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23.0 CUMULATIVE AND COMBINED EFFECTS

23.1 Introduction

23.1.1 This chapter reports the findings of an assessment of the potential for combined and cumulative effects to occur as a result of the Proposed Development.

23.1.2 The assessment presented in this chapter draws on the findings of the assessments reported in Chapters 8 to 22 of the Environmental Statement (ES) ~~(ES Volume I, EN070009/APP/6.2),~~[APP-060 to APP-075], and information in the public domain relating to other known developments within the Study Area or Zone of Influence (ZoI).

23.1.3 The cumulative effects assessment does not consider other developments that are already constructed and operational, as all existing developments are already accounted for in the baseline conditions ~~established for~~ within the ~~main~~ assessments ~~within~~reported in Chapters 8 to 22 ~~(ES Volume I, EN070009/~~[APP~~/6.2).~~ 060 to APP-075].

23.1.4 This is a revised version of the Cumulative and Combined Effects Assessment (Original Cumulative and Combined Effects Assessment is [APP-076]), submitted to the Planning Inspectorate at Deadline 5 of the Examination. This document and its appendices have accordingly been updated by the Applicant to:

- make corrections and clarifications contained in the Errata Report [PDA-021];
- consider changes to the status of planning applications for the Other Developments and account for additional Other Developments that have been identified between 1 November 2023 and 18 September 2024; and
- consider and assess changes to the Proposed Development identified in the Change Application Report [CR1-044] and in response to Relevant Representations (RR) and Written Questions (WQ) [REP2-026].

23.1.5 The Relevant Representations and WQs [REP2-026] that have been addressed as part of this updated Cumulative and Combined Effects Assessment are in Table 23-1 as follows:

Table 23-1: Written Questions / Relevant Representations applicable to the Deadline 5 update

REFERENCE	QUESTION	RESPONSE	UPDATE
Q1.8.2	For ease of reference, please add a table insert to Figure 23-2 which shows information already included in Appendix 23A to detail the other developments highlighted on that plan. The table column headings requested are ID; Planning Authority; Applicant and Scheme Title; Timescale Summary; and Status.	The Applicant is currently preparing an updated Cumulative and Combined Effects Assessment. The Applicant has not been able to update Figure 23-2 [APP-181] in the timeframe as requested. The update would require a table showing information for the 235 sites listed in Appendix 23A, which will not be able to be shown on one figure. Furthermore, the updates to the Cumulative and Combined Effects Assessment (which are explained in the response to FWQ 1.8.3 below), will result in additional sites to be shown on an amended Figure 23-2 [APP-181]. The Applicant proposes to submit all updates to Figure 23-2 [APP-181] at Deadline 5. The Applicant notes that to meet this request it would be necessary to split Figure 23-2 into approximately 24 sheets to allow an insert table on each with the requested information. The Applicant can do this for Deadline 5 if this is considered agreeable by the ExA, but would be grateful for confirmation that this approach is still wanted, in light of that context as it will take some preparation to complete.	An updated Figure 23-2 is provided along with this updated Cumulative and Combined Effects Assessment (ES Volume II, EN070009/APP/6.3).
Q1.8.3	Paragraph 23.3.19 of ES Chapter 23 (Cumulative and Combined Effects) [APP-076] states that the long list of developments was updated up to a cut-off point of 1 November 2023. It does not state whether the Applicant proposes to keep the list under review during the Examination. Bearing the above in mind, please explain the steps that it will take to keep information about other developments used in the cumulative effects assessment (ES Chapter 23 [APP-076]) under review, including how any changes would be addressed and reported to the examination.	A re-review of all Other Developments currently captured within the Long List present in Appendix 23A [APP-221] to account for any updates to the status of the respective planning applications is also being conducted as part of this update. This will be reported to the Examination in the format of an updated Chapter 23 and its relevant figures and appendices, thus superseding the versions that were submitted with the DCO Application [APP-076] [APP-180 to APP-182] [APP-221 to APP-225]. The updated Assessment will also account for the changes set out in the Change Notification, if accepted into Examination by the Inspectorate.	This updated Cumulative and Combined Effects Assessment accounts for developments submitted after 01/11/2023 up to 18/09/2024 and assesses them in the context of the Proposed Development (including accounting for the changes set out in the Changes Application Report [CR1-044] as they were accepted into Examination by the Inspectorate.

REFERENCE	QUESTION	RESPONSE	UPDATE
Q1.8.4	Please provide an updated cumulative effects assessment that considers the proposed Teesside Flexible Regas Port national significant infrastructure project, for which a Scoping Opinion was adopted in April 2024 and which is located within the Applicant's zone of influence for cumulative effects (as set out in Table 23-1 of ES Chapter 23 (Cumulative and Combined Effects) [APP-076].	The Applicant can confirm that the proposed Teesside Flexible Regas Port will be included within the updated Cumulative and Combined Effects Assessment, anticipated to be submitted into the Examination at Deadline 5.	This has fallen in scope due to the updated window of assessments. This is Development ID 236. Please refer to Appendix 23A and Appendix 23B for further information on its specific assessment.
NE10	The revised HRA concludes that there would be no Likely Significant Impacts from construction traffic on the integrity of the SPA, as the qualifying features (defined as known bird nesting locations) are further than 200m from the roads used by construction (and indeed operational) traffic (para 4.2.89 and Annex G of the revised HRA). Para 4.2.89 also indicates that other construction plant (identified in para 4.2.86) would not be within 200m of avocet or tern nesting sites. It is unclear why the supporting habitat of the qualifying bird species within the SPA is excluded at the screening stage of the construction assessment, as the boundary of the SPA is within 200m. It is also unclear why only nesting sites are considered relevant, and not areas used for feeding, for example. The Conservation Objective for the SPA includes the objective "to maintain or restore the structure and function of the habitats of the qualifying features". This should therefore be considered to be integral to the designation, or evidence provided (within the appropriate assessment) as to why there is no potential for this area and the habitat there to be used (for any purpose) by the qualifying birds. It is most	As a reminder (and as explained in the HRA and cited on APIS for Teesmouth & Cleveland Coast SPA), the only SPA bird species sensitive to air quality impacts on their habitat are the nesting terns and avocet. Away from their nesting habitat, the only habitat either species particularly relies on during the nesting season is their foraging habitat. In both cases the supporting foraging habitat is open water. In the case of terns, they fish by plunge diving into the water column. There is no evidence on APIS or elsewhere that fish populations in the open sea or tidal river water column are sensitive to atmospheric nitrogen deposition, and there are no critical loads/levels available for this habitat. Avocet also forage in open water, by 'scything' their bills from side to side in shallow water to catch small prey (aquatic insects and small crustaceans). APIS indicates that nitrogen deposition may be positive for foraging avocets by increasing prey abundance. This is the reason the assessment of air quality impacts on the SPA/Ramsar for both construction and operation focusses on nesting habitat for these two species. Air quality impacts during construction are controlled in the Framework CEMP (5.12), and include good practice to minimise vehicle and plant idling. This is discussed further in the update to the HRA also submitted at Deadline 5.	The assessment of combined impacts from both peak construction and operational emissions (Phases 1 and 2) had been carried out in the Original ES to confirm no significant effects would occur during any overlap in activities. Note that this is overly conservative as only one phase would be operational and the other in construction, leading to less emissions from both operations and traffic. This assessment has been updated to include ammonia from traffic and stacks and is presented in Section 4.2 of the Technical Note: Updates to Air Quality and Traffic Cumulative Assessments (6.4.42) completed as part of this Cumulative and Combined Effects Assessment Update.

REFERENCE	QUESTION	RESPONSE	UPDATE
	precautionary to assume at the LSE/ screening stage that the qualifying feature is located at the boundary of the site – or could be – and evidence as to why this is not feasible provided in the appropriate assessment. This is especially the case for mobile species such as birds which are not restricted to only known current nest sites. A justification of the inappropriateness of the slag-based dunes nearest to the operational emissions for nesting is undertaken at (for example) section 6.6.5 in the appropriate assessment for operational stack emissions only. This has not included consideration of impacts from the roads/ construction emissions, however, which would be expected to affect a different part of the SPA. As emissions from the roads are not included as a potential source in the assessment, there therefore appears to have been no assessment of ammonia emissions from the roads, as indicated would be carried out in the previous response (road emissions are excluded from the operational assessment - para 4.3.7 – and therefore the operational in combination assessment). As the boundary of the SPA is within 200m of the road, and the conservation objective covers supporting habitat of the qualifying birds, ammonia (and other roadside emissions) should be considered. We recommend that the updated modelling also reflects worst-case ammonia contributions to nitrogen deposition, ensuring any cumulative impacts are fully accounted for.	It has been agreed with Natural England in a meeting on 28th November to screen in construction period air quality impacts for appropriate assessment, and to then provide the rationale for no adverse effect on integrity as above. This has been done in the D5 HRA. APIS explicitly states on the Site Relevant Critical Load app that none of the SPA birds are sensitive to ammonia, by which it means the ability of their habitats to support the SPA birds will not be affected. APIS also has columns to list if lichens or bryophytes are integral to any feature for which a site is designated, and for the SPA these are blank; for the SSSI they are either blank or it says 'no'. Nowhere does APIS indicate that lower plants are integral to the interest features of either the SPA or the SSSI. This is therefore the justification for using the higher critical level of 3µg/m3. The Applicant has added this explanation to the Deadline 5 version of the HRA.	

REFERENCE	QUESTION	RESPONSE	UPDATE
	Justification for use of the 3µg/m3 critical level for ammonia for the operational assessment is not provided. The SSSI citation indicates there is a mosaic of habitats within the boundary of the SSSI (underpinning the SPA), and bryophytes may be integral to some of these habitats – the citation refers to mosses in some of the wetter dune slacks, for example – which may be considered to be integral to that habitat. Further consideration of the affected habitat types and key species/ ecosystems within them should be made before assigning the "higher plant" critical level. We note the consideration of acid deposition in the assessment and accept that this would not have an adverse impact on integrity on the identified protected sites. As well as the SPA – consideration of the impact on the SSSI should be considered. It is unclear if the main EIA has been amended with the revised modelling results.		
NE14	Para 8.3.33 in the Air Quality Chapter [APP-060] indicates that potential cumulative traffic emissions from the construction of the Proposed Development as well as the contribution from traffic associated with other committed schemes in the area, is reflected in the 2026 scenario. Further information about the traffic model should be provided – for example whether it includes allocations in the Local Plan and is therefore a worst case. It is not clear what search terms were used in establishing the long list of other plans/ projects included in Chapter 23 [APP-076] (e.g. para 23.3.14) - for example, no agricultural	The report to inform HRA has been amended as part of the Change Application [CR1-024]. Noting NE have no further comments specific to this, the Applicant does raise to NE that an updated In-Combination Assessment is submitted at Deadline 5.	Additional developments have been considered both for the construction and operational phases. Details of which developments are considered within the construction traffic assessment can be found in the Section 3.3 of the Technical Note: Updates to Air Quality and Traffic Cumulative Assessments (6.4.42) completed as part of this Cumulative and Combined Effects Assessment Update. Details of which developments are considered within the operational phase

REFERENCE	QUESTION	RESPONSE	UPDATE
	developments appear to have been listed in Appendix 23A [APP-221] which could have a local impact on Ndep or ammonia concentrations. The approach to identifying in-combination projects relevant to the HRA is also unclear. For example, it seems the in-combination assessment for traffic includes only other vehicle emissions, and not emissions from the (point) sources outlined in Chapter 23 of the ES [APP-076]. In addition, some projects are not included in the in-combination assessment in the HRA (Table 5.1) as their individual assessments did not highlight significant impacts at European sites. However, at screening the requirement is to assess whether several non-significant impacts could add up to a significant one.		assessment can be found in the Section 6.7 of the Technical Note: Updates to Air Quality and Traffic Cumulative Assessments (6.4.42) completed as part of this Cumulative and Combined Effects Assessment Update.

23.1.6 The updated Cumulative and Combined Effects Assessment in response to WQ 1.8.3 has led to Appendices 23A, 23B, 23C, 23D, and 23E (ES Volume III, EN070009/APP/6.4) being updated to account for additional Other Developments being added to the longlist and shortlist as well as updates to the status of already captured Other Developments.

23.1.7 In addition to the amendments made in response to the WQs, Figure 23-3 (ES Volume II, EN070009/APP/6.3) has been updated to show the additions to the shortlist (Appendix 23C (ES Volume III, EN070009/APP/6.4)). Sheets 1 of Figure 23-3 remains as it was in the Original ES's Figure 23-3 [APP-182] however Sheets 2 and 3 have been updated to include the additions to the shortlist.

23.2 Legislation, Planning Policy Context and Other Guidance

23.2.1 Due to the potential for cumulative and combined effects to occur as a result of the construction and operation (including maintenance) of the Proposed Development, a cumulative effects assessment has been undertaken as part of the Environmental Impact Assessment (EIA) in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA Regulations') (HM Government, 2017), as amended (including as amended by the Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018 (SI 2018/1232)) (HM Government, 2018), and the assessment requirements of the Overarching National Policy Statement (NPS) for Energy (EN-1) (Department for Energy Security and Net Zero (DESNZ), 2023).

23.2.2 The requirement for cumulative and combined effects assessments is stated in the relevant European Directive and domestic legislation / policy, as follows:

- Schedule 4 Paragraph 5 of the EIA Regulations (HM Government, 2017) requires: "A description of the likely significant effects of the development on the environment resulting from, inter alia […] (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources."
- It goes on to say that this description of likely significant effects "should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development."

23.3 Assessment Methodology and Significance Criteria

23.3.1 The assessment reported within this chapter considers two forms of potential impact, comprising ~~either~~:

- impacts which, in combination with impacts associated with other developments, are likely to result in an effect of greater significance, or a new or different likely significant effect, than the Proposed Development in isolation (hereafter referred to as 'cumulative effects'); ~~or~~and
- combinations of impacts resulting from the construction or operation of the Proposed Development which have been identified as part of the assessments reported within Chapters 8 to 22 ~~(ES Volume I, EN070009/APP/6.2),~~[APP-060 to APP-075], which are considered likely to result in a new or different likely significant effect, or an effect of greater significance, than any one of the impacts on their own (hereafter referred to as 'combined effects').

Assessment of Cumulative Effects

23.3.2 The assessment of cumulative effects considers the effects on environmental resources and receptors that will likely occur from the changes arising from the

Proposed Development in conjunction with those associated with other planned developments (hereafter referred to as 'other developments').

23.3.3 The cumulative effects assessment is primarily based upon guidance contained within the Planning Inspectorate's ~~(The Inspectorate's) ''~~Nationally Significant Infrastructure Projects: Advice on Cumulative Effects ~~Assessment – Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects' (The~~Assessment' (The Planning Inspectorate, ~~2019a),~~2024a)[1], which provides advice on the identification and assessment of other developments.

23.3.4 The four-stage approach set out in the Advice ~~Note Seventeen~~on Cumulative Effects Assessment (The Planning Inspectorate, ~~2019a~~2024a) was adopted for the assessment of cumulative effects:

- ~~stage~~Stage 1: Establishing the long list of 'other existing development and/or approved development';
- ~~stage~~Stage 2: Establishing a shortlist of 'other existing development and/or approved development';
- ~~stage~~Stage 3: Information gathering; and
- ~~stage~~Stage 4: Assessment.

23.3.5 Further details of how the four-stage approach was implemented are provided in the following sub-~~section~~sections.

Establishing the Long List of Other Developments

23.3.6 The first stage of the assessment of cumulative effects was guided by the following principles:

- understanding the limits of the effects associated with the Proposed Development and those of other developments;
- the sensitivity, value or importance of environmental resources or receptors, and their susceptibility to effects;
- whether different types of effect will occur and interact in a way that alters their significance;
- whether effects will be temporary or permanent in duration, what their timescales will be, and whether such effects will be intermittent or constant; and
- the degree of certainty and confidence relating to the effects.

23.3.7 Given the scope and scale of the works associated with the Proposed Development, the Stage 1 activities focussed on establishing the Proposed Development's likely

[1] The Inspectorate's 'Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment' (2024a) is an updated version of the previously named 'Advice Note Seventeen: Cumulative Effects Assessment' (2019). There is nothing substantially different in terms of Cumulative Effects Assessment requirements however this distinction is noted here for the benefit of the reader.

ZoI associated with each of the environmental topic areas ~~being~~ assessed within the EIA.

23.3.8 Table 23-~~1~~2 presents the ZoI identified within each environmental topic (considering only those topics scoped into this assessment as discussed in Section 23.5).

Table 23-2: Summary of Indicative Zones of Influence

ENVIRONMENTAL TOPIC ~~(ES VOLUME I, EN070009/~~[APP-060 TO APP~~/6.2)~~-075]	ZOI APPLIED TO THE ASSESSMENT OF CUMULATIVE EFFECTS
Chapter 8: Air Quality	**Construction**: 350 m ZoI from the Proposed Development Site boundary and 500 m for site entrances. Construction impacts will be due to construction dust and emissions dispersion from construction activities, which may affect human receptors up to approximately 350 m from the construction activities and 50 m for ecological receptors. At site entrances the ZoI increases to 500 m for both human and ecological receptors due to greater 'track out' of dust e.g. on vehicle wheels. **Operation**: 15 km from the Main Site for international and national designated ecological sites; 2 km from the Main Site for human receptors and all other ecological receptors. **Traffic-related air quality**: 200 m from affected roads[2]. As the construction phase traffic data includes traffic associated with other developments, the air quality impacts assessment of traffic-related construction impacts reported in Chapter 8: Air Quality ~~(ES Volume I, EN070009/APP/6.2)~~[APP-060] is inherently cumulative. There is therefore no separate assessment of cumulative air quality construction traffic-related impacts included in this ES. Refer to Chapter 8: Air Quality ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-060] for more information.
Chapter 9: Surface Water, Flood Risk and Water Resources	**Construction and Operation**: 1 km ZoI from the Proposed Development Site boundary to identify surface water features that could reasonably be affected by the Proposed Development and other developments. However, since watercourses flow and water quality impacts may propagate downstream, where relevant, the assessment also considers a wider study area based on professional judgement.

[2] Affected roads are roads which are predicted by the traffic model to exceed threshold increases in traffic flows and where receptors have been identified that would be affected by the increases, refer to Chapter 15: Traffic and Transport (ES Volume I, EN070009/APP/6.2) for further information.

ENVIRONMENTAL TOPIC ~~(ES VOLUME I, EN070009/~~[APP-060 TO APP~~/6.2) 075~~]	ZOI APPLIED TO THE ASSESSMENT OF CUMULATIVE EFFECTS
	Refer to Chapter 9: Surface Water, Flood Risk and Water Resources ~~(ES Volume I, EN070009/~~[APP~~/6.2) 061~~] for more information.
Chapter 10: Geology, Hydrogeology and Contaminated Land	**Construction and Operation**: 1 km ZoI from the Proposed Development Site boundary, for both construction and operational effects upon geology and soils. Refer to Chapter 10: Geology, Hydrogeology and Contaminated Land ~~(ES Volume I, EN070009/~~[APP~~/6.2) 062~~] for more information.
Chapter 11: Noise and Vibration	**Construction Vibration**: 100 m ZoI from the Proposed Development Site boundary. **Construction Noise**: 2 km ZoI from the Main Site and 800 m from the Proposed Development Site boundary where this extends beyond the 2 km ZoI from the Main Site. **Operational Noise**: 2 km ZoI from the Main Site. **Traffic-related noise**: 600 m ZoI from the traffic links identified within the Traffic and Transport assessment study area (Chapter 15: Traffic and Transportation ~~(ES Volume I, EN070009/APP/6.2)).~~[APP-068]. Refer to Chapter 11: Noise and Vibration ~~(ES Volume I, EN070009/~~[APP~~/6.2) 063~~] for more information.
Chapter 12: Ecology and Nature Conservation (incl. Aquatic Ecology	**Construction and Operation**: 15 km ZoI from the Proposed Development Site boundary for international and national nature conservation designations. **Construction and Operation**: 2 km ZoI from the Proposed Development Site boundary for all other ecology effects. Refer to Chapter 12: Ecology and Nature Conservation ~~(ES Volume I, EN070009/~~[APP~~/6.2) 064~~] for more information.
Chapter 13: Ornithology	**Construction and Operation**: 15 km ZoI from the Proposed Development Site boundary for international and national nature conservation designations. **Construction and Operation**: 2 km ZoI from the Proposed Development Site boundary for all other ornithology effects. Refer to Chapter 13: Ornithology ~~(ES Volume I, EN070009/~~[APP~~/6.2) 065~~] for more information.

ENVIRONMENTAL TOPIC ~~(ES VOLUME I, EN070009/~~[APP-060 TO APP~~/6.2) -~~075]	ZOI APPLIED TO THE ASSESSMENT OF CUMULATIVE EFFECTS
Chapter 14: Marine Ecology and Nature Conservation	**Construction and Operation**: 10 km ZoI from the Proposed Development Site boundary for all construction and operational effects on all designated marine ecology and nature conservation areas. Refer to Chapter 14: Marine Ecology and Nature Conservation ~~(ES Volume I, EN070009/~~[APP~~/6.2) -~~067] for more information.
Chapter 16: Landscape and Visual Amenity	**Construction and Operation**: 10 km from the Main Site and 2 km from the Proposed Development Site boundary where that extends beyond 10 km from the Main Site. Refer to Chapter 16: Landscape and Visual Amenity ~~(ES Volume I, EN070009/~~[APP~~/6.2) -~~069] for more information.
Chapter 17: Cultural Heritage	**Construction and Operation**: (designated assets): 5 km ZoI from the Proposed Development Site boundary. **Construction and Operation**: (non-designated assets): 1 km ZoI from the Proposed Development Site boundary. Refer to Chapter 17: Cultural Heritage ~~(ES Volume I, EN070009/~~[APP~~/6.2) -~~070] for more information.
Chapter 18: Socio-Economics and Land Use	**Construction and Operation**: ~~includes~~Includes the Middlesbrough and Stockton Travel To Work Area (TTWA). Refer to Chapter 18: Socio-Economics and Land Use ~~(ES Volume I, EN070009/~~[APP~~/6.2) -~~071] for more information.
Chapter 24: Human Health	**Construction and Operation**: The ZoI for each determinant is reflective of the ZoI set out in the respective discipline from which the assessment classification is derived. Refer to Chapter 8: Air Quality, Chapter 11: Noise and Vibration, Chapter 15: Traffic and Transport, Chapter 18: Socio-Economics, Chapter 19: Climate Change, and Chapter 20: Major Accidents and Disasters ~~(ES Volume I, EN070009/~~[APP~~/6.2 -~~060, -063 -068, -071, -072, -073]) for more information.

23.3.9 The Traffic and Transportation assessment ~~(~~in Chapter 15~~: Traffic and Transportation, ES Volume I, EN070009/~~ [APP~~/6.2) -~~068] identifies the impacts of construction traffic in the year of peak construction (2026) for the Proposed Development, for the following road links:

- A1085 Trunk Road, 100 m east of Ennis Road;
- A1085 Trunk Road, 1.34 km south of West Coatham Lane;

- A1042 Kirkleatham Lane, 85 m south of Staintondale Avenue;
- A1085 Trunk Road, 500 m north of A1053 Tees Dock Road;
- A1085 Broadway, 235 m east of Birchington Avenue;
- A1380 High Street, 50 m east of Lackenby Lane;
- A66, 140 m east of Whitworth Road;
- A1046 Port Clarence Road, 20 m north of Beech Terrace;
- A178 Seaton Carew Road, 535 m north of Huntsman Drive;
- Unnamed Road, 725 m east of A178 Seaton Carew Road;
- A1053 Greystone Road, 600 m north of the A174/A1053 Greystones roundabout ~~(National Highways (NH), 2023);~~;
- A174 (West of Greystone Roundabout), located approximately 1 km west of the A174/A1053 Greystones roundabout ~~(NH, 2022);~~;
- A1046 Haverton Hill Road, approximately 800 m south of Port Clarence Street / Hope Street ~~(DfT, 2022a);~~;
- A1185 (west of A178 Seaton Carew Road), located approximately 800 m west of A178 Seaton Carew Road ~~(DfT, 2022b);~~; and
- B1275 Belasis Avenue, located approximately 1.6 km west of its junction with Cowpen Bewley Road.

23.3.10 These road links were identified based on the potential for impacts, in line with IEMA guidance~~,~~ for Environmental Assessment of Traffic and Movement (IEMA, 2023), as set out in Section 15.3 of Chapter 15: Traffic and Transportation ~~(ES Volume I, EN070009/~~[APP~~/6.2).~~-068].

23.3.11 A cumulative assessment of traffic that would be generated by ~~committed~~the shortlisted other developments as well as construction traffic from the Proposed Development has been assessed against the 2026 future baseline ~~and~~ . The 2026 future baseline based on TEMPRO growth factors does not change based on the updated Cumulative Effects Assessment. The cumulative assessment of traffic is reported within the updated Table 15-~~A~~16 to Table 15-19 and Table 15A-42 to Table 15A-48 of the Transport Assessment ~~(Appendix 15A (ES Volume III, EN070009/APP/~~section of the Technical Note: Updates to Air Quality and Traffic Cumulative Assessments (6.4~~)~~.42) and is therefore not repeated in this chapter.

23.3.12 For those topics where cumulative effects assessment has not been undertaken, this is for the reasons set out below:

- Climate Change:
  - In line with IEMA guidance (IEMA, 2022), a cumulative assessment of a specified list of developments is not considered appropriate or meaningful

in terms of assessing the Proposed Developments impact on the receptor of the global climate.

- IEMA guidance states: "*All global cumulative GHG sources are relevant to the effect on climate change, and this should be taken into account in defining the receptor (the atmospheric concentration of GHGs) as being of 'high' sensitivity to further emissions*."
- In essence, there is no difference in the impact on the global climate of a tonne of CO_2e emitted at one location compared to the same mass of CO_2e emitted anywhere else on the planet. So, it is not meaningful to carry out a cumulative assessment of the Proposed Development alongside other developments in a geographical area, nor is such an exercise reasonably practicable due to the difficulties in accessing reliable future emissions data for other developments. This approach is supported by recent case law (Boswell v Secretary of State for Transport).
- All GHG emissions have the potential to equally impact the receptor i.e. the global climate. UK Carbon budgets, setting binding limits on the total emissions that can be emitted in the UK, are used as a proxy for the global climate for the GHG assessment and this is done within the chapter.

- Major Accidents and Disasters:
  - There is the potential for cumulative Major Accidents and Disasters (MA&Ds) effects as a result of the Proposed Development, where effects associated with it may act in conjunction with those associated with other planned projects and local plan allocations in the vicinity. In particular, cumulative effects associated with the possible construction and operation of adjacent HyGreen and Net Zero Teesside (NZT) Carbon Capture Usage and Storage (CCUS) developments is noted.
  - As such, the MA&Ds assessment has implicitly considered cumulative effects that may arise due to other major accident hazard installations and pipelines in the area (domino effects) which are knock-on impacts (e.g., fire at one installation which causes an explosion at another installation).
  - Should new developments take place near to the Proposed Development in the future (including NZT and HyGreen) these will need to be sited to prevent domino effects from occurring by following the Health and Safety Executive (HSE) standard land use planning methodology (Planning Advice for Developments near Hazardous Installations (PADHI) assessment (HSE, 2023~~).~~)). Furthermore, the Proposed Development, NZT and ~~Hygreen~~HyGreen will all go through the Control of Major Accident Hazards (COMAH) (HM Government, 2015b) and the Planning (Hazardous Substances ~~Act Regulatory~~) Regulations 2015 (HM Government, 2015c) process ~~to~~. This will ensure that the risks associated with their construction and operation are ~~limited to be~~ As Low as Reasonably Practicable (ALARP).

Those processes will consider the development and existence of each of the other developments. and existence of each of the other developments.

- Materials and Waste: ~~A detailed cumulative effects assessment has not been undertaken for materials and waste since:~~
- ~~No significant materials and waste effects during construction, operation and decommissioning have been identified.~~
  - As part of their planning function, Waste Planning Authorities (WPAs) are required to ensure that enough land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas;
  - Minerals Planning Authorities (MPAs) are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs;
  - In preparing their waste management strategies, the WPAs already take into account waste generation at the regional and sub-regional scale, since these are the figures which are then used for determining the need for waste facilities. The landfill void capacity remaining (which is used to evaluate the effects of the Proposed Development) already takes into account the cumulative effects of waste generated by other developments, and hence a separate cumulative impact assessment is not required for waste. It is therefore not necessary or feasible for each development within the region to, in effect, duplicate the function of the WPA as part of the EIA process; and
  - It is assumed that each of the cumulative developments will also be considering and implementing the ~~waste hierarchy~~Waste Hierarchy as per requirements set out in The Waste (England and Wales) Regulations 2011 (HM Government, 2011).

Search Area for Long List of Other Developments

23.3.13 In accordance with Advice ~~Note Seventeen~~on Cumulative Effects Assessment (The Planning Inspectorate, ~~2019a~~2024a), the ZoI for the long list of other developments was set at 15 km from the Proposed Development Site boundary, consistent with the largest ZoI of the individual disciplines~~.~~, being Ecology and Ornithology for international and national nature conservation designations during construction and operation, and for Air Quality for internationally and nationally designated ecological sites during operation

Local Authority and Major Infrastructure Developments Included in Long List

23.3.14 ~~For~~To identify other developments within the ZoI, the following search criteria were applied during Stage 1:

- local authority planning applications that represent 'major developments', the definitions and thresholds for which are set out in The Town and Country

Planning (Development Management Procedure) (England) Order 2015 (HM Government, 2015);

- Development Consent Order (DCO) applications for Nationally Significant Infrastructure Projects (NSIPs) in England, registered on the Register of Applications on the National Infrastructure Planning website (The Planning Inspectorate, ~~2019b~~2024b);
- any major development projects being progressed through other statutory procedures;
- allocations identified in the adopted and emerging development plans of the relevant local planning authorities (LPAs); and
- other relevant development plans and projects.

23.3.15 Certain criteria were used to screen out development of insufficient scale, or of a type which would not result in cumulative impacts with the Proposed Development, as follows:

- any planning applications older than five years at the commencement date of the study[3];
- construction of small-scale agricultural buildings (e.g. storage of livestock machinery or feed);
- house extensions or cosmetic changes to buildings;
- work to trees;
- micro-generation wind turbines;
- roof mounted solar PV panels (or ground mounted less than 50 kW output);
- renewal of planning permission of existing operational use;
- ~~variation~~variations to planning permissions, including reserved matters applications (where the original application would not have been considered within the assessment); and
- ~~Small~~small scale residential uses (specifically, less than two dwellings) or changes of ~~buildings'~~building use (unless it could itself result in a cumulative effect, such as a conversion of several barns into a holiday village).

Initial Long List of Developments

23.3.16 An initial long list of other developments ~~in~~within the ~~vicinity~~15 km ZoI of the Proposed Development was identified following a search of the relevant planning databases ~~(~~:

- Planning Inspectorate~~,~~;

[3] Certain applications older than 5 years were included where it was known that construction had not commenced, for example if reserved matters or Section 73 applications had been submitted within a recent timescale.

- Middlesbrough Council (MC~~),~~);
- Redcar and Cleveland Borough Council (RCBC~~),~~);
- Hartlepool Borough Council (HBC~~),~~);
- Stockton-on-Tees Borough Council (STBC~~),~~);
- Durham County Council (DCC~~),~~);
- Hambleton District Council (HDC, now within North Yorkshire Council~~),~~);
- Darlington Borough Council (DBC~~),~~);
- the Marine Management Organisation (MMO~~) and~~);
- the Transport and Works Act Orders list~~).~~); and
- Hybrid Bills.

~~23.3.16~~23.3.17 This initial search focused on developments within the 15 km ZoI which meet the criteria outlined above. The findings are presented in Appendix 23A: Planned Development and Development Allocations with the ZoI (ES Volume III, EN070009/APP/6.4). This preliminary search, based on information available from local authority online planning portals, was subsequently extended as further work was undertaken during the EIA process, to capture other developments within the adopted areas of search, and to ensure the most up to date information was used to inform the EIA.

~~23.3.17~~23.3.18 Based on a review of the initial long list of other developments, it was considered that potential exists for some of these to generate cumulative impacts with the Proposed Development based on their location, scale and / or their likely construction and operational timescales.

~~23.3.18~~23.3.19 During the completion of the EIA, the long list of other developments continued to be updated with additional developments or information that emerged (up until ~~a~~an initial cut-off date of 1 November 2023).

23.3.20 The initial long list of other developments has subsequently been updated to account for the following:

- development applications submitted after the initial cut-off date (1 November 2023);
- the errata review [PDA-021]; and
- updates to already accounted for development applications.

23.3.21 This updated long list has been collated based on a new cut-off date of 18 September 2024.

~~23.3.19~~23.3.22 Each development on the long list was reviewed to determine its status at the time of undertaking the updated assessment (~~November 2023~~18 September 2024) and was assigned a final status and tier, as described in Table 23-~~23~~, informed by the guidance and levels presented within the Advice ~~Note Seventeen~~on

Cumulative Effects Assessment (The Planning Inspectorate, ~~2019a~~2024a). This was also informed by feedback from the local authorities to establish the level of certainty and detail available for each development. The long list of other developments and the current tiers are presented in Table 23B-1 in Appendix 23B: Assessment of Cumulative Effects – Stages 1-~~3~~2 (ES Volume III, EN070009/APP/6.4).

Table 23-3: Assigning Certainty to 'Other Developments'

Tier 1	• Under construction	Decreasing level of information likely to be available.
	• permitted application(s), whether under the Planning Act 2008 or other regimes, but not yet implemented; • submitted application(s) whether under the Planning Act 2008 or other regimes but not yet determined;	
	• all refusals subject to appeal procedures not yet determined;	
Tier 2	• projects ~~in~~on the Planning Inspectorate's Programme of Projects ~~where a scoping report has been submitted~~;	
Tier 3	• projects in the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted;	
	• identified in the relevant development plan (and emerging Development Plans~~—~~, with appropriate weight being given as they ~~move closer to~~near adoption~~)~~, recognising that there will be limited information available on the relevant proposals;	
	• identified in other plans and programmes ~~(~~, as appropriate~~)~~, which set the framework for future developments consents ~~/~~or approvals, where such a development is likely to come forward.	

~~23.3.20~~23.3.23 With regards to other developments under construction, the Advice ~~Note Seventeen~~on Cumulative Effects Assessments states that *"Where other ~~projects~~existing and, or approved developments are expected to be ~~fully constructed and in operation~~completed before construction of the proposed NSIP [Proposed Development] and the effects ~~of those projects~~ are fully determined, effects arising from them should be considered as part of the baseline and may be considered as part of both the construction and operational assessment. If the effects of other existing and, or approved development under construction are not yet fully determined, for example the outcome of mitigation is being monitored and*

is not yet known, it may be appropriate to consider these in the CEA [Cumulative Effects Assessment]. The ES approach should clearly be agreed with the relevant consultation bodies. The Environmental Statement should distinguish between projects forming part of the dynamic baseline and those in the cumulative effects assessment." CEA." Where other developments would already be constructed and / or be in operation and have been included in the baseline for the specialist topic assessments, they are not included in the cumulative assessments reported in this chapter.

23.3.21 23.3.24 The generation of the long list of developments was also informed by consultation with relevant stakeholders and in response to the EIA Scoping Opinion (Appendix 1B: EIA Scoping Opinion, ES Volume III, EN070009/APP/6.4) [APP-185] and statutory consultation undertaken for the Proposed Development (as detailed in Table 23-4 below).

23.3.25 In gathering information to comprise the long list, if the Other Development does not provide coordinates for its location, this has been determined by an approximate centre point of the Other Development's red line boundary.

Stage 2: Establishing a Shortlist of Other Developments

23.3.22 23.3.26 This stage involved a review of the long list of other developments, to identify those to be taken forward (shortlisted) into the cumulative assessment.

23.3.23 23.3.27 Inclusion / exclusion criteria based on the temporal scope, scale and nature of the development, and other factors such as the nature of the receiving environment were used for the shortlisting process, in line with Advice Note Seventeen on Cumulative Effects Assessment (The Planning Inspectorate, 2019a 2024a). The shortlist was also informed by engagement with the LPAs and the professional judgement of the environmental specialists undertaking the EIA. Professional judgement was applied by considering the criteria together, for example the scale and nature of the development alongside the its distance from the Proposed Development.

23.3.24 23.3.28 In determining which of the developments should be shortlisted, a minimum level of environmental information is necessary. Only those developments with at least a Scoping Report, Environmental Assessment Report (EAR), Preliminary Environmental Information (PEI Report) (for Nationally Significant Infrastructure Projects) or ES available were considered for shortlisting. However, certain exceptions to this general principle were made where no Scoping Report, EAR or ES such reports were unavailable, but other focused environmental information was available, but it was considered within submitted planning applications – for example Habitats Regulations Assessments – and where a review of that there was information identified potential for significant cumulative effects to occur. This is based upon professional judgement, for example, due, or where information was provided to the close proximity of another development to the Proposed Development, or other developments being brought forward by the Applicant. through the Examination Process.

~~23.3.25~~23.3.29 Land allocations from relevant development plans on their own have not been considered as there is no certainty that developers will come forward with projects within the timescale for the delivery of these sites, and as the nature for such projects and their associated environmental effects are currently unknown.

~~23.3.26~~23.3.30 In terms of the scale and nature of ~~TCPA~~ developments advanced through the Town and Country Planning Act 1990 (HM Government, 1990) procedures, only those developments classed as major developments, as defined in The Town and Country Planning (Development Management Procedure) (England) Order 2015 (HM Government, 2015), were included.

~~23.3.27~~23.3.31 Where individual technical disciplines have scoped out assessment of developments included on the short list for the purposes of their cumulative assessment, the reasoning for this is set out in the relevant section below.

Stage 3: Gathering Information

~~23.3.28~~23.3.32 This stage involved reviewing the available information relating to the shortlisted developments to establish the details of their likely environmental effects.

~~23.3.29~~23.3.33 This considered factors including: the proposed design and location information; the ZoIs of the environmental topics assessed; the planned timescales for construction, operation and (where relevant) decommissioning; and details of their likely significant effects. Information on the shortlisted other developments has been derived from information readily available in the public domain.

~~23.3.30~~23.3.34 Information on the ~~planning~~ application details of each other development is listed in Appendix 23A (ES Volume III, EN070009/APP/6.4~~), whilst the available information collected at Stage 3 and used to inform Stage 4 of the assessment is presented in~~). Appendix ~~23D~~23C (ES Volume III, EN070009/APP/6.4~~).~~) provides an overview of whether sufficient environmental information is available to conduct the cumulative effects assessment at Stage 4, and outlines the relevant environmental topics that are considered.

Stage 4: Assessment

~~23.3.31~~23.3.35 Those other developments which met the criteria set out in the above stages were incorporated into the cumulative effects' assessment. This involved identifying where effects are likely to occur and assessing the significance of those effects on environmental receptors and resources, taking into account any mitigation measures.

~~23.3.32~~23.3.36 As noted in Table 23-~~1~~2, the assessment of traffic-related construction air quality and noise impacts reported in Chapters 8 and 11 ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~ 060 and APP-063] respectively are based on traffic data which includes traffic from other committed developments ~~and are~~; therefore these two assessments are inherently cumulative.

~~23.3.33~~23.3.37 In determining the possible significance of cumulative effects, the location and timing of the identified other developments and their associated impacts / effects have been taken into account wherever possible.

~~23.3.34~~23.3.38 Where information regarding construction and operational timescales was available, it is included in Table 23B-1 in Appendix 23B: Assessment of Cumulative Effects – Stages 1-~~3~~2 (ES Volume III, EN070009/APP/6.4). Where timescale information was not available, as a worst-case scenario, the assessments were conducted under the assumption that the construction and operational phases would overlap, though this is unlikely to be the case for all.

~~23.3.35~~23.3.39 The cumulative effects assessment only considers those receptors that would experience a residual effect associated with the Proposed Development. For receptors where the Proposed Development's residual effects are assessed to be neutral / negligible (i.e. no effect as a result of the Proposed Development), it is considered that such receptors could not experience cumulative effects. It has, however, been considered whether cumulative impacts could amplify effects that have been assessed as minor for the Proposed Development. For the purposes of ~~the assessment of~~assessing cumulative effects during construction, a worst-case year of construction has been defined by the expected peak construction year for the Proposed Development, which would be 2026. Full details of significance criteria are provided within the relevant technical topic chapters.

~~23.3.36~~23.3.40 The assessment of cumulative effects during operation considers the total effects of the Proposed Development and the other identified developments operating concurrently.

~~23.3.37~~23.3.41 As the Proposed Development has an estimated design life of 25 years (although that duration could be extended based on market conditions and condition of the plant and so the ES does not assume this period), cumulative effects during decommissioning are not considered as it is not possible to predict the developments that would be in progress at that point in time.

~~23.3.38~~23.3.42 An assessment has been undertaken in the Report to Inform Habitats Regulations Assessment (HRA) (~~EN070009/APP/~~5.10) with other projects or plans proposing development in adjacent authorities to satisfy Regulation 63(a) of the Conservation of Habitats and Species Regulations 2017. This assessment has been undertaken using the shortlisted other developments identified for the cumulative effects assessment presented in this chapter, with a further screening exercise then undertaken to determine which developments should be taken forward to Appropriate Assessment (presented in Section 6 of the Report to Inform HRA (~~EN070009/APP/~~5.10)).

Assessment of Combined Effects

~~23.3.39~~23.3.43 The Study Area for the assessment of combined effects is defined by the Study Areas ~~used~~adopted in each of the environmental topics set out in Chapters 8 to 22 of the ES ~~(ES Volume I, EN070009/~~[APP~~/6.2).~~-060 to APP-075]. The sources of data for the assessment of combined effects are the specialist

environmental assessments presented within Chapters 8 to 22 of the ES ~~(ES Volume I, EN070009/APP/6.2).~~[APP-060 to APP-075].

~~23.3.40~~23.3.44 The following environmental resources and receptor groups have been identified ~~and considered in relation to the~~ to have potential for combined effects from more than one type of impact ~~to be experienced by a single receptor~~from the Proposed Development and therefore have been considered when identifying receptors as follows:

- human receptors (residents, local community using community facilities);
- ecological receptors;
- ~~geology and soils;~~
- water bodies; and
- users and operators of local businesses and tourism amenities.

~~23.3.41~~23.3.45 The process by which resources and receptor groups have been identified for further assessment is explained ~~below~~ in Section 23.~~4~~3.46 to 23.3.49 ~~and Table 23-3~~.

~~23.3.42 Geological strata, mineral resources and soils are not considered likely to be affected by impacts other than those identified within the assessment in Chapter 10: Geology, Hydrogeology and Contaminated Land (ES Volume I, EN070009/APP/6.2) and are therefore not included within the assessment of combined effects.~~

~~23.3.43~~23.3.46 The potential interactions between individual effects have been identified by reviewing the final conclusions of the assessments presented in Chapters 8 to 22 of the ES ~~(ES Volume I, EN070009/APP/6.2).~~[APP-060 to APP-075]. Some of these chapters have already addressed interactions between different types of impact relating to specified environmental resources and receptors, as follows:

- Chapter 8: Air Quality ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-060] includes an assessment of the potential impacts of construction dust and nitrogen deposition upon ecological receptors. These have also been taken into account in the assessment of effects upon terrestrial ecology and nature conservation as reported in Chapter 12: Ecology and Nature Conservation ~~(ES Volume I, EN070009/APP/6.2).~~[APP-064].
- Chapter 9: Surface Water, Flood Risk and Water Resources ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-061] considers the potential impacts of air quality upon water quality, as well as the potential impacts of climate change upon flood risk.
- Chapter 10: Geology, Hydrogeology and Contaminated Land ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-062] considers the potential impacts of soils disturbance and mobilisation of contamination on ecological receptors.

- Chapter 12: Ecology and Nature Conservation (incl. Aquatic Ecology) and Chapter 13: Ornithology ~~(ES Volume I, EN070009/APP/6.2)~~[APP-064 and APP-065] takes into consideration the potential for air quality, dust and noise impacts and how they could (in combination with other ecological impacts, such as habitat loss) affect ecological receptors.
- Chapter 12: Ecology and Nature Conservation (incl. Aquatic Ecology) and Chapter 14: Marine Ecology ~~(EN070009/~~[APP~~/6.2)~~-064 and APP-067] each include consideration of effects on the water environment and how they could in turn affect ecological receptors.
- Chapter 17: Cultural Heritage ~~(EN070009/~~[APP~~/6.2)~~-070] includes consideration of any potential effects on the setting of heritage assets (e.g. visual and noise).
- Chapter 19: Climate Change ~~(ES Volume I, EN070009/APP/6.2)~~[APP-072] includes an In-Combination Climate Change Impact (ICCI) Assessment, which addresses the in-combination effects of a changing climate and the Proposed Development on receptors in the surrounding environment. Potential ICCIs have been assessed by technical disciplines and the findings collated within Appendix 19B: In-Combination Climate Change Impact Assessment ~~(ES Volume III, EN070009/APP/6.4).~~[APP-216].

~~23.3.44~~23.3.47 This chapter accordingly only considers impacts and effects additional ~~impacts~~ to those already identified and reported in the technical assessments. The combined effects assessment considers only those effects which could arise ~~because~~from the interaction of multiple impacts on ~~single~~ receptors or resources which have not been identified elsewhere within the EIA.

~~23.3.45~~23.3.48 As potential combined effects on ecological resources, geology and soils and waterbodies are considered in the relevant technical chapters, this assessment considers the combined effects on human receptors only. The types of impacts that could be experienced by these receptors and which may interact are considered to be noise, air quality and visual effects, during both construction and operation.

~~23.3.46~~23.3.49 The potential for interactions between the following effects have been considered:

- air quality – effects on receptors identified as being sensitive with respect to construction dust (i.e. at more than negligible risk) and receptors experiencing a minor adverse or worse effect during operation;
- noise – effects on receptors experiencing a minor adverse or worse effect during construction or operation; and
- visual effects –– effects on receptors experiencing a minor adverse or worse effect during construction.

Impact Assessment and Significance Criteria

~~23.3.47~~23.3.50 The significance of potential combined effects has been determined in accordance with the classification criteria set out in Table 23-~~3.~~4 The significance of potential cumulative effects has been determined in accordance with the criteria used within each of the individual topic assessments.

Table 23-4: Classification of Combined Effects

EFFECT CLASSIFICATION	TYPICAL DESCRIPTORS OF EFFECT
Major (adverse or beneficial)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a highly significant (beneficial or adverse) effect. Effects would be due to impacts which would be, e.g.: • widespread / large scale for a receptor of high value or vulnerability; • permanent for a receptor of high value or vulnerability; • localised for a receptor or receptors of very high value or vulnerability; or • temporary for a receptor or receptors of very high value or vulnerability.
Moderate (adverse or beneficial)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a significant (beneficial or adverse) effect. Effects would be due to impacts which would be, e.g.: • permanent for a receptor or receptors of medium value or vulnerability; • localised for a receptor or receptors of high value or vulnerability; or • temporary for a receptor or receptors of high value or vulnerability.
Minor (adverse or beneficial)	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a beneficial or adverse effect. Effects would be due to impacts which would be, e.g.: • permanent for receptors of low value or vulnerability; • localised for a receptor or receptors of medium value or vulnerability; or • temporary for a receptor or receptors of medium value or vulnerability.
Neutral/ Negligible	Where the combined effects of the Proposed Development upon an individual or collection of environmental receptors would result in a negligible and not significant (beneficial or adverse) effect.

EFFECT CLASSIFICATION	TYPICAL DESCRIPTORS OF EFFECT
(adverse or beneficial)	

~~23.3.48~~23.3.51 The significance of combined effects upon environmental receptors and resources has been determined using professional judgement, assisted by the competent experts responsible for undertaking the technical topic assessments reported in Chapters 8 to 22 of the ES ~~(ES Volume I, EN070009/APP/6.2).~~[APP-060 to APP-075].

~~23.3.49~~23.3.52 Combined and cumulative effects that are moderate, large or very large are considered to represent significant effects ~~in accordance with~~for the purposes of satisfying the requirements of the EIA Regulations.

Consultation

Scoping Opinion

~~23.3.50~~23.3.53 The list of other developments was also informed by comments received during consultation on the Scoping Report (Appendix 1A, ~~ES Volume III, EN070009/~~[APP~~/6.4).~~ 184]). An EIA Scoping Opinion was requested from the Planning Inspectorate on 6 April 2023. A response was received on 17 May 2023. For the Scoping Opinion and the Applicant's responses to them, refer to Appendix 1E ~~(ES Volume III, EN070009/APP/6.4).~~[APP-188].

Statutory Consultation

~~23.3.51~~23.3.54 The PEI Report was published for statutory consultation on 14 September 2023 and the consultation period ended on 26 October 2023. A second statutory consultation was held between 13 December 2023 and 23 January 2024, and additional targeted consultation was held between 9 February 2024 and 10 March 2024. The matters raised have been reviewed and an explanation of how the Applicant has had regard to them is set out in the Consultation Report ~~(EN070009/APP/5.1).~~[AS-015].

~~23.3.52~~23.3.55 As noted previously, LPAs were consulted on the developments included in the shortlist. LPAs were contacted in November 2023 and one response was received. A summary of this is included in Table 23-~~4~~5. The Applicant has also accounted for developments suggested by Interested Parties during Examination.

Table 23-5: Response to Other Consultation Feedback

~~C~~CONSULTEE~~CONSULTEE~~	~~D~~DATE~~DATE~~ AND METHOD OF CONSULTATION	~~S~~SUMMARY~~SUMMARY~~ OF CONSULTEE COMMENTS	~~S~~SUMMARY~~SUMMARY~~ OF RESPONSE/ HOW COMMENTS HAVE BEEN ADDRESSED
HBC Flood Risk Officer	Email – 22.01.2024	No comments were raised in respect of surface water management or contaminated land.	Noted.
HBC Ecology	Email – 22.01.2024	Three of the four developments included on the shortlist within Hartlepool are for housing developments which have potential to impact the Teesmouth and Cleveland SPA and Ramsar through increased recreational disturbance and Nutrient Neutrality via increased sewage disposal. As neither are relevant to H2Teesside it was recommended to remove these developments from the shortlist. The other development, the Greatham North East Flood Alleviation Scheme, was recommended to be HRA assessed as part of the Cumulative Effects Assessment.	Response has been noted, however as these comments were received after the assessment was undertaken, the three housing developments were included on the shortlist and were retained as part of the assessments. The Greatham North East Flood Alleviation Scheme has been considered within the ecology and ornithology assessments.

23.4 Assumptions and Limitations

Assumptions

23.4.1 The cumulative assessment is based upon currently available information regarding other developments in the vicinity of the Proposed Development Site. It has been assumed that information available for other developments is of acceptable quality and is sufficiently accurate to inform this cumulative effects assessment.

Limitations

23.4.2 Limitations relating to the individual assessments are detailed within Chapters 8 to 22 of the ES ~~(ES Volume I, EN070009/APP/6.2).~~[APP-060 to APP-075].

23.5 Cumulative Effects Assessment

23.5.1 The developments included in the shortlist and progressed to Stages 3 and 4 of the cumulative effects' assessment are listed in Appendix 23C: Shortlist of Planned Developments and Development Allocations within the ZoI (ES Volume III, EN070009/APP/6.4). Appendix 23B: Assessment of Cumulative Effects – Stages 1-~~3~~2 (ES Volume III, EN070009/APP/6.4), which is based on ~~Appendix~~Annex 1 of the Advice ~~Note Seventeen~~on Cumulative Effects Assessment (The Planning Inspectorate, ~~2019a~~2024a), provides a record of the outcomes of the Stage 1~~, 2~~ and ~~3~~2 processes and thereby provides the basis whereby the final shortlist of developments to be assessed was established.

23.5.2 All of the developments identified in Appendix 23C: Shortlist of Other Developments within the ZoI (ES Volume III, EN070009/APP/6.4) are considered to have the potential to generate significant cumulative effects when considered alongside the Proposed Development, by virtue of their nature, proximity to the Proposed Development Site and / or temporal scope (i.e. the planned timescales for construction and operation). They have therefore been progressed to Stage 4 of the cumulative effects assessment and have been assessed in relation to each environmental topic included in the ES ~~(ES Volume I, EN070009/~~[APP~~/6.2),~~ 060 to APP-075] with the exceptions of, Climate Change, Major Accidents and Disasters (MA~~ and~~ &Ds), and Materials and Waste. The locations of the shortlisted other developments in relation to the Proposed Development are shown on Figure 23-3 (ES Volume II, EN070009/APP/6.3).

23.5.3 As~~ earlier~~ stated in Section 23.3 (sub-section: Stage 2: Establishing a Shortlist of Other Developments) certain exceptions were made to the general rule of excluding developments without at least a Scoping Report, EAR, PEI Report or ES from the shortlist, those being IDs 20, 30, 41, 65, 80, 167, and 168. These were included due to their potential to generate significant effects due to their proximity to the Proposed Development and due to the scale and nature of the development. Further details about these developments are provided in Appendices 23A to 23C (ES Volume III, EN070009/APP/6.4). Where relevant, comments are provided within the sections below.

23.5.4 The results of the ~~cumulative effects assessment~~Updated Cumulative Effects Assessment (Stage 4) are presented in the following sections.

~~23.5.4~~23.5.5 Due to the differences in assessments between each environmental discipline, their assessments and results are presented in different ways. They have been structued and presented as they are in this document and Appendix 23D (ES Volume III, EN070009/APP/6.4) for the optimisation of space, and to support the readers understanding of each topic.

Air Quality Cumulative Effects

~~23.5.5~~23.5.6 There is the potential for cumulative air quality effects as a result of the Proposed Development, where effects associated with it may act in conjunction with those associated with other developments.

~~23.5.6~~23.5.7 For the construction phase, cumulative impacts from dust are considered below. The assessment of construction dust impacts reported in this assessment have been undertaken in line with industry-standard guidance to demonstrate the level of dust control required to mitigate any potential for significant effects. It is reasonable to assume that any other construction site in the vicinity of the Proposed Development will have done the same and will control dust through mitigation that is standard practice on all well managed construction sites throughout the UK.

~~23.5.7~~23.5.8 For the construction phase traffic data, refer to the ~~cumulative effects section in Chapter 15:~~ Technical Note: Updates to Air Quality and Traffic ~~and Transport (ES Volume I, EN070009/APP/~~Cumulative Assessments (6.~~2~~4.42). In summary, the construction phase traffic assessment has utilised traffic data which incorporates traffic associated with other developments in the area and as such is inherently cumulative.

~~23.5.8~~23.5.9 For the operational phase, the ZoI for potential cumulative air quality effects is 15 km, as illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). Following consideration of all developments within the ZoI, the following other developments have been ~~included in~~shortlisted into this assessment of cumulative effects. These were considered to have large point source emissions to air that could notably change pollutant concentrations in the receiving environment:

- ID 2: The Tees Combined Cycle Power Plant, EN010082;
- ID 3: Net Zero Teesside, EN010103;
- ID 20: CBRE anaerobic biogas production facility and combined heat and power plant, R/2016/0484/FFM;
- ID 22: Grangetown energy recovery facility (ERF), R/2019/0767/OOM;
- ID 30: Tourian Renewables, R/2019/0031/FFM;
- ID 46: Redcar Energy Centre (REC), R/2020/0411/FFM;

- ~~ID166~~ID 166: O2N Energy (materials recycling facility and production of energy from waste), 13/2892/EIS;
- ID 178: Green Lithium Refining, R/2023/0291/ESM;
- ID 212: Teesside Green Energy Park, 22/1525/EIS; and
- ID 219: Greenergy Renewable Fuels and Circular Products Facility, 23/1019/EIS
- ID 135: Suez Recycling and Recovery UK Ltd, 23/0090/EIS;
- ID 1: York Potash Limited, TR030002;
- ID 8: Lighthouse Green Fuels Ltd, EN010150;
- ID 260: British Steel Limited, R/2023/0793;
- ID 267: Willis Sustainable Fuels Ltd, R/2023/0646/ESM;
- ID 268: CSG, R/2023/0820/ESM; and
- ID 452: Greenergy Biofuels Immingham, 24/0709/FUL.

~~23.5.9~~23.5.10 The information considered within the air quality assessment for these developments ~~come~~comes from planning applications and associated air quality assessment reports and ES chapters.

Cumulative Effects During Construction

~~23.5.10~~23.5.11 An assessment of the potential for cumulative effects upon air quality during the construction phase of the Proposed Development is presented below. Detailed results are presented in ~~Appendix 8A:~~the Technical Note: Updates to Air Quality ~~– Construction Assessment (ES Volume III, EN070009/APP/~~and Traffic Cumulative Assessments (6.4.42).

~~23.5.11~~23.5.12 Additional vehicles from other committed developments (including HyGreen and Net Zero Teesside) ~~were~~have been accounted for in the traffic assessment and included in the "Future Year without Proposed Development" data used in this assessment.

~~23.5.12~~23.5.13 The assessment of construction dust impacts reported in this assessment has been undertaken in line with industry-standard guidance to demonstrate the level of dust control required to mitigate any potential for significant effects. It is reasonable to assume that any other construction site in the vicinity of the Proposed Development will have done the same and will control dust through mitigation that is standard practice on all well managed construction sites across the UK. For example, the Net Zero Teesside Framework Construction Environmental Management Plan (CEMP) (bp, 2022a) includes best practice control measures for dust. There is also the Framework Construction Workers' Travel Plan (CWTP) (bp, 2022b) and the Framework Construction Traffic Management Plan (CTMP) (bp, 2022c). The Environmental Statement for HyGreen will also include a CEMP with relevant best practice control measures. It is, therefore, concluded that

the risk of cumulative construction dust impacts is Low and considered to be **Not Significant**.

Cumulative Effects During Operation

~~23.5.13~~23.5.14 An assessment of the potential for cumulative effects upon air quality during the operational phase of the Proposed Development is included within Table 8-~~7~~8 and Table 8-~~8~~9 of Chapter 8: Air Quality ~~(ES Volume I, EN070009/~~[APP~~/6.2).-~~060]. The results presented within the air quality assessment are inherently cumulative, as the air quality modelling for the operational phase includes all relevant ~~committed~~other developments (including those identified in this Cumulative Update) on top of the existing background, both with and without the Proposed Development. The results of the inherently cumulative assessment are presented in ~~Section 8B.7 of Appendix 8B: Air Quality – Operation Assessment (ES Volume III, EN070009/APP/6.4), with the details of the cumulative developments included in the model presented in Annex B of Appendix 8B: Air Quality – Operation Assessment (ES Volume III, EN070009/APP/6.4~~the Technical Note: Updates to Air Quality and Traffic Cumulative Assessments (6.4.42).

~~23.5.14~~23.5.15 Cumulative effects are therefore accounted for in the predicted environmental concentrations (PECs) results. For impacts on human health, PECs are below their respective Air Quality Assessment Level (AQAL) for all pollutants, therefore cumulative operational effects are considered to be **Not Significant.** Whilst for impacts on ecological receptors, PECs are within relevant critical levels~~. However,~~ for all ecological receptors apart from OE6 (shown on Figure 8-2 [APP-097]) for annual mean NOx. Although the concentration is above the secondary screening criteria, it is below 100% of the critical level. The nitrogen deposition~~, the~~ critical load is exceeded at all receptors as the background concentration is higher than the critical load, but the change in nitrogen deposition is less than 1~~%.~~% at all receptors apart from Teesmouth and Cleveland Coast Ramsar, Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI) (OE1, OE2 and OE6). At sensitive features within the Ramsar/SPA (i.e. bird nesting locations), the PC is less than 1% of the critical load. The impacts on sensitive features within the SPA and SSSI are discussed further in the Ecology and Nature Conservation section of this document, Table 23D-7 in Appendix 23D (ES Volume III, EN070009/APP/6.4), the Updated Report to Inform Habitats Regulations Assessment and the response to Natural England's Deadline 4 submissions, submitted at Deadline 5 of the Examination. The cumulative effects overall for the ecological receptors are Minor Adverse (**Not Significant**~~.~~).

Summary of Cumulative Effects

~~23.5.15~~23.5.16 Effects associated with cumulative construction dust, construction traffic and operations are anticipated to be **Not Significant**.

Surface Water, Flood Risk and Water Resources Cumulative Effects

~~23.5.16~~23.5.17 There is the potential for cumulative surface water, flood risk and water resources effects as a result of the Proposed Development, where effects associated

with it may act in conjunction with those associated with other developments and local plan allocations in the vicinity.

~~23.5.17~~23.5.18 The ZoI for potential cumulative effects is generally 1 km, as illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). Where other developments are located adjacent to water features that could also be impacted by the Proposed Development (notably the River Tees Transitional Water Body), this ZoI is extended up to 2 km, where relevant. Therefore, the other developments that have been considered in this assessment of cumulative effects are summarised in Table 23D-1 (Appendix 23D: Assessment of Cumulative and Combined Effects, (ES Volume III, EN070009/APP/6.4) and the location details of each are shown on Figure 23-3: Short List of Other Developments (ES Volume II, EN070009/APP/6.3~~).~~)).

Cumulative Effects During Construction

~~23.5.18~~23.5.19 There is potential for overlap between the construction of the Proposed Development and the construction of other developments. Thus, there is the potential for short term, temporary construction related pollutants generated from both the Proposed Development and adjacent developments to impact on watercourses in the ZoI. However, provided that standard practice mitigation is implemented on the construction sites through the Final CEMP(s) and as per the conditions of the relevant planning permission, environmental permits and licences, as will be carried out for the Proposed Development, the cumulative effects risk can be effectively managed and there would not be a significant increase in the risks to any relevant waterbodies. As such, there would not be any significant cumulative effects anticipated during construction. Potential construction phase cumulative effects, mitigation and significance are summarised in Table 23D-2 (Appendix 23D: Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)). Similar cumulative effects would be anticipated during decommissioning.

~~23.5.19~~23.5.20 The other developments identified with the greatest potential to lead to cumulative effects are the neighbouring NZT project (ID~~:~~ 3) and HyGreen project (ID~~:~~ 222). These are both immediately adjacent to the Proposed Development (see Figure 23-3: Short List of Other Developments (ES Volume II, EN070009/APP/6.3)). ~~NZT includes for potential construction of a new outfall to Tees Bay for discharge of process water and surface water, which would also potentially be used by the Proposed Development for process water discharge (see Section 9.5 of Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2)).~~ Watercourse crossings are required for pipelines associated with NZT and HyGreen but none are known to require an open-cut, intrusive approach. There would be construction works in the proximity of many of the watercourses associated with the Proposed Development for both of these neighbouring developments, and thus potential for effects from construction site runoff and accidental spillages. However, ~~no~~**No significant** effects were identified with regard to the water environment (including flood risk) within the EIA for NZT (bp, 2021a). ~~An ES for HyGreen is not~~

~~yet available and is due to be submitted this year, however, an~~An assessment of cumulative effects ~~based on the current understanding of~~ for the HyGreen development has also been undertaken ~~which is that **no likely significant** environmental~~and **No Significant** effects ~~are anticipated~~were identified. Assuming best practice construction measures, including implementation of the Final CEMP(s) and ~~WMP, **no significant**~~Water Management Plan (WMP), **No Significant** cumulative effects are anticipated during construction, even where there may be overlapping construction programmes.

Cumulative Effects During Operation

~~23.5.20~~23.5.21 An assessment of the potential for cumulative effects upon Surface Water, Flood Risk and Water Resources during the operational phase of the Proposed Development is included within the Table 23D-3 (Appendix 23D: Stage 4 - Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)).

~~23.5.21~~23.5.22 The neighbouring NZT project (ID~~:~~ 3) is of particular importance, as ~~under Case 2B for the Proposed Development,~~ process wastewater ~~would~~will be discharged to Tees Bay via a proposed new outfall to be built for the NZT development's wastewater and surface water runoff. Hydrodynamic dispersion modelling has been undertaken of the cumulative impact of the combined discharge from NZT and the Proposed Development, as described in Appendix 9B: Water Quality Modelling Report ~~(ES Volume III, EN070009/APP/6.4).~~ [APP-193].

~~23.5.22~~23.5.23 Near and far field modelling indicated that the cumulative impact of discharges from the Proposed Development Site and assumptions for the NZT site is larger for all polluting substances and temperature at all stages of the tidal cycle than for the Proposed Development alone, as would be expected, with mixing zones more likely to reach the water surface. However, the thermal mixing zones remain extremely small and pollutants are diluted to below the Environmental Quality Standards (EQS) value within a very short distance of the discharge point. Concentrations of Dissolved Inorganic Nitrogen (DIN) are slightly elevated above background concentrations over a wider area than the Proposed Development alone, but the overall increase in average and maximum pollutant concentrations do not exceed EQS values. The near field and far field modelling results show that the development proposals for both the Proposed Development Site and assumptions for the NZT site include sufficient treatment of process effluent to ensure that there is **no significant** effect on water quality in Tees Bay due to the cumulative impact of discharges from both sites. HyGreen has been considered but it has no discharge ~~into~~to Tees Bay.

~~23.5.23~~23.5.24 It is assumed that drainage strategies for all of the developments in Table 23D-3 (Appendix 23D: Assessment of Cumulative and Combined Effects, (ES Volume III, EN070009/APP/6.4~~)~~)). have been or will be produced with reference to the relevant policies and guidance documents outlined in Section 9.2 of Chapter 9: Surface Water, Flood Risk and Water Resources ~~(ES Volume I, EN070009/~~[APP~~/6.2).~~ 061]. The Proposed Development ~~assessed in this chapter~~ will similarly be designed

to ensure no long-term deterioration in water quality or increase in flooding. Attenuation and treatment will be provided for runoff from the Proposed Development prior to discharge to waterbodies as has been outlined in this chapter. As such, provided that all the mitigation measures are implemented for all developments, then the cumulative impacts from the Proposed Development and the above other developments will be **Not Significant** for flood risk, water quality or water resources.

Summary of Cumulative Effects

~~23.5.24~~23.5.25 No significant cumulative effects have been identified.

Geology, Hydrogeology and Contaminated Land Cumulative Effects

~~23.5.25~~23.5.26 There is the potential for cumulative geology, hydrogeology and contaminated land effects as a result of the Proposed Development, where effects associated with it may act in conjunction with those associated with other developments.

~~23.5.26~~23.5.27 The ZoI for potential cumulative geology, hydrogeology and contaminated land effects is 1 km, as illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). All of the other developments identified as being within the 1 km ZoI, as shown in Appendix 23B: Assessment of Cumulative Effects Stages 1-~~3~~2 (ES Volume III, ~~EN070009~~EN0700009/APP/6.4), have therefore been considered in this assessment.

Cumulative Effects During Construction

~~23.5.27~~23.5.28 An assessment of the potential for cumulative effects upon geology, hydrogeology and contaminated land during the construction phase of the Proposed Development is included within Table 23D-4 (Appendix 23D: Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)).

~~23.5.28~~23.5.29 One **Slight Adverse (Not Significant)** cumulative effect ~~to~~on soil resources has been identified between the Proposed Development and the Greatham Flood Alleviation Scheme~~.~~ (ID 205). This is because for both developments there is a potential loss of Best and Most Versatile agricultural land. No ~~other~~ significant cumulative effects to soil resources have been identified.

~~23.5.29~~23.5.30 No cumulative effects were identified on geology as none of the developments overlap with designated geological sites.

~~23.5.30~~23.5.31 Any effects to groundwater will be mitigated for each development as required by legislation and industry standard measures, therefore no cumulative effects are anticipated.

~~23.5.31~~23.5.32 An assessment for each of the scoped in developments is included in Appendix 23D: Assessment of Cumulative Effects (ES Volume III, EN070009/APP/6.4).

Cumulative Effects During Operation

~~23.5.32~~23.5.33 There are not considered to be cumulative effects during operation as the Proposed Development and other developments in the surrounding area will be carried out in accordance with the measures set out within the Draft DCO (~~EN070009/APP/4.1~~Document Reference REP4-004) and other planning permissions and will adhere to environmental industry standard construction mitigation measures. This will mitigate the risks associated with geology, hydrogeology and contaminated land.

Summary of Cumulative Effects

~~23.5.33~~23.5.34 In summary, it is considered that there are **no significant** cumulative effects to geology, groundwater receptors or soil resources associated with the Proposed Development.

Noise and Vibration Cumulative Effects

~~23.5.34~~23.5.35 There is the potential for cumulative effects where the impacts of noise associated with the Proposed Development interact with those associated with the other ~~planned projects and~~ developments identified. These could act together to result in a greater significance of effect. Therefore, cumulative effects ~~are~~have been assessed using predictions available in this chapter and information available in noise assessments for the other ~~major~~ developments that may have noise ~~impacts~~impact interactions.

~~23.5.35~~23.5.36 The ZoI for potential cumulative noise effects is 2 km from the ~~main site~~Main Site for operational ~~noise~~sound. For construction noise, it is defined as 2 km from the Main Site, and 800 m from the Proposed Development Site where this extends beyond 2 km from the Main Site - as illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). For traffic noise, a 600 m ZoI from the traffic links is identified within the Traffic and Transport assessment ZoI (Chapter ~~16~~15: Traffic and Transportation ~~(ES Volume I, EN070009/[~~APP~~/6.2). 068].~~ As the construction phase traffic data includes traffic associated with other developments, the noise and vibration assessment of construction-related traffic noise reported within Chapter 11: Noise and Vibration ~~(ES Volume I, EN070009/[~~APP~~/6.2), 063]~~ is inherently cumulative. As construction vibration effects have been assessed as negligible for ~~H2 Teesside~~the Proposed Development no further assessment of cumulative vibration effects has been made. ~~Therefore~~On the basis of the above, the following 'Other Developments' have been considered in this assessment of cumulative construction noise and operational sound effects:

- ID 3: The Net Zero Teesside Project, EN010103;
- ID 5: Northern Endurance Partnership, D/4271/2021;
- ID 33: York Potash, R/2017/0906/OOM;
- ID 48: Northern Gateway Container Terminal, R/2006/0433/OO;

- ID 53: Foundry, R/2020/0821/ESM;
- ID 54: Long Acres, R/2020/0822/ESM;
- ID 55: Steel House, R/2020/0823/ESM;
- ID 168: Stockton-on-Tees Local Plan, Policy SD4 Economic Growth Strategy, including:
- ID 174: York Potash, R/2014/0626/FFM;
- ID 178: Green Lithium, R/2023/0291/ESM;
- ID 212: Energy Recovery Facility Seal sands, 22/1525/EIS;
- ID 219: Greenergy Renewable Fuels and Circular Products Facility 23/1019/EIS; ~~and~~
- ID 222: HyGreen, R/2023/0179/SCP;
- ID 1: York Potash Limited, TR03002;
- ID 471: Tees Seagrass Project, R/2024/0321/FFM; and
- ID 259: Port Handling Facility, R/2024/0098/ESM.

~~23.5.36~~23.5.37 ID 5 has been scoped out of this cumulative assessment, given that it is largely offshore and not likely to result in cumulative noise effects. IDs 419 and 471 has been scoped out due to a lack of noise and vibration information submitted with the application. Only some of the receptors in the other developments are within a distance to the Proposed Development that ~~is likely to~~may result in a noise impact interaction and therefore not all have been assessed for their cumulative effects. IDs ~~3~~1, 33, 53, 54, 55, 174 and ~~174~~259 affect receptors H5, H6 and ~~H6.~~H7. ID 3 affects receptors H4, H5, H6 and H7, ID 48 ~~affect~~affects receptors H2~~ and~~, H6~~. IDs 212~~ and H7. ID 219 ~~affect~~affects receptors H1 and ~~H2.~~H5 (construction) and H5 (operation). ID 212 affects receptor H5 (operation).

Cumulative Effects During Construction

~~23.5.37~~23.5.38 An assessment of the potential for cumulative effects upon construction noise during the construction phase of the Proposed Development is included within Table 23D-5 in Appendix 23D: Assessment of Cumulative Effects (ES Volume III, EN070009/APP/6.4). Information regarding each relevant planning application has been gathered from their respective noise assessments. However, not all of the other developments considered have been consented yet, so are not certain to go ahead and therefore Table 23D-5 presents a potentially exaggerated worst-case scenario. The effects have been classified for Noise Sensitive Receptors (NSRs) H1, H2, H3, H5 and H6 by considering the daytime ABC noise limit value given in Table 11-~~18~~17 (Chapter 11: Noise and Vibration, ~~ES Volume I, EN070009/~~[APP~~/6.2), 063~~]) and using the semantic scales in Table 11-5 (Chapter 11: Noise and Vibration, ~~ES Volume I, EN070009/~~[APP~~/6.2). 063~~]). For NSRs H4 and H7 which are offices the effects have been classified using the semantic scales in Table 11-6 (Chapter 11: Noise and Vibration, [APP-063]). The effect resulting from

each individual potential impact type is classified according to the magnitude of the impact and the sensitivity or value of the affected receptor using the matrix presented in Table 11-14 (Chapter 11: Noise and Vibration ~~(ES Volume I, EN070009/APP/6.2).~~[APP-063]).

~~23.5.38~~23.5.39 As a worst-case assumption, the construction phase producing the highest construction noise levels for each development occurring simultaneously is shown in Table 23D-5 (Appendix 23D: Assessment of Cumulative Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)). In practice this is unlikely to occur for prolonged periods, or at all. Where the predicted construction noise levels for other developments have been provided as façade levels, the predicted construction noise levels have been converted to free-field values to allow comparison with the predicted free-field construction noise levels for the Proposed Development.

~~23.5.39~~23.5.40 As shown in Table 23D-5 (Appendix 23D: Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~),~~)), at NSRs H1, H2, H3, H4, H5 and H7 cumulative construction noise effects are ~~not significantly increased compared with~~the same as the predicted individual effects of the Proposed Development ~~or the other developments.~~; for NSRs H1 and H4 this is **Moderate Adverse (Significant)**, for NSRs H3 and H7 this is **Minor Adverse (Not Significant)** and for NSRs H2 and H5 this is **Negligible Adverse (Not Significant)**. At NSR H6 effects are predicted to increase from **Negligible** ~~to **Minor** **Adverse** **(Not**~~ to **Moderate Adverse (Significant)** with the addition of simultaneous noise from construction of the Proposed Development and the other developments ~~The~~. No specific mitigation is proposed as no appropriate mitigation is available beyond that which is secured in the Framework CEMP (5.12) and given that the construction noise level predicted for the Proposed Development is during construction of the pipeline which will be close to ~~this receptor~~NSR H6 for a short period ~~of time~~ within the Proposed Development construction~~, and it's therefore considered unlikely that this will be simultaneous with the construction of all the other developments, thus reducing the likelihood of significant cumulative effects.~~.

Cumulative Effects During Operation

~~23.5.40~~23.5.41 Cumulative effects of operational ~~noise~~sound from the Proposed Development together with the predicted ~~noise~~sound levels presented in the noise assessments of the other developments are presented in Table 23D-6 (Appendix 23D: Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)). This chapter presents an assessment of night-time effects only as the Proposed Development effects were **Negligible (Not Significant)** during the daytime and therefore H4 ~~is~~and H7 are excluded.

~~23.5.41~~23.5.42 Not all of the other developments assessed are consented so are not certain to go ahead and therefore Table 23D-6 (Appendix 23D: Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~)~~)) presents a potentially exaggerated worst-case. As a further worst-case approach, the assessment presented in the chapter has been based on all of the other developments operating during the night-time period when ambient sound levels

are ~~lower~~typically at their lowest and therefore when impacts are likely to be greater, and the highest of the reported predicted operational sound levels have been used ~~for~~from each development noise assessment.

~~23.5.42~~23.5.43 Table 11-31 (Chapter 11: Noise and Vibration, ~~ES Volume I, EN070009/~~[APP~~/6.2) 063~~]) shows ambient sound level increases at all NSRs~~, however this is~~. These increases are as a result ~~only~~ of the other developments and therefore, the ~~same increase~~increases would occur ~~without~~irrespective of the Proposed Development being operational. The predicted operational sound level for the Proposed Development is more than 10 dB below the cumulative ambient sound level~~, so when added onto the cumulative ambient level it~~ from all other developments, therefore will not increase the significance of effect of the overall cumulative ambient sound level. Therefore,~~ -~~ this is considered to result in a **Not Significant** cumulative effect.

Summary of Cumulative Effects

~~23.5.43~~23.5.44 ~~The~~For the majority of the ~~cumulative~~potential noise and vibration ~~effects~~impact types associated with the Proposed Development, there would be ~~of~~no change in the ~~same level of~~ significance ~~as the~~ of noise and vibration effects already associated with the cumulative effects ~~for the Proposed Development~~of the other developments being constructed or operating together. Exceptions to this are at NSR H1 and H3 where the cumulative construction noise level from all of the other developments alone~~, both during construction and operation. The only exception to this~~ would ~~be~~lead to a Negligible effect, whilst the predicted construction noise level from the addition of the Proposed Development would result in a Moderate Adverse effect (NSR H1) and Minor Adverse effect (NSR H3). When summed, this would result in overall cumulative effects of **Moderate Adverse (Significant)** and **Minor Adverse (Not Significant)** respectively. Conversely, the cumulative construction noise effect at NSR H6~~, which would increase~~ increases from Negligible ~~to **Minor Adverse** (Not Significant) compared~~ to Moderate Adverse (Significant). However the predicted effect ~~for~~of the Proposed Development alone~~. This Minor Adverse effect is due to construction of the pipeline and is therefore only expected to last a short period of time.~~ is Negligible (Not Significant), meaning that the contribution of the Proposed Development does not increase the predicted construction noise level or the prevailing cumulative noise effect of **Moderate Adverse (Significant)** already predicted from all other developments. Therefore for NSR H6, no specific mitigation measures are proposed. The same measures for mitigating the noise and vibration effects for the Proposed Development, as outlined in Chapter 11: Noise and Vibration ~~(ES Volume I, EN070009/~~[APP~~/6.2) 063~~] are considered suitable.

Ecology and Nature Conservation Cumulative Effects

~~23.5.44~~23.5.45 The ZoI for potential cumulative ecology and nature conservation effects is up to 15 km, as illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). An assessment of the potential for cumulative effects upon ecology and nature conservation during

construction and operation of the Proposed Development is included within Table 23D-7 (Appendix 23D: Stage 4 - Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)).

Summary of Cumulative Effects

~~Summary of Cumulative Effects~~

23.5.46 The cumulative assessment identified ~~the~~ potential for significant cumulative effects between the Proposed Development and the identified other developments. Cumulative **Moderate Adverse (Significant)** effects have been identified for eight other developments on the shortlist during the construction phase of the Proposed Development (ID 42, 51, 52, 53, 54, 178, 219 and 222) due to potential effects on Open Mosaic Habitat, ephemeral habitats and invertebrates. The Proposed Development alone identifies Minor Adverse (Not Significant) effects on these receptors, the Significant effect is considered to arise as a result of the Other Developments plus the Proposed Development occurring simultaneously (which is a worst case scenario).

23.5.47 One **Major Adverse (Significant)** effect has been identified for ID 205 during the construction phase due to the potential for significant cumulative effects on designated sites, habitats and Great Crested Newt.

23.5.48 Potential **Minor Adverse (Not Significant)** cumulative effects have been identified during the operation phase due to cumulative nitrogen deposition from the other developments (ID 3, 22, 46, 95, 178, 212, 268 and 452) plus the Proposed Development on the Teesmouth and Cleveland Coast SSSI. This cumulative effect is considered to be Not Significant as it would not disturb recovery of the SSSI once the appropriate critical load is applied and in any event because the total nitrogen deposition rate will remain lower with the Proposed Development consented (even allowing for other plans and projects) than it has been historically, and it therefore cannot be argued that the Proposed Development will be harming the interest of the SSSI, even by impeding restoration. That is particularly the case given the contribution of the Proposed Development is at the '1% of the upper critical load' level for dismissal as imperceptible

~~23.5.45~~23.5.49 No additional mitigation ~~is proposed at this stage,~~ above and beyond the measures presented in Chapter 12: Ecology and Nature Conservation ~~(ES Volume I, EN070009/~~[APP~~/6.2). However~~-064] is proposed; however, opportunities will be explored to engage with South Tees Development Corporation (STDC) in the development of its overarching Mitigation Strategy for Teesworks ~~in order~~ to identify measures to reduce potential cumulative impacts.

~~23.5.46~~23.5.50 The Applicant's proposals for mitigation are set out in Chapter 12: Ecology and Nature Conservation ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-064] and in the Outline Landscape and Biodiversity Management Plan ~~(EN070009/APP/5.9).~~[CR1-022]. The measures in the latter will be developed into a Full ~~LBMP~~Landscape and Biodiversity Management Plan to reflect the detailed design (and impacts) of the Proposed ~~Scheme~~Development, in substantial

accordance with that outline. This is secured through the Draft DCO (~~EN070009/APP/~~4.1). ~~Through these measures, the Applicant will be able to deliver a commitment to no net loss, as a minimum.~~

~~23.5.47~~23.5.51 Furthermore, the Applicant is keen to secure environmental enhancements in the wider Teesside area ~~off site from~~outside of the Order ~~limits~~Limits and is working with stakeholders such as the ~~EA~~Environment Agency, Natural England, the ~~RPSB~~RSPB, the Tees Rivers Trust, the Teesside Environmental Trust and ~~INCA~~Industry Nature Conservation Association to develop proposals in this regard. ~~Whilst the Applicant does not propose to quantify these in BNG metric terms at this point in time, it is hoped that such measures, to be secured though a section 106 Agreement, will be able to demonstrate a wider qualitative net gain overall as a result of the Proposed Development.~~

~~23.5.48~~23.5.52 No significant cumulative effects are considered likely during the operational phase of the Proposed Development.

Ornithology Cumulative Effects

~~23.5.49~~23.5.53 The ZoI for potential cumulative ornithology effects is up to 15 km, as illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). An assessment of the potential for cumulative effects upon ornithology during construction and operation of the Proposed Development is included within Table 23D-8 (Appendix 23D: Stage 4 - Assessment of Cumulative and Combined Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)).

~~Summary of Cumulative Effects~~

~~One potential effect was~~Summary of Cumulative Effects

23.5.54 Minor Adverse (Not Significant) effects have been identified between the Proposed Development and ~~Net Zero Teesside~~NZT (ID 3) during the construction phase~~. Although~~ and the Proposed Development and the Woodsmith Port Handling Facility (ID 259).

~~23.5.50~~23.5.55 For ID 3, although mitigation is proposed, based upon a precautionary approach, there is potential for cumulative losses of grassland and open mosaic habitats during the construction phase in the interim period between newly created and restored habitats reaching their target condition, and these would be expected to result in cumulative losses of habitats used by birds on a short term basis during construction. However, this effect is considered to be short term and reversible and is assessed to be **Minor Adverse (Not Significant)**. Effects due to potential interactions with all other developments are expected to be not significant during construction with the appropriate mitigation measures in place as detailed in Chapter 13: Ornithology ~~(EN070009/~~[APP~~/6.2).~~-065].

23.5.56 For ID 259, mitigation measures are proposed to minimis noise and visual disturbance to acceptable levels during construction for both the Proposed Development and the Other Development. Furthermore, sensitive lighting strategies and timing of works and vegetation clearance are proposed to avoid

adverse impacts upon breeding birds. Therefore, this is considered to be **Minor Adverse (Not Significant)**.

~~23.5.51~~23.5.57 No significant cumulative effects are considered likely during the operational phase of the Proposed Development.

Marine Ecology Cumulative Effects

~~23.5.52~~23.5.58 There is the potential for cumulative marine ecology effects as a result of the Proposed Development, where effects associated with it may act in conjunction with those associated with other developments.

~~23.5.53~~23.5.59 The ZoI for potential cumulative marine ecology effects is a maximum of 10 km, as illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). Several other developments which are within the ZoI have been screened out of this assessment due to having no interaction with the marine environment. The developments which do interact with the marine environment have been reviewed to understand their potential impact pathways and Table 23D-9 (Appendix 23D: Stage 4 - Assessment of Cumulative and Combined Effects~~, (~~ES Volume III, EN070009/APP/6.4~~))) presents whether they have been scoped in or out as a result.

~~23.5.54~~23.5.60 ~~Potential~~The potential marine ecology effects ~~as a result~~ of the Proposed Development have been assessed within Chapter 14: Marine Ecology ~~(ES Volume I, EN070009/~~[APP~~/6.2).~~ 064]. Several of the potential impact pathways identified are avoided or reduced to **Negligible (Not Significant)** through the use of best practice and industry standard proposed design avoidance and best practice measures.

~~23.5.55~~23.5.61 The risk of changes in water quality from accidental spills of vessel fuels and oils is reduced to **Negligible (Not Significant)**, due to the requirement for Proposed Development vessels to comply with the International Regulations for Preventing Collisions at Sea (~~IMO,~~International Maritime Organisation (IMO), 1972) and regulations relating to International Convention for the Prevention of Pollution from Ships (MARPOL Convention 73/78) specifically including compliance with Annex IV on pollution by sewage and prevention of air pollution by ships; and Annex V on pollution by garbage from ships. Similarly, to mitigate against the introduction, transportation and spread of ~~INNS,~~Invasive Non-Native Species (INNS), all Proposed Development vessels shall adhere to the International Convention for the Control and Management of Ships' Ballast Water and Sediments with the aim of preventing the spread of marine INNS (IMO, 2017), and shall also adhere to the ~~International Maritime Organisation (IMO)~~IMO Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (Biofouling Guidelines) (IMO, 2011). Therefore, the risk of a cumulative impact from accidental spills and/or the introduction, transportation and spread of INNS is expected to be **Negligible (Not Significant)**, and these are not considered further within the cumulative effects assessment.

~~23.5.56~~23.5.62 Several ~~design avoidance~~ measures are proposed as part of the Proposed Development to avoid and minimise indirect effects to marine ecology from changes in marine water quality, including surface runoff. These ~~design~~ measures include the production of a ~~Framework~~Final CEMP(s) and WMP with measures to manage fine sediment in surface runoff, risk of accidental spillages on the Proposed Development site and the management of construction dewatering. Therefore, the effect of indirect cumulative effects to marine ecology due to changes in marine water quality are expected to be **Negligible (Not Significant)** both alone and cumulatively and therefore this impact pathway is not considered further.

~~23.5.57~~23.5.63 Collision risk between project vessels and marine mammals has also been identified as a potential cumulative effect. However, the Proposed Development and other developments which could cause a cumulative effect are located within a busy shipping area which is managed by Harbour Authority approvals. Therefore, it is expected that the number of boats using the estuary at any one time is efficiently managed to reduce the risk of collisions. Furthermore, marine mammals, particularly seals, are likely to be habituated to vessel presence in the estuary and are likely to exhibit avoidance behaviour. Therefore, cumulative effects with all projects identified of collision risk between vessels and marine mammals is considered to be **Negligible (Not Significant)**. Therefore, this will not be considered further.

~~23.5.58~~23.5.64 Changes in visual stimuli including from artificial light are also mitigated through avoidance measures which are in place to avoid light spill into the estuary, such as: Indicative Lighting Strategy (Operation) ~~(EN070009/~~[APP~~/5.8).~~ 038]. In addition, due to the heavy industrial use of the surrounding area, many marine species are expected to be habituated to artificial light. Therefore, cumulative effects are expected to be avoided and reduced to ~~negligible~~**Negligible** **(Not Significant)**, and this impact pathway is not considered further.

~~23.5.59~~23.5.65 The cumulative impact pathways that are scoped in ~~include~~are: changes in airborne soundscape during both construction and operation, nutrient and chemical effects from the dispersion and discharge of treated effluent during operation, and deposition of airborne pollutants including nitrogen during operation.

Cumulative Effects During Construction

Changes in Airborne Soundscape

NZT CCUS (ID~~:~~ 3)

~~23.5.60~~23.5.66 If construction activities were to occur simultaneously, there is the potential for cumulative effects of airborne sound disturbance. Airborne sound created by Horizontal Directional Drilling (HDD) next to Greatham Creek as part of the Proposed Development, has the potential to result in a 2 dB increase from ambient sound levels, resulting in a total unweighted SEL of 125 dB. The Proposed Development is also going to implement noise abatement barriers and the HDD

timings will avoid the important breeding and moulting period for harbour seals (mid-June to August) (as secured in the Framework CEMP (5.12)). Based on airborne sound modelling for the NZT CCUS project, the total unweighted Sound Exposure Level (SEL) at Seal Sands is expected to be 97 dB (bp, 2021b), which is considerably lower than the ambient unweighted SEL of 123 dB and that predicted for the Proposed Development. The additional airborne sound from the NZT CCUS is not considered to result in an increase in the total unweighted SEL, cumulatively with the Proposed Development. Therefore, the cumulative effect is ~~still~~ considered to be **Minor Adverse (Not Significant)** with the current essential mitigation proposed (noise abatement barriers at the Potential Offtaker at Greatham Site).

STDC – demolition of existing structures and development of 148,000 sqm of general industry and storage facility (ID~~:~~ 42)

~~23.5.61~~23.5.67 The demolition of existing structures and the development of an industrial area, including a storage facility on the banks of the River Tees is expected to produce airborne sound during the construction phase. If construction activities were to occur simultaneously with the Proposed Development, there is the potential for cumulative effects of airborne sound disturbance.

~~23.5.62~~23.5.68 Airborne sound created by HDD next to Greatham Creek has the potential to result in a 2 dB increase from ambient sound levels, resulting in a total unweighted SEL of 125 dB. However, based on airborne sound modelling conducted as part of the STDC project, the highest predicted construction noise level is 58 dB La_{eq} (Arup, 2020).

~~23.5.63~~23.5.69 This value is considerably lower than the ambient noise recorded near to Seal Sands and the noise produced by the Proposed Development (comparing the A-weighted values) and will not result in a change in the total unweighted SEL overall. Therefore, the cumulative effect is ~~still~~ considered to be **Minor Adverse (Not Significant)** with the current essential mitigation proposed (noise abatement barriers at the Potential Offtaker at Greatham Site).

STDC – demolition of existing quay, capital dredging and development of new quay and associated works (ID~~:~~ 172)

~~23.5.64~~23.5.70 There is the potential for Phase Two of the STDC works involving the demolition of an existing quay, capital dredging and development of a new quay to overlap with the construction phase for the Proposed Development. The construction timeline for STDC Phase Two is not currently known, and the construction may not occur. However, for the purpose of this assessment, it is assumed that the construction periods of STDC and the Proposed Development will overlap.

~~23.5.65~~23.5.71 The assessment of airborne sound for STDC focuses on airborne sound disturbance to hauled-out seals due to vessel movements, rather than airborne sound generated by construction activities (RoyalHaskoningDHV, 2020). Based on the high volume of vessel traffic in the River Tees (ABPmer, 2017) and therefore the degree of habituation expected from seals hauled-out at Seal Sands, airborne sound

from vessels is not expected to result in increased airborne sound cumulatively and the effect is considered to be **Minor Adverse (Not Significant)**.

Greatham North East Flood Alleviation Scheme (ID~~:~~ 205)

~~23.5.66~~23.5.72 The Greatham North East Flood Alleviation Scheme is currently still in the scoping stage and therefore a detailed assessment of the increase in airborne sound has not yet been produced. However, airborne sound is expected to be produced due to the nature of the construction activities and is scoped in for further assessment in the Scoping Report (Environment Agency, 2023c). In the absence of a detailed airborne sound assessment, it is assumed that construction activities associated with the Greatham North East Flood Alleviation Scheme will result in an increase in the airborne sound level above ambient conditions, resulting in a cumulative effect.

~~23.5.67~~23.5.73 Therefore, on this basis, if the activities associated with the Flood Alleviation Scheme and the Proposed Development were to occur simultaneously for a continuous period of time, there would be the potential for behavioural effects exhibited by seals hauled-out at Seal Sands. This could include the disturbance of resting, moulting and breeding. However, HDD during the construction phase for the Proposed Development is only expected to occur for a maximum of ~~three weeks.~~ two to three weeks and will be restricted to only occur between September and November as part of mitigation proposed to prevent effects on ornithological features in the Study Area, which avoids the peak pupping and moulting season for seals of mid-June to end of August (INCA, 2023) (as secured in the Framework CEMP (5.12)). Construction activities at the Main Site may occur for a longer duration. However, it is likely that the airborne sound-generating activities of the Proposed Development and the Greatham North East Flood Alleviation Scheme will not overlap, given the current consenting stages of each project (the Greatham North East Flood Alleviation Scheme being much further behind in terms of consent).

~~23.5.68~~23.5.74 Furthermore, given the proximity of the Greatham North East Flood Alleviation Scheme to Seal Sands, any construction noise that had an adverse disturbance effect to seals, would be expected to require mitigation (as is the case for the Proposed Development). This could include noise abatement measures or a seasonal restriction.

~~23.5.69~~23.5.75 Therefore, due to the temporary, short-term and intermittent nature of behavioural disturbance effects as a result of airborne sound from the Proposed Development and the low likelihood that activities from cumulative developments would occur concurrently or consecutively and the likely requirement for essential mitigation, the potential for cumulative impacts is **Minor Adverse (Not Significant)**.

Greatham Beck Engineering Operations (ID 370)

23.5.76 Greatham Beck Engineering Operations has stated that the project will produce airborne noise which could affect qualifying features of the Teesmouth and Cleveland Coast SSSI and Ramsar site, during excavation of new channels and

construction of new intertidal habitat. This will include sheet piling for the construction of a temporary cofferdam.

23.5.77 Detailed information on the noise levels expected to be produced by the works is not available. However, the development has concluded that there will be no effects to hauled-out seals in Greatham Creek and Seal Sands, as the development is located in Greatham Creek approximately 2 km upstream from Seal Sands. This is a suitable distance away in an area not typically used by seals. In addition, a tidal structure is currently present within Greatham Beck which prevents the movement of seals into the development area (which is to be removed during the works). Therefore, as the seals are unlikely to be hauled-out in close proximity to the works, and due to the distance of project, any noise that is produced is expected to be localised, temporary and of low intensity in nature. Therefore, the cumulative noise levels are likely to be below ambient and therefore not perceptible to seals, and therefore the potential for cumulative effects is **Negligible (Not Significant)**

Teesside GasPort (ID 466)

23.5.78 During the construction phase of Teesside GasPort, the construction activities and repair works to a jetty are expected to produce airborne sound. This could disturb and displace marine mammals (particularly seals at Seal Sands) in the estuary, if the Proposed Development and the Teesside GasPort works were to occur simultaneously, although the timeline for Teesside GasPort is currently not known.

23.5.79 The Teesside GasPort is located in the main channel of the Tees Estuary / River Tees. This is an area already subject to high levels of baseline noise production and visual disturbance. It is also located nearly 2 km from Seal Sands, where the main seal haul-out is located. Details on sound levels expected to be produced by the Teesside GasPort have not been provided in relation to seals. However, both the Proposed Development (with the addition of noise abatement barriers) and the Teesside GasPort construction activities are not expected to increase ambient sound levels. Furthermore, the Proposed Development will be subject to seasonal restrictions meaning HDD can only occur between September and November as part of mitigation proposed to prevent effects on ornithological features in the Study Area, which avoids the peak pupping and moulting season for seals of mid-June to end of August (INCA, 2023). Restrictions on noise producing activities for Teesside GasPort have also been recommended to avoid sensitive periods where necessary although no specific timing is given (as per MMO Screening Opinion for this Other Development).

23.5.80 Furthermore, both Teesside GasPort and the Proposed Development are also expected to be short term and intermittent, with breaks in noise production. It is assumed there will be seasonal restrictions due to the works amounting to jetty repair. Therefore, there is a very low likelihood that activities would occur at the same time. As a result, cumulative impacts are unlikely to occur concurrently or consecutively and there is no likely requirement for essential mitigation. Therefore, the potential for cumulative impacts is **Negligible (Not Significant).**

Cumulative Effects During Operation

Changes in Airborne Soundscape

NZT CCUS (ID: 3)

~~23.5.70~~23.5.81 As the operational phases of NZT CCUS and the Main Site of the Proposed Development are expected to occur simultaneously, there is the potential for cumulative effects of airborne sound. However, based on airborne sound modelling conducted for the Proposed Development, the total unweighted SEL is not expected to exceed the operational ambient sound levels of 127 dB, assuming a 12-hour day. The worst-case operational airborne sound pressure levels for the NZT CCUS development are 85 dB La_{eq},T, which is considerably lower than the Proposed Development. Therefore, these two projects are not expected to result in a cumulative increase in airborne sound, and this cumulative effect is considered to be **Negligible (Not Significant)**.

Lighthouse Green Fuels Ltd 'Waste-to-sustainable aviation fuel' facility (ID: 8)

~~23.5.71~~23.5.82 The Lighthouse Green Fuels Ltd 'Waste-to-sustainable aviation fuel' facility is currently still in the scoping stage and therefore a detailed assessment of the increase in airborne sound has not yet been produced. However, airborne sound is expected to be produced during operation and is scoped in for further assessment in the Scoping Report (Lighthouse Green Fuels, 2023). The total unweighted SEL for the Proposed Development is not expected to exceed ambient conditions of 127 dB over a 12-hour day. Furthermore, this project is further away from Seal Sands and therefore, the two projects are not expected to result in a cumulative increase in operational airborne sound. As a result, this cumulative effect is considered to be **Negligible (Not Significant)**.

Teesside GasPort (ID 466)

23.5.83 During the operational phase of Teesside GasPort, airborne sound production is expected due to increased vessel traffic in the main channel of the Tees Estuary. The simultaneous operation of Teesside GasPort and the Proposed Development could result in disturbance to seals.

23.5.84 However, the Tees Estuary is already subjected to high levels of vessel traffic daily, due to the importance of the estuary as a port and for shipping activities. Therefore, any seals present in the Tees Estuary are expected to have a high level of habituation to vessel noise. The noise production during the operation of the Proposed Development, and noise production from vessels for Teesside GasPort is expected to be below ambient noise conditions. Furthermore, the Teesside GasPort is located nearly 2 km from Seal Sands. The number of vessels required during operation of Teesside GasPort is also expected to be small compared to the high level of vessel traffic within Tees Estuary and is not expected to result in a deviation from baseline conditions. Therefore, the potential for cumulative effects to arise is very unlikely. As a result, this cumulative effect is considered to be **Negligible (Not Significant)**.

Nutrient and Chemical Effects from the Dispersion and Discharge of Treated Effluent

~~23.5.72~~23.5.85 The cumulative effect of nutrients and chemicals from the dispersion and discharge of treated effluent has only been assessed for the NZT CCUS project. All other potentially cumulative developments will not disperse, or discharge treated effluent during operation and therefore they have been scoped out.

~~23.5.73~~23.5.86 This is with the exception of the Waste-to-sustainable aviation fuel' project (ID~~:~~ 8), for which there is the potential for discharge of process water, which based on the scoping report for the project will be discharged to the River Tees following treatment at Bran Sands ~~WwTW.~~Waste water Treatment Works. However, any water quality effects that do occur are expected to be minor and within the estuary, rather than located within Tees Bay where the NZT CCUS and Proposed Development outfall is located. Furthermore, ~~an FRA~~a Flood Risk Assessment and drainage strategy would need to be produced and therefore cumulative effects relating to this impact pathway have not been considered further for this project.

NZT CCUS (ID~~:~~ 3)

~~23.5.74~~23.5.87 The operational periods of the Proposed Development and NZT are expected to overlap and therefore there is the potential for cumulative effects from chemical effects due to the discharge of treated effluent.

~~23.5.75~~23.5.88 ~~One of the options for the~~The discharge of treated effluent as part of the Proposed Development is via the NZT Project and therefore, effluent from both projects ~~could~~will be released in the same place.

~~23.5.76~~23.5.89 Water quality modelling shows that the NZT effluent is discharged at a lower temperature resulting in smaller mixing zones for temperature compared with the Proposed Development discharge in isolation.

~~23.5.77~~23.5.90 Excluding the addition of surface water runoff, from either the Proposed Development or NZT, the EQS for DIN, polyaromatic hydrocarbons, benzo(g,h,i)-perylene and PFOS reach the surface during low tide and minimum current conditions, but are met within the initial plume rising stage during high tide and high current conditions (Appendix 9B: Water Quality Modelling Report, ES Volume III, EN070009/APP/6.4). However, rapid dilution will result in concentrations reducing to below EQS values over a short distance. The maximum increase for DIN and polyaromatic hydrocarbons is 0.024 mg/l and 0.045 ng/l respectively, which is below the EQS. For benzo(g,h,i)-perylene and PFOS, the maximum increases are 0.065 ng/l and 0.007 ng/l respectively above ambient, which are both less than 5% above the ambient.

~~23.5.78~~23.5.91 Dilution of the combined process effluent discharges from the Proposed Development and NZT sites through the addition of surface water runoff is expected to increase the discharge rate to Tees Bay but will reduce the contaminant concentrations. The effluent is rapidly diluted such that concentrations fall to below the EQS over a short distance and the area around the discharge point where the EQS for DIN is exceeded is extremely small. Under

minimum current conditions, only benzo(g,h,i)-perylene and PFOS exceed the EQS value, with increases of 0.009 ng/l and 0.002 ng/l above ambient conditions respectively, but these are less than 5% of above the ambient background concentrations.

~~23.5.79~~23.5.92 Although the combined effluent discharge from both the NZT and Proposed Development outfall results in greater plume distances, these are still highly localised and within very short distances. Any chemicals and contaminants are expected to be rapidly diluted and dispersed. Some small scale, minor deterioration in habitat may occur directly around the outfall, but this is not expected to result in a major deviation from baseline conditions and will be within very small distances (i.e. tens of metres). Therefore, the cumulative effect is assessed as **Minor Adverse (Not Significant)**.

Deposition of Airborne Pollutants Including Nitrogen

~~23.5.80~~23.5.93 The cumulative effect of deposition of airborne pollutants including nitrogen has only been assessed for the NZT CCUS project. All other potentially cumulative developments will not emit airborne pollutants during operation and therefore they have been scoped out. Any effects to the marine environment that do occur, particularly intertidal habitats, are expected to be minor.

NZT CCUS (ID~~:~~ 3)

~~23.5.81~~23.5.94 The operational periods of the Proposed Development and NZT CCUS project are expected to overlap and therefore there is the potential for cumulative effects from deposition of airborne pollutants.

~~23.5.82~~23.5.95 For the NZT CCUS project, airborne pollutants will be emitted from the single carbon capture unit absorber stack, which is in close proximity to the main stack of the Proposed Development. Due to design changes for the Proposed Developed, emissions of acid (sulphur dioxide, SO2) are no longer expected. Therefore, this pollutant has been removed from further assessment and modelling.

~~23.5.83~~23.5.96 An assessment of cumulative effects for the deposition of airborne pollutants during the operational phase of the Proposed Development has been conducted. Emissions from the Proposed Development have been assessed using the Environment Agency's Risk Assessment for air emissions (Defra and Environment Agency, 2016). In line with this, detailed dispersion modelling using the atmospheric dispersion model ADMS (currently ADMS 5.2.2) has been used to calculate the concentrations of pollutants at identified receptors. Dispersion modelling, takes into consideration recent meteorological data and any buildings, structures, and local topography which may affect dispersion, assessing the worst-affected ecological receptor. This follows the method that was also used for the NZT CCUS project.

~~23.5.84~~23.5.97 An assessment of nutrient nitrogen enrichment has been undertaken by applying published emission/deposition velocities to the predicted annual average nitrogen dioxide (NO_2) and ammonia (NH_3) concentration thresholds for

the Teesmouth and Cleveland Coast SSSI, Ramsar and Teesmouth ~~NNR. Emission/deposition rates of acid (sulphur dioxide, SO_2) have also been considered.~~National Nature Reserve.

~~23.5.85~~23.5.98 Modelled nitrogen and acid rates have been calculated at a range of locations within these designated sites, representative of different protected habitats, including those in the intertidal. At each location, the Process Contribution (PC) of the Proposed Development and the baseline (including contribution of all ~~'~~Other ~~Developments'~~Developments within 15 km of the Proposed Development, including proposed developments such as NZT) were calculated to give Predicted Environmental Concentrations (PEC). These rates have then been compared to the Critical Loads (or Air Quality Assessment Level, AQAL) for nitrogen and acid, published by UK Air Pollution Information System (APIS) (Centre for Ecology and Hydrology and APIS, 2016). Natural England and the Environment Agency air quality specialists consider the following to be an indicator of potential **'significant'** atmospheric pollution impacts which require further analysis:

- The PC exceeds 1% (or 10% for daily calculations) of the critical load/level threshold; and
- The PEC exceeds 100% of the Critical Load.

~~23.5.86~~23.5.99 The worst-case PEC emissions of nitrogen oxides (NOx) were calculated as 24.2~~.26 µG M~~ µg m^{-3} for the annual mean and ~~9.6 µG M~~53.8 µg m^{-3} for the maximum daily value, which is ~~61.2~~80.7% and ~~55~~71.7% of the Critical Load, respectively. This does not meet the threshold for further analysis and the potential for effect.

~~23.5.87~~ The highest worst-case concentration of annual nitrogen deposition in the Teesmouth and Cleveland Coast SSSI is predicted to be ~~138.9~~139.6% of the Critical Load and therefore above the 100% threshold. However, this value takes into account all 'Other Developments' within 15 km. The contribution to this percentage of the Critical Load value from both the Proposed Development and the NZT CCUS project is ~~0.6~~1.1% and 2%, respectively. Therefore, these projects represent a very small contribution to the overall deposition in the Teesmouth and Cleveland Coast SSSI compared to other developments.

~~23.5.88~~23.5.100 ~~The worst-case annual mean PEC emission of SO_2 is calculated to be 10.7% of the Critical Load (20 µG M^{-3}). The maximum annual rates of SO_2 deposition during the operational phase is calculated to be 5.6% of the Critical Load. Therefore, effects from SO_2 is considered to be negligible.~~

~~23.5.89~~23.5.101 Any cumulative impacts to air quality and subsequent depositions of nitrogen and acid from the NZT CCUS project and the Proposed Development are expected to be negligible in the context of other developments within the Study Area and therefore are not expected to result in adverse effects to the marine environment. In the event that airborne pollutant and deposition do occur, the hydrodynamic conditions and the open nature of the coastline mean that this area is subject to frequent tidal washing and therefore, any deposits will be rapidly

dispersed. Therefore, NZT CCUS and the Proposed Development are not expected to result in a cumulative increase in airborne pollutants or deposition, and this cumulative effect is considered to be **Negligible (Not Significant)**.

Summary of Cumulative Effects

~~23.5.90~~23.5.102 No likely significant cumulative effects between the Proposed Development and other developments have been identified, taking into account the conclusions provided above, mitigation measures to be implemented and the results of modelling.

Landscape and Visual Amenity Cumulative Effects

~~23.5.91~~23.5.103 Cumulative landscape effects may arise where effects resulting from a number of other developments combine, increasing the prevalence of such development within a landscape to an extent where they may become a defining characteristic. The likely significance of these effects relates to the number of developments affecting the landscape, their scale, their inter-relationship and the sensitivity and ability of the particular landscape to accommodate this type of development.

~~23.5.92~~23.5.104 Cumulative visual amenity effects may result where effects resulting from a number of developments combine to increase the appearance and dominance within a particular view. The likely significance of these effects relates to the number of developments visible and their scale, location and inter-relationship to each other within the view.

~~23.5.93~~23.5.105 As is outlined in Chapter 16: Landscape and Visual Amenity ~~(ES Volume I, EN070009/APP/6.2),~~[APP-069] the landscape and visual effects at Year 1 (opening) and Year 15 (operation) are expected to be similar as mitigation planting would be of limited value in screening the Main Site and no tree planting is proposed for the Connection Corridors. Year 1 and Year 15 have therefore been assessed together as operational effects ~~and~~. These effects are assessed at two stages, those being construction and operation.

Landscape Cumulative Effects

~~23.5.94~~23.5.106 The landscape cumulative assessment considers the potential for cumulative effects on identified landscape receptors as a result of the addition of the Proposed Development to a cumulative baseline which includes a number of other developments. Landscape receptors that have been assessed as having Negligible effects from the Proposed Development alone have not been included in the cumulative assessment, as it is considered unlikely that the addition of a Negligible effect to the cumulative baseline would lead to a significant cumulative effect.

~~23.5.95~~23.5.107 Potential cumulative effects which may arise during the construction and operation phases of the Proposed Development are outlined in Table 23D-10 (Appendix 23D: Stage 4 - Assessment of Cumulative Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)).

~~23.5.96~~23.5.108 All of the shortlisted developments identified in Appendix 23C: Shortlist of Planned Developments and Development Allocations within the ZoI (ES Volume III, EN070009/APP/6.4) have been screened into the assessment of cumulative landscape effects, below, with the exceptions of IDs 76, 80, 91, 121, 150, 157, and ~~157~~375, due to their remoteness from the Proposed Development. The other developments were scoped into the landscape assessment due to their potential to affect the landscape, their scale, their proximity to the Proposed Development and their inter-relationship to each other within the view. For the purposes of this assessment, the unlikely worst-case scenario of all the shortlisted developments being constructed and therefore present in the landscape simultaneously has been assumed and if construction were not to occur simultaneously then the reported cumulative effect would be reduced.

~~23.5.97~~23.5.109 In summary, the cumulative landscape assessment identified that the Redcar Flats Landscape Character Tract (LCTr), the Easton Hills LCTr, the East Billingham to Teesouth Landscape Character Area (LCA) and Coastal Fringe Local Character Type (LCT) are all predicted to be subject to **Minor Adverse (Not Significant)** cumulative effects during construction and operation. The Estuarine LCT is predicted to be subject to a **Minor Adverse (Not Significant)** cumulative effect during construction.

Visual Amenity Cumulative Effects

~~23.5.98~~23.5.110 The visual cumulative assessment assesses the potential for cumulative effects upon identified visual receptors within the ZoI, i.e. the landscape and visual ZoI, as defined in Table 23-~~1~~2.

~~23.5.99~~23.5.111 Development IDs 1, 3, 8, 33, 35, 42, 46, 48, 51, 52, 53, 54, 55, 167, 168, 212, 219, 222, 236, 259, 273, 419, 452 and ~~222~~465 were scoped into the assessment of cumulative visual effects, due to their scale, their potential to be visible from the identified sensitive receptors, and their inter-relationships within the view.

~~23.5.100~~23.5.112 Table 23D-11 (Appendix 23D: Stage 4 - Assessment of Cumulative Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~))~~) outlines the reasoning for the remaining shortlisted developments being scoped out of the assessment of cumulative visual effects.

~~23.5.101~~23.5.113 Potential cumulative visual effects of the Proposed Development are summarised in Table 23D-12 (Appendix 23D: Stage 4 - Assessment of Cumulative Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~))~~) by reference to representative viewpoints. The detailed assessments are provided in Chapter 16: Landscape and Visual Amenity ~~(ES Volume I, EN070009/APP/6.2).~~[APP-069]. Viewpoint locations are shown in Figure 16-5: Zone of Theoretical Visibility and Representative Viewpoint Locations ~~(ES Volume II, EN070009/APP/6.3).~~[APP-169].

~~23.5.102~~23.5.114 Visual receptors that have been assessed as having a Negligible effect due to the Proposed Development have not been included in the cumulative assessment, as it is considered unlikely that the addition of a Negligible effect to the

cumulative baseline of other developments would lead to a significant cumulative effect. This applies to:

- ~~viewpoint~~Viewpoint 1 (Albion Terrace, Hartlepool) at all assessment scenarios;
- ~~viewpoint~~Viewpoint 6 (Cowpen Bewley Woodland Park) at all assessment scenarios;
- ~~viewpoint~~Viewpoint 10 (Eston Nab) at all assessment scenarios;
- ~~viewpoint~~Viewpoint 11 (Longbeck Lane) at all assessment scenarios;
- ~~viewpoint~~Viewpoint 12 (Carpark off A1085 Coast Road, Marske by the Sea) at all assessment scenarios;
- ~~viewpoint~~Viewpoint 13 (Viewpoint at Saltholme Wildlife Reserve and Discovery Park (~~RSPB))~~Royal Society for the Protection of Birds (RSPB))) at all assessment scenarios; and
- ~~viewpoint~~Viewpoint 14 (Viewpoint at Salthome Wildlife and Discovery Park (RSPB)) at all assessment scenarios.

~~23.5.103~~23.5.115 In summary, the cumulative viewpoint assessment identified that Viewpoint 7 (recreational receptors at England Coast Path, Warrenby), and Viewpoint 8 (recreational and residential receptors at Redcar seafront) would be subject to a **Moderate Adverse (Significant)** cumulative effect as a result of views of the construction of the Proposed Development if concurrent with the construction and operation of a number of the identified cumulative developments. The cumulative effect is the same overall classification of effect as that for construction of the Proposed Development at these viewpoints in isolation which is assessed to be **Moderate Adverse (Significant)**.

~~23.5.104~~23.5.116 The cumulative viewpoint assessment identified that Viewpoint 7 would be subject to a **Moderate Adverse (Significant)** cumulative effect as a result of views of the operation of the Proposed Development if concurrent with the construction and operation of a number of the identified cumulative developments.

~~23.5.105~~23.5.117 At Viewpoint 7, the cumulative effect is the same overall classification of effect as that for operation of the Proposed Development in isolation and assessed to be **Moderate Adverse (Significant)**.

~~23.5.106~~23.5.118 The remaining scoped in viewpoints (Viewpoint 2, Viewpoint 3, Viewpoint 4, Viewpoint 5, and Viewpoint 9) are all predicted to be subject to **Minor Adverse (Not Significant)** cumulative effects during construction and operation and Viewpoint 8 is predicted to be subject to **Minor Adverse (Not Significant)** cumulative effect during operation.

~~23.5.107~~23.5.119 As likely significant effects were recorded, the scope for further mitigation measures, such as screen planting, was considered. However, it was concluded that due to the combination of operational constraints, development proximity, and scale of the Proposed Development there is no opportunity to deliver additional mitigation to reduce the significant visual effects for Viewpoints 7 and 8.

~~23.5.108~~23.5.120 The principles outlined in the Framework CEMP (~~EN070009/APP/~~5.12) will limit construction phase effects of the Proposed Development and the design principles for the Proposed Development, such as the routing options for the above ground pipelines, buried pipelines where ~~routing~~routeing does not make use of existing infrastructure, and HDD to avoid sensitive features and existing vegetation, will reduce the effects on landscape and visual receptors further.

Cultural Heritage Cumulative Effects

~~23.5.109~~23.5.121 The potential for cumulative archaeology and / or cultural heritage effects has been considered during the construction and operational phases of the Proposed Development (refer to Chapter 17: Cultural Heritage ~~(ES Volume I, EN070009/APP/6.2)).~~ [APP-070]).

~~23.5.110~~23.5.122 For a cumulative effect to arise as a result of a physical impact to a heritage asset during construction, a development would have to affect the same heritage asset as the Proposed Development. Cumulative effects during operation could arise where the operational components of a development, when viewed alongside or combined with those from the Proposed Development, could interrupt lines of inter-visibility or, for example, create an increase in massing within a view of historical importance.

~~23.5.111~~23.5.123 None of the developments identified to be within the ZoI for Cultural Heritage in Appendix 23B: Assessment of Cumulative Effects – Stages 1-~~3~~2 (ES Volume III, EN070009/APP/6.4) that have been taken forward to the shortlist, would result in additional physical impacts to the heritage assets considered in Chapter 17: Cultural Heritage ~~(ES Volume I, EN070009/APP/6.2).~~[APP-070].

~~23.5.112~~23.5.124 The only shortlisted developments within the ZoI for Cultural Heritage which have the potential to interrupt lines of inter-visibility or create an increase in massing within a view of historical importance are those situated between the Main Site and designated assets to the south-east (Marsh Farmhouse, Westfield House, 1-20, Dormans Crescent, Kirkleatham Conservation Area and Coatham Conservation Area). Developments which have the potential to alter the setting of these assets and add visual intrusions over and above those of the Proposed Development are the following:

- ID 1: The York Potash Harbour Facilities, TR030002;
- ID 3: The Net Zero Teesside Project, EN010103;
- ID 46: Redcar Energy Centre, R2020/0411/FFM;
- ID 53: STDC Foundry, R/2020/0821/ESM;
- ID 54: STDC Long Acres, R/2020/0822/ESM;
- ID 55: STDC Steel House, R/2020/0823/ESM; ~~and~~
- ID 222: HyGreen, R/2023/0179/SCP~~.~~; and
- ~~While~~ID 236: Teesside Flexible Regas Port, EN40001.

23.5.125 Although in close proximity to the Main Site, the HyGreen Hydrogen Production Facility (ID 222) and the Redcar Energy Centre (ID 46) would not add substantially to the massing of industrial buildings as to cause any additional visual intrusion~~, the other four~~ which could degrade the setting, and thus impact the value, of any designated assets. These schemes, including their additional flare stacks, would broadly align with the existing industrial character of the area and would result in **Negligible (Not Significant)** cumulative effects during construction and operation.

~~23.5.113~~23.5.126 The other developments would largely screen and interrupt views of the Proposed Development. The only feature of the Proposed Development which has the potential to be visible to and from the designated assets ~~listed above~~discussed in the cultural heritage chapter would be the two flare ~~stack~~stacks of up to 100 m in height. The ~~flare~~flares would ~~form an additional feature in~~blend with the already widely industrialised landscape with a number of flares already present at Seal Sands to the north of the River Tees. Moreover, the presence of the ~~flare~~flares over and above any one or more of the above shortlisted developments would not add any cumulative impacts to any designated assets through changes to setting.

~~23.5.114~~23.5.127 All shortlisted developments scoped in are considered to have a **Negligible (Not Significant)** cumulative effect during construction and operation. All other shortlisted developments within the ZoI for ~~Cultural Heritage~~cultural heritage can be scoped out of the assessment of cumulative archaeology and heritage effects as there is no potential for cumulative effects on heritage assets or their setting either during construction or operation of the Proposed Development.

Socio-Economics and Land Use Cumulative Effects

~~23.5.115~~23.5.128 There is the potential for cumulative socio-economic and land use effects as a result of the Proposed Development, where effects associated with it may act in conjunction with those associated with other planned projects and local plan allocations in the vicinity.

~~23.5.116~~23.5.129 The ZoI for potential cumulative socio-economic and land use effects is the Middlesbrough and Stockton Travel To Work Area (TTWA), as this represents the potential spread of cumulative construction employment that may come forward for cumulative schemes. This is illustrated by the Wider Impact Area in Figure 18-1 ~~(ES Volume II, EN070009/~~[APP~~/6.3).~~177]. Therefore, all development included in the shortlist except for IDs 76, 80, 91, ~~and~~95, 205, and 370, which lie outside the TTWA, have been considered in this assessment.

Cumulative Effects During Construction

~~23.5.117~~23.5.130 An assessment of the potential for cumulative effects is considered for the employment effects and consequently the effects on the local housing market and local services of non-home based construction employment, referring to those living outside of the ZoI and requiring housing accommodation during the construction phase. The effects on other receptors have not been considered due

to the fact the effects identified in Chapter 18: Socio-Economics and Land Use ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-071] are considered Not Significant.

~~23.5.118~~23.5.131 For construction, multiple other developments within the TTWA present information on the construction phase of their assessments. This includes information on the workforce requirements and the construction phase timeline[4]. This is not available for all developments on the shortlist, and where this is not available, these developments have been discounted from the assessment. If information on the construction timeline is not provided, it is assumed that the 'other developments' will overlap with that of the Proposed Development. Those developments which have been included in the assessment are included in Table 23D-13 (Appendix 23D: Stage 4 - Assessment of Cumulative Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)).

~~23.5.119~~23.5.132 In terms of construction employment, assuming that 780 net construction jobs come forward alongside the ~~30,281~~12,701 jobs and Full Time Equivalents (FTEs) from cumulative developments~~,~~ (13,481 jobs in total), then the cumulative effect on employment is likely to be beneficial for the local economy. Together, this represents a greater total than that of the construction workforce (11,000) for Middlesbrough and Stockton TTWA (ONS, 2022).

~~23.5.120~~23.5.133 In terms of labour demand, there is a short-term risk of temporary labour shortage should multiple projects in the region progress simultaneously. These could include the developments listed in Table ~~23-2~~23D-13. However, the ~~30,281~~12,701 jobs are not likely to come forward at the same time, and also represent a mix of jobs and FTEs, with some figures representing annual totals and others representing the totals over the course of the entire construction programme. As a result, it is likely that the actual number of cumulative jobs supported is lower than this figure. It is also likely that the construction workforce in Middlesbrough and Stockton TTWA will increase in response to demand, through the geographical movement of existing construction workers in other areas. Therefore, the overarching socio-economic cumulative effect is expected to be positive, as this will support substantial cumulative employment over a medium to long term timescale, and the supply of labour is expected to respond to increasing demand in the Middlesbrough and Stockton TTWA should there be any shortages.

~~23.5.121~~23.5.134 In summary, these factors and the size of the cumulative construction workforce suggests that the cumulative magnitude of impact is High, and the sensitivity of the receptors is High. Therefore, this results in a **Major Beneficial (Significant)** cumulative construction worker effect.

Effect of Construction Employment on Local Housing Market and Tourist Accommodation

~~23.5.122~~23.5.135 A separate cumulative assessment has been prepared to assess the cumulative socio-economics effects of the Proposed Development in conjunction

[4] Employment has been presented in a multitude of ways in other developments, for example, as jobs supported, or as Full Time Equivalents (FTEs). For the purposes of this assessment, these metrics are combined to present the maximum cumulative employment that is likely in the ZoI.

with the NZT and ~~Hygreen~~HyGreen developments located in close proximity. This is presented in Appendix 23E: Socio-Economic Cumulative Assessment (ES Volume III, EN070009/APP/6.4).

~~23.5.123~~23.5.136 In terms of the effect on the local housing market and tourist accommodation services, there is a short-term risk of a temporary accommodation shortage as a result of the cumulative employment impact, especially if most or all of the cumulative schemes' construction phases take place simultaneously. The cumulative jobs calculation is presented in Table 23D-13 of Appendix 23D. The total figure of ~~30,281~~13,481[5] jobs and FTEs suggests that the residential surplus in the private rental sector for non-home based workers required, as noted in Section 18.4 (Chapter 18: Socio-economics and Land Use~~, ES Volume I, EN070009/~~ [APP~~/6.2), 071])~~, would be filled from these schemes~~.~~, which could lead to a deficit in available temporary accommodation and housing.

23.5.137 As shown in updated Table 23D-13, the Other Developments are likely to require 12,701 construction jobs. Assuming that 780 net construction jobs required for the Proposed Development come forward alongside the 12,701 jobs and Full Time Equivalents (FTEs) from Other Developments, there will be 13,481 construction workers required for the developments. ONS data shows that the cumulative employment requirements for the construction phase in a worst-case scenario are larger than the total current construction workforce in the Middlesbrough and Stockton TTWA (11,000 total employees; ONS, 2022).

23.5.138 Through applying the same assumptions detailed in Chapter 18: Socio-economics and Land Use [APP-071] for leakage (25%) to the cumulative workforce figure of 13,481, it suggests that 3,370 jobs will be taken by residents from outside of the TTWA. This represents the 'non-home based' proportion of employment, potentially requiring housing accommodation during the construction phase.

23.5.139 The private rented homes sector is considered to be the principal sector for accommodating demand for housing from 'non-home based' construction workers in an urban development context. Chapter 18: Socio-economics and Land Use [APP-071] details that there are 1,575 properties within the Middlesbrough and Stockton TTWA in 2021 that could potentially be occupied by construction workers. The non-home-based worker figure of 3,370 suggests that the residential surplus in the private rental sector for non-home-based workers required would be filled from these schemes, which could lead to a deficit in available temporary accommodation and housing.

~~23.5.124~~ The overall socio-economic effect is expected to be negative due to the potential disruption that the cumulative jobs could cause for the tourism accommodation sector and the local housing market. It is considered likely that the other developments will not all come forward simultaneously, and that the cumulative jobs figure is overestimated for reasons noted previously. However, it is anticipated

[5] The total number for Construction Employment has been reduced from 30,281 jobs, to 13,481. This is because Development ID 35 has reduced from 25,200 jobs to 2,430 jobs. This is as a result of the Errata Review undertaken as part of the updated Cumulative and Combined Effects Assessment.

that a considerable reliance on accommodation for private residential purposes will persist~~. The bed and breakfast accommodation sub-sector is poised~~, due to ~~address~~ the ~~cumulative~~sustained demand~~, particularly for shorter stays.~~

~~23.5.125~~23.5.140 ~~Given this,~~ that could take place in the ~~cumulative~~construction phase. As a result, the level of demand for accommodation could have a high magnitude of impact ~~is Medium, and the~~ on the receptors impacted by the Other Developments. The sensitivity of the ~~receptors~~receptor is Medium~~. This~~, therefore this results in a ~~**Moderate**~~**Major** **Adverse (Significant)** cumulative effect.

~~23.5.126~~23.5.141 The Applicant is committed to working with the promoters of other cumulative schemes, and the local planning authorities to mitigate and reduce the effect of the cumulative construction workforce as far as possible in relation to impacts to housing and other health, social, and community facilities. This includes setting up a working group for the Proposed Development and other cumulative developments in order to communicate and co-ordinate construction works at the individual developments in order to reduce any issues created by the additional construction workforce in the vicinity of the respective cumulative developments. This will involve sharing information about construction programmes, construction workforce expectations and requirements and allowing for on-going consideration of temporary accommodation and health, social, and community facility availability (as discussed below) and agreeing approaches to how any deficit could be dealt with in a proportionate and strategic manner by that group, based on the detailed construction worker profiles and programmes of those developments and the Proposed Development.

Demographic Effects and Community Disruption

~~23.5.127~~23.5.142 The significant cumulative effects of construction employment, and their requirements for housing and accommodation, will lead to an increase in construction workers in the ZoI, which in turn will affect the demographic characteristics of the local communities in the vicinity of the Proposed Development. This may also lead to increased demand for local services and the use of community facilities and their respective activities. It is likely that the impact on local residents is worsened through increased demand, and restricted access to local services as a result. The overall socio-economic effect is expected to be negative due to the potential disruption that the cumulative jobs could cause for the tourism accommodation sector and the local housing market. To accommodate this, it is likely that local services and infrastructure will need to be expanded to accommodate the cumulative additional construction workforce from these projects. This could lead to adverse socio-economic effects for several local communities and the demographic characteristics impacted by the cumulative developments.

~~23.5.128~~23.5.143 Given this, the cumulative magnitude of this effect is ~~Medium~~High, and the sensitivity of the receptors is Medium. This results in a ~~**Moderate**~~**Major** **Adverse (Significant)** cumulative effect.

Cumulative Effects During Operation

~~23.5.129~~23.5.144 None of the post-mitigation operational effects for the Proposed Development are expected to be cumulatively significant. Furthermore, the overall impact is expected to be minimal on employment, land use and community facilities in the Wider Impact Area, with the operational workforce in particular expected to be relatively small in comparison to the Wider Impact Area, and not contribute to a cumulative effect in the ZoI. Therefore, when considering the cumulative operational phase effects in the ZoI, there are not expected to be any significant cumulative operational effects for the Proposed Development.

Summary of Cumulative Effects

~~23.5.130~~23.5.145 The following significant cumulative effects are anticipated in the construction phase:

- ~~Employment~~employment – **Major Beneficial (Significant)**; and
- ~~Impacts~~impacts of Construction Employment on Local Housing Market and Local Services – ~~**Moderate**~~**Major Adverse (Significant)**.
- ~~Demographic~~demographic effects and Community Disruption – ~~**Moderate**~~**Major Adverse (Significant)**.

Human Health Cumulative Effects

~~23.5.131~~23.5.146 There is the potential for cumulative human health effects as a result of the Proposed Development, where effects associated with it may act in conjunction with those associated with other planned projects and local plan allocations in the vicinity.

Cumulative Effects During Construction

~~23.5.132~~23.5.147 An assessment of the potential for cumulative effects upon human health during the construction phase of the Proposed Development is included below. Some determinants (open space, leisure, and play; community safety; community identity, culture, resilience, and influence; social participation, interaction, and support; education and training; and radiation) have been deemed not relevant to the cumulative assessment as there will be no cumulative impacts on them and therefore have not been assessed.

~~23.5.133~~23.5.148 Chapter 22: Human Health [APP-075] is based on findings from Chapter 8: Air Quality, Chapter 11: Noise and Vibration, Chapter 15: Traffic and Transport, Chapter 18: Socio-economics and Land Use, Chapter 19: Climate Change, and Chapter 20: Major Accidents and Disasters ~~(ES Volume I, EN070009/APP/6.2),~~ and therefore the ZoI for potential cumulative human health effects is based on the ZoI set out in these respective chapters. These are illustrated by Figure 23-1: Zones of Influence for Cumulative Effects Assessment (ES Volume II, EN070009/APP/6.3). This section will summarise relevant aspects of each cumulative assessment in regard to human health.

Risk Taking Behaviour

~~23.5.134~~23.5.149 Chapter 20: Major Accidents and Disasters [APP-071] has implicitly considered cumulative effects that may arise due to other major accident hazard installations and pipelines in the area (domino effects) which are knock-on impacts (e.g. fire at one installation which causes an explosion at another installation). ~~Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2) has implicitly considered cumulative effects that may arise due to other major accident hazard installations and pipelines in the area (domino effects) which are knock-on impacts (e.g. fire at one installation which causes an explosion at another installation).~~ Measures such as ground investigation, adherence to the Final CEMP(s), the production of a COMAH ~~(Control of Major Accident Hazards)~~ Safety Report and Emergency Response Plans will reduce these risks to ALARP. Therefore, the overall cumulative effect on the 'Risk Taking Behaviour' human health determinant is assessed to remain at **Negligible (Not Significant~~)..~~).**

Transport Modes, Access, and Connections

~~23.5.135~~23.5.150 Chapter 15: Traffic and Transport ~~(ES Volume I, EN070009/[~~APP~~/6.2) 065]~~ finds that it is possible that the cumulative effect of the construction traffic of the developments could have an adverse effect in terms of fear and intimidation[6] and severance[7] (IEMA, 2023). However, it is expected that through the adoption of the Final CTMP(s) and Final CWTP(s) any effect upon non ~~car~~ motorised users in regard to both fear and intimidation and severance is likely to be reduced to an acceptable level. The Applicant will also conduct a public awareness campaign prior to the construction of the Proposed Development. Through this the Applicant will work with other applicants to seek to develop a co-ordinated response in increasing public knowledge of the cumulative developments and to consider methods to manage construction traffic impacts. Therefore, the overall cumulative effects on the 'Transport Modes, Access, and Connections' and 'Community Safety' human health determinants are assessed to remain at **Minor Adverse (Not Significant)**.

Employment and Income

~~23.5.136~~23.5.151 Chapter 18: Socio-economics and Land Use ~~(ES Volume I, EN070009/[~~APP~~/6.2) 071]~~ finds that the construction phases of the Proposed Development and the other cumulative developments would be expected to generate employment which would be beneficial to the local economy. As assessed in Chapter 18: Socio-economics and Land Use ~~(ES Volume I, EN070009/[~~APP~~/6.2), 071] and~~ the Updated Appendix 23D, assuming that 780 net construction jobs come forward (Section 18.6 [APP-071])) alongside the 12,701 jobs and FTEs from cumulative developments, then the cumulative effect on employment is likely to be beneficial. The size of the construction workforces of the other developments is enough to produce a High cumulative magnitude of effect. Therefore, the overall

[6] The extent of fear and intimidation is dependent upon, the total volume of traffic, HGV composition, speed of traffic and proximity of traffic to people and the quality of any non-motorised provision.
[7] Severance is the perceived division that can occur within a community when it becomes separated by major transport infrastructure and can also result from the difficulty of crossing a heavily trafficked road or a physical barrier.

cumulative effect on the 'Employment and Income' human health determinant is assessed to be **Major Beneficial (Significant)**.

Housing

~~23.5.137~~23.5.152 Considering the cumulative assessment of 'Employment and Income' above, Chapter 18: Socio-economics and Land Use ~~(ES Volume I, EN070009/APP/6.2)~~[APP-071] assesses that there is a short-term risk of a temporary accommodation shortage as a result of the cumulative employment impact, especially if most or all of the cumulative developments' construction phases take place simultaneously. It is likely that these developments will not all come forward simultaneously, however there will remain a substantial reliance on accommodation for private residential accommodation. Therefore, the overall cumulative effect on the 'Housing' human health determinant is assessed to be ~~**Moderate**~~**Major Adverse (Significant)**.

Health and Social Care Services

~~23.5.138~~23.5.153 ~~Additional jobs could add pressure to local~~Construction workers working on the Proposed Development and the cumulative developments may place extra demand on health and social care services~~.~~ if they move to the area, or if emergency treatment is required. Chapter 18: Socio-economics and Land Use ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-071] finds that the cumulative developments could lead to an increase in the number of people in the area if construction phases are to take place at the same time. ~~This could cause an increase in workers who may require access to health and social care services. Therefore~~. Therefore, due to the temporary nature of the construction phase, the overall cumulative effect on the 'Health and Social Care Services' human health determinant is assessed to be **Moderate Adverse (Significant)**.

Climate Change Mitigation and Adaptation

~~23.5.139~~23.5.154 Chapter 19: Climate Change ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-072] does not include a GHG cumulative assessment because the GHG assessment is inherently cumulative~~.~~ as all GHG emissions have the potential to equally impact the receptor i.e. the global climate. Further information on the inherent cumulative nature of the GHG assessment can be found in Chapter 19 [APP-072]. This is because all GHG emissions have the potential to equally impact the receptor i.e. the global climate. Therefore, the cumulative effect of the proposed developments on climate change mitigation and adaptation is assessed to remain as **Minor Adverse (Not Significant)**.

Air Quality

~~23.5.140~~23.5.155 Chapter 8: Air Quality ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-060] finds that proposed developments in the vicinity of the Proposed Development ~~Site~~ may interact with the air quality impacts and effects outlined in the chapter. For example, the impact of additional vehicles from other committed developments (including HyGreen and Net Zero Teesside). However, these were accounted for in the traffic assessment. In addition, sources of dust from the construction of other

nearby development could cause a cumulative impact to air quality. However, the assessment of construction dust impacts reported in Chapter 8 has been undertaken in line with industry-standard guidance to demonstrate the level of dust control required to mitigate any potential for significant effects. It is reasonable to assume that any other construction site in the vicinity of the Proposed Development will have done the same and will control dust through mitigation that is standard practice on all well managed construction sites across the UK. Based on this, the overall cumulative effect on the 'Air Quality' human health determinant is assessed to remain at **Minor Adverse (Not Significant)**.

Noise and Vibration

~~23.5.141~~23.5.156 Chapter 11: Noise and Vibration ~~(ES Volume I, EN070009/[~~APP~~/6.2) 063]~~ finds that cumulative construction noise effects are not significantly increased at most of the noise sensitive receptors. At ~~one~~ receptor H6, effects are predicted to increase from ~~minor adverse (not significant~~**Negligible (Not Significant)** to ~~moderate adverse (significant~~**Moderate Adverse (Significant)** with the addition of simultaneous noise from construction of the Proposed Development and the ~~other committed developments.~~Other Developments. No specific mitigation is proposed as no appropriate mitigation is available beyond that which is secured in the Framework CEMP (5.12). The construction noise level predicted for the Proposed Development is during construction of the pipeline which will be close to ~~this receptor for~~H6for a short period within the ~~proposed development~~Proposed Development construction. Therefore, it is unlikely that this will be simultaneous with the construction of all the Other Developments. Based on this, the overall cumulative effect on the 'Noise and Vibration' human health determinant is assessed to remain at **Minor Adverse (Not Significant)**.

Cumulative Effects During Operation

~~23.5.142~~23.5.157 An assessment of the potential for cumulative effects upon human health during the operational phase of the Proposed Development is reported in the following sections.

Risk Taking Behaviour

~~23.5.143~~23.5.158 ~~Chapter 20: Major Accidents and Disasters (ES Volume I, EN070009/APP/6.2) has implicitly considered cumulative effects that may arise due to other major accident hazard installations and pipelines in the area (domino effects) which are knock-on impacts (e.g.,~~Chapter 20: Major Accidents and Disasters [APP-073]~~fire at one installation which causes an explosion at another installation).~~ has implicitly considered cumulative effects that may arise due to other major accident hazard installations and pipelines in the area (domino effects) which are knock-on impacts (e.g. fire at one installation which causes an explosion at another installation). Therefore, the overall cumulative effect on the 'Risk Taking Behaviour' human health determinant during operation is assessed to remain at **Negligible (Not Significant)**.

Transport Modes, Access, and Connections

~~23.5.144~~23.5.159 Chapter 15: Traffic and Transport ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-068] states that once operational the Proposed Development is not considered to result in a severe impact upon the local highway network and therefore no further assessment has been undertaken. Therefore, there are no cumulative effects anticipated.

Employment and Income

~~23.5.145~~23.5.160 Chapter 18: Socio-economics and Land Use ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-071] finds that the overall cumulative impact on employment is expected to be minimal in the wider area, with the operational workforces of the other developments expected to be relatively small. Therefore, the overall cumulative effect on the 'Employment and Income' human health determinant during operation is assessed to remain at **Minor Beneficial (Not Significant)**.

Health and Social Care Services

~~23.5.146~~23.5.161 Similar to the Proposed Development, operational workforces of the other developments are expected to be relatively small. Due to this, access to health and social care services is likely to remain unchanged and therefore the cumulative effect on the 'Health and Social Care Services' determinant during operation is assessed to remain at **Negligible (Not Significant)**.

Climate Change Mitigation and Adaptation

~~23.5.147~~23.5.162 Chapter 19: Climate Change ~~(ES Volume I, EN070009/APP/6.2)~~[APP-072] does not undertake a GHG cumulative assessment because the GHG assessment is inherently cumulative as all GHG emissions have the potential to equally impact the receptor i.e. the global climate. Further information on the inherent cumulative nature of the GHG assessment can be found in Chapter 19 [APP-072]. The Proposed Development will help to enable a just transition to a lower carbon economy. The Applicant is not preventing other climate change mitigation or adaptation from coming forward for the cumulative developments. Therefore, the cumulative effect of the proposed developments on climate change mitigation and adaptation is assessed to remain as **Minor Adverse (Not Significant)**.

Air Quality

~~23.5.148~~23.5.163 The results presented within the air quality assessment are inherently cumulative, as the air quality modelling for the operational phase includes all relevant committed developments on top of the existing background, both with and without the Proposed Development. Therefore, the overall cumulative effect on the 'Air Quality' human health determinant during operation is assessed to remain at **Negligible (Not Significant)**.

Noise and Vibration

~~23.5.149~~23.5.164 Chapter 11: Noise and Vibration ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-063] finds that the cumulative developments could cause ambient sound level

increases at all noise sensitive receptors. However, it is stated that this is as a result only of other developments and the same increase would occur without the Proposed Development. As the Proposed Development operational noise does not increase the cumulative ambient level, this is not considered to result in a significant cumulative effect. Therefore, the overall cumulative effect on the 'Noise and Vibration' human health determinant during operation is assessed to remain at **Minor Adverse (Not Significant)**.

Summary of Cumulative Effects

~~23.5.150~~23.5.165 In summary, the following cumulative human health effects are expected during construction:

- **Negligible (Not Significant)** for Risk Taking Behaviour
- **Minor Adverse (Not Significant)** for Transport Modes, Access and Connections
- **Major Beneficial (Significant)** for Employment and Income
- ~~**Moderate**~~**Major Adverse (Significant)** for Housing
- **Moderate Adverse (Significant)** for Health and Social Care
- **Minor Adverse (Not Significant)** for Air Quality
- **Minor Adverse (Not Significant)** for Noise and Vibration

~~23.5.151~~23.5.166 During operation, all cumulative human health effects are expected to be ~~negligible~~**Negligible** except for employment and income which is expected to be **Minor Beneficial (Not Significant)** and noise and vibration which is expected to be **Minor Adverse (Not Significant)**.

23.6 Combined Effects Assessment

23.6.1 Each of the technical assessments reported in the ES ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~-060 to APP-075] has identified effects which may occur as a result of the Proposed Development. Multiple effects upon one or more common receptors could theoretically interact or combine~~,~~ to result in a combined effect ~~which is more or less significant than the effects individually~~.

23.6.2 As described in Section 23.3, some of the technical assessments have already considered effects that result from the combination or interaction of different types of impacts on individual receptors. For example, the potential for multiple effects to affect the Teesmouth and Cleveland Coast SSSI, SPA and Ramsar sites is considered within Chapter 12: Ecology and Nature Conservation and Chapter 13: Ornithology ~~(ES Volume I, EN070009/APP/6.2).~~[APP-064 and APP-065]. Any effects arising from the interaction of impacts on individual receptors which have already been assessed within the technical assessments are not repeated here, this is reported in each technical chapter ~~as required~~ (Chapters 8 to 22 ~~(ES Volume I, EN070009/~~[APP~~/6.2)).~~-060 to APP-075]). This section considers only those combined effects which have not been identified elsewhere within the technical

assessments. ~~As such~~Accordingly, this chapter only considers ~~only~~ the potential combined effects on human receptors.

23.6.3 When considering combined effects, the mitigation measures as set out in Chapters 8 to 22 ~~(ES Volume I, EN070009/APP/6.2),~~[APP-060 to APP-075]. including embedded mitigation measures incorporated into the Proposed Development's design and measures included in the Framework CEMP (~~EN070009/APP/~~5.12) must be taken into account. Therefore, only residual effects (post-mitigation) are considered in this chapter.

23.6.4 In assessing potential combined effects, human receptors experiencing effects of minor or greater ~~magnitude~~significance have been considered. The types of ~~impacts~~effects that could be experienced by these receptors (and which may interact) are noise, air quality and visual effects, during both construction and operation.

23.6.5 Mitigation of ~~any~~identified combined effects ~~identified~~ is best achieved through management and control measures employed to prevent or reduce the individual effects in the first instance, thereby reducing the likelihood of the effects interacting and combining.

23.6.6 The following sections provide a qualitative assessment of the potential for combined effects to arise, following a review of the impacts reported within ES Chapters 8 to 22 ~~(ES Volume I, EN070009/APP/6.2).~~[APP-060 to APP-075]. Common receptors have been identified.

Combined Effects During Construction

23.6.7 One potential receptor group is identified for construction, which includes residential receptors located around Grangetown and Middlesbrough which lie in close proximity to the Hydrogen Pipeline Corridor and the A1085. Potential combined effects for the receptor group are considered to be traffic-related air quality and noise. Further details on this receptor group are included in Table 23D-14 (Appendix 23D: Stage 4 - Assessment of Cumulative Effects~~,~~ (ES Volume III, EN070009/APP/6.4~~).~~)).

23.6.8 The updated Air Quality assessment presented in ~~Chapter 8:~~the Technical Note: Updates to Air Quality ~~(ES Volume I, EN070009/APP/~~and Traffic Cumulative Assessments (6.~~2) identified~~4.42) identifies Negligible traffic-related air quality effects on the receptors located in Grangetown and Middlesbrough, therefore it is not considered that there would be any potential for combined effects when considered alongside potential noise impacts.

Combined Effects During Operation

23.6.9 Four potential receptor groups were identified for operation, as detailed in Table 23D-14 (Appendix 23D: Stage 4 - Assessment of Cumulative Effects~~,~~ (ES Volume III, EN070009/APP/6.4) and summarised below:

- receptor group 2: Recreational receptors located at Marine Club and Tingdale Beach Caravan Park, Redcar and South Gare Breakwater;

- receptor group 3: Recreational receptors located at Cleveland Golf Links and England Coastal Path;
- receptor group 4: Residential Property Marsh House Farm, Redcar; and
- receptor group 5: Residential Properties located on Broadway West, Redcar.

23.6.10 All of the receptor groups were identified for their potential for combined effects between air quality and either visual or noise effects. However, the updated Air Quality assessment presented in Chapter 8: Air Quality ~~(ES Volume I, EN070009/~~[APP~~/6.2)~~ 060] identified Negligible effects for all receptors during operation and it is therefore not considered that there is potential for significant combined effects.

23.7 Additional Mitigation and Monitoring

23.7.1 No additional mitigation measures have been proposed beyond those outlined in Chapters 8 to 22 ~~(ES Volume I, EN070009/APP/6.2).~~[APP-060 to APP-075].

23.8 Summary of Residual Effects

23.8.1 Summaries of the potential significant cumulative and combined effects associated with the construction and operation of the Proposed Development are presented in Table 23-~~57~~ and 23-~~68~~ respectively.

Table 23-6: Summary of Residual Effects During Construction

RECEPTOR/ RECOURCE	LIKELY EFFECTS	PROPOSED MITIGATION / ENHANCEMENT[8]	RESIDUAL EFFECTS
Air Quality: Construction dust	**Not Significant**	None proposed	**Not Significant**
Surface Water, Flood Risk and Water Resources: impacts to waterbodies from construction related pollutants	**Not Significant**	None proposed	**Not Significant**
Geology, Hydrogeology and Contaminated Land: Loss of agricultural soils	**Slight Adverse (Not Significant)**	None proposed	**Slight Adverse (Not Significant)**
Geology, Hydrogeology and Contaminated Land: geological effects	**Not Significant**	None proposed	**Not Significant**
Geology, Hydrogeology and Contaminated Land: groundwater effects	**Not Significant**	Mitigation for each development in accordance with legislation and industry standard measures	**Not Significant**
~~Noise and Vibration: Construction Noise at NSRs H1, H2, and H3~~	~~**Not Significant**~~	~~None proposed~~	~~**Not Significant**~~
~~Noise and Vibration: Construction Noise at NSR H5~~	~~**Minor Adverse (Not Significant)**~~	~~None proposed~~	~~**Minor Adverse (Not Significant)**~~
Noise effect: Noise Sensitive ~~Receptor~~Receptors H1, H4 and H6	**Moderate Adverse (Significant)**	For H6, no specific mitigation is proposed as no appropriate mitigation is available beyond that which is secured in the Framework CEMP (5.12), and given that the construction noise level predicted for the Proposed Development is during construction of the pipeline which will be close to	**Moderate Adverse (Significant)**

[8] Where no mitigation is proposed for significant adverse effects, it is considered no extra essential mitigation be can provided above and beyond what is already proposed in the respective technical chapter (Chapter 8 – 22 (ES Volume I, EN070009/APP/6.2)).

RECEPTOR/ RECOURCE	LIKELY EFFECTS	PROPOSED MITIGATION / ENHANCEMENT[8]	RESIDUAL EFFECTS
		NSR H6 for a short period within the Proposed Development construction. ~~None proposed as no appropriate mitigation available~~	
Ecology: Construction phase effects on designated sites, habitats and GCN	**Major Adverse (Significant)**	None proposed as no appropriate mitigation available at this stage	**Major Adverse (Significant)**
Ecology: Construction phase effects on open mosaic habitats and invertebrates	**Moderate Adverse (Significant)**	None proposed as no appropriate mitigation available at this stage	**Moderate Adverse (Significant)**
Ornithology: Short term construction phase impact on grasslands and open mosaic habitat	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant**
Marine Ecology: Changes in Airborne Soundscape	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Landscape effects during construction for all landscape types	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Visual effects at Viewpoints 2, 3, 4, 5, and 9 during construction	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Visual effect: Viewpoint 7 and 8 during construction	**Moderate Adverse (Significant)**	None proposed as no appropriate mitigation available	**Moderate Adverse (Significant)**
Cultural Heritage: impacts to setting of heritage assets	Negligible (**Not Significant**)	None proposed	Negligible (**Not Significant**)
Socio-demographic effect: Construction employment	**Major Beneficial (Significant)**	None proposed	**Major Beneficial (Significant)**

RECEPTOR/ RECOURCE	LIKELY EFFECTS	PROPOSED MITIGATION / ENHANCEMENT[8]	RESIDUAL EFFECTS
Socio-demographic effect: Local housing market and tourist accommodation	~~Moderate~~Major **Adverse (Significant)**	The Applicant is committed to working with the promoters of other ~~cumulative schemes~~developments to mitigate and reduce the effect of the cumulative construction workforce as far as possible. This includes setting up a working group for the Proposed Development and other cumulative developments in order to communicate and co-ordinate construction works at the individual developments in order to reduce any issues created by the additional construction workforce in the vicinity of the respective cumulative developments.	~~Moderate~~Major **Adverse (Significant)**
Socio-demographic effect: Demographic effects and community disruption	~~Moderate~~Major **Adverse (Significant)**	~~None proposed as no appropriate mitigation available~~The above group would also consider the management of these effects.	~~Moderate~~Major **Adverse (Significant)**
Human ~~Health~~health effect: Risk taking behaviour	**Negligible (Not Significant)**	None proposed	**Negligible (Not Significant)**
Human health effect: transport modes, access and connections	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Human health effect: Employment and Income	**Major Beneficial (Significant)**	None proposed	**Major Beneficial (Significant)**
Human health effect: Housing	~~Moderate~~Major **Adverse (Significant)**	None proposed as no appropriate mitigation available	~~Moderate~~Major **Adverse (Significant)**

RECEPTOR/ RECOURCE	LIKELY EFFECTS	PROPOSED MITIGATION / ENHANCEMENT[8]	RESIDUAL EFFECTS
Human health effect: Health and Social Care Service	**Moderate Adverse (Significant)**	None proposed as no appropriate mitigation available	**Moderate Adverse (Significant)**
Human ~~Health~~health effect: Climate Change Mitigation and Adaptation during construction	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Human ~~Health~~health effect: Air Quality during construction	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Human ~~Health~~health effect: Noise and Vibration during construction	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**

Table 23-7: Summary of Significant Effects During Operation

RECEPTOR/ RECOURCE	LIKELY SIGNIFICANT EFFECTS	PROPOSED MITIGATION / ENHANCEMENT	RESIDUAL EFFECTS
Surface Water, Flood Risk and Water Resources: wate quality changes or increased flooding	**Not Significant**	Flood Risk Assessments and Drainage Strategies are expected for most developments.	**Not Significant**
Noise and Vibration: Operational Noise at NSRs H5 and H6	**Negligible (Not Significant)**	None proposed	**Negligible (Not Significant)**
Ecology: Operational impacts on designated sites, ~~LNRs~~Local Nature Reserves and habitats and other identified ecological receptors	**Not Significant**	None proposed	**Not Significant**
Ornithology: Operational impacts on designated sites, qualifying species and breeding, non-breeding and regularly occurring species of bird	**Not Significant**	None proposed	**Not Significant**
Marine Ecology: Changes in Airborne Soundscape	**Negligible (Not Significant)**	None proposed	**Negligible (Not Significant)**
Marine Ecology: Nutrient and Chemical Effects from the Dispersion and Discharge of Treated Effluent	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Landscape effects for Redcar Flats LCTr, Eston Hills LCTr, East Billingham to Teesmouth LCA and Coastal Fringe LCT	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**

RECEPTOR/ RECOURCE	LIKELY SIGNIFICANT EFFECTS	PROPOSED MITIGATION / ENHANCEMENT	RESIDUAL EFFECTS
Landscape effects for Estuarine LCT	**Negligible (Not Significant)**	None proposed	**Negligible (Not Significant)**
Visual effects at Viewpoints 3, 4, 5, 8 and 9	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Visual effect: Viewpoint 7	**Moderate Adverse (Significant)**	None proposed as no appropriate mitigation available	**Moderate Adverse (Significant)**
Cultural Heritage: impacts to setting of heritage assets	**Not Significant**	None proposed	**Not Significant**
Human Health: Risk taking behaviour	**Negligible (Not Significant)**	None proposed	**Negligible (Not Significant)**
Human Health: Employment and Income	~~**Negligible**~~Minor Beneficial **(Not Significant)**	None proposed	~~**Negligible**~~Minor Beneficial **(Not Significant)**
Human Health: Health and Social Care Services	**Negligible (Not Significant)**	None proposed	**Negligible (Not Significant)**
Human Health: Climate Change Mitigation and Adaptation	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**
Human Health: Air Quality during operation	**Negligible (Not Significant)**	None proposed	**Negligible (Not Significant)**
Human Health: Noise and Vibration during operation	**Minor Adverse (Not Significant)**	None proposed	**Minor Adverse (Not Significant)**

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