were encountered during the individual assessment area detailed within Chapters 6 to 16.
- 17.9.2 As consultation with the local planning authorities progresses, a definitive list of projects to be considered by the cumulative impact assessment for the Proposed Development will be agreed. This list will form the basis of the final cumulative impact assessment that will be reported in the ES for the Proposed Development that will submitted as part of the DCO application.
- 17.9.3 The assessment of potential cumulative impacts presented in this Chapter, and as developed in preparation of the ES, has been/ will be based on information published by the respective developers either as part of the respect applications for consent/permission or other publicly available sources, such as project websites.

### **17.10 References**

- Ref 17-1 Planning Inspectorate (2015) Advice Note 17 Cumulative effects assessment relevant to nationally significant infrastructure projects.

Ref 17-2 Highways England (1999) Design Manual for Roads and Bridges Volume 5  
Assessment and Preparation of Road Schemes Section 1: Preparation and  
Implementation. TA 79/99 Amendment No 1 Traffic Capacity of Urban Roads