

27 CUMULATIVE IMPACT ASSESSMENT

27.1 Introduction

In addition to identifying and assessing the potential impacts of the proposed scheme in isolation, the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) and the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 require an assessment of its potential cumulative impacts. A CIA assesses the potential impacts of a project with other past, present (current) and reasonably foreseeable (proposed) projects.

With respect to past projects or existing/completed projects, a useful ground rule in CIA is that the environmental impact of schemes that have been completed should be included within the environmental baseline. As such, these impacts are already taken into account in the EIA process for the proposed scheme. Consequently, completed projects can be excluded from the scope of CIA. However, the environmental impacts of recently completed projects may not be fully manifested and, therefore, care is needed in respect of how the potential impacts of such projects are taken into account.

Projects that are currently being constructed or that are in the planning process (where sufficient information is publicly available), as well as on-going activities that have the potential to influence the same environmental parameters as the proposed scheme are the focus of this CIA. Future plans or projects for which sufficient information is not available on which to base a reliable assessment, which are unlikely to be submitted or receive consent until after the proposed scheme has been completed, cannot reasonably be assessed as part of a CIA. However, the applicants for such projects will be required to take the effect of this proposed scheme into account in their own application.

27.2 Guidance on cumulative impacts and cumulative effects assessment

The IEMA 'Guidelines for Environmental Impact Assessment' (IEMA, 2004) define cumulative impacts as:

"...the impacts on the environment which result from incremental impacts of the action when added to other past, present and reasonably foreseeable future actions..."

Cumulative impacts can be therefore additive or interactive. Typically, additive impacts occur when different project activities have an impact on the same environmental receptor at the same time. Interactive impacts are assessed in relation to a specific receptor but are caused by the interaction of different types of impacts from project activities even if individually these are insignificant (e.g. the interaction of underwater noise disturbance and increased suspended sediments on migratory fish).

To be considered within the CIA, other plans and projects should meet the following criteria. They should:

- generate their own residual impacts of at least minor significance;
- be likely to be constructed or operate over similar time periods to the proposed scheme (or their environmental consequences have the potential to be realised over the same time period);
- be spatially linked to the predicted zone of influence of the proposed scheme (for example, influencing the same area as affected by the sediment plume); and,
- be either consented (but not operational) or the subject of consent applications with the statutory authorities in the study area or part of another statutory procedure.

27.3 Assessment methodology

27.3.1 Definition of temporary boundaries

Temporal boundaries provide the timescales over which a project and, therefore, the assessment are undertaken and they give temporal limits to the CIA. When determining temporal boundaries, it is necessary to consider the longevity of effects, the potential nature of effects over time and the importance of seasonal variations in populations and sensitivities.

The temporal boundary for this assessment includes present plans and projects where the impacts are still occurring, or where mitigation measures are still operating; and reasonably foreseeable future plans and projects with which there could be a temporal or spatial overlap.

STDC's intention is to construct the proposed scheme during 2021 with the proposed scheme planned to be operational by 2023.

27.3.2 Definition of spatial boundaries

Spatial boundaries define the area likely to be affected by the proposed scheme. The study area can therefore be defined by the hydrodynamic model extent which for the marine environment is determined on the basis of the potential extent of the dredging and disposal plumes.

As with the marine parts of the proposed scheme, the study area for the landside parts of the proposed scheme is defined as the area over which potentially significant direct and indirect effects may occur. In this instance, the landside study area is likely to vary by topic (as detailed in the respective technical sections of this report and summarised in **Table 1.1**). Landscape and visual impact assessment has been detailed separately within **Table 1.1** as impacts associated with that topic are predicted to extend the greatest distance from the proposed scheme footprint (up to 5km from the proposed scheme footprint).

27.3.3 Identification of relevant plans and projects

Based upon the temporal and spatial boundaries described above, a comprehensive list of plans and projects relevant or potentially relevant to the CIA has been compiled and is provided in **Section 27.4**. This includes an explanation as to why plans/projects were taken forward for detailed assessment in the CIA or why they were screened out of the need for further assessment. The list of projects to consider has been discussed and agreed with the MMO and RCBC as part of the scoping discussions held in July / August 2020.

27.4 Scope of assessment

27.4.1 Screening

Plans and projects identified within the vicinity of the proposed scheme are outlined in **Table 27.1**. The landside projects detailed in **Table 27.1** have been determined through liaison with RCBC planning department in July 2020. Where data is available, details of project type, construction dates, duration of works and other relevant data are provided, along with the distance from the proposed works.

Table 27.1 Plans and projects identified in the vicinity of the proposed scheme

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
AV Dawson	Proposed quayside works and dredging at its North Sea supply base and Dawson's Wharf.	Approximately 4.5km upstream	No marine licence application submitted to date.	There is no environmental assessment information available to undertake a cumulative assessment with the proposed scheme. In addition, given the separation distance between the proposed scheme footprint and the AV Dawson scheme, it is considered that there is no pathway for cumulative impacts to occur. Screened out of the CIA.
South Industrial Zone	Outline planning application for demolition of existing structures on site and the development of up to 418,000sqm (gross) of general industry (Use Class B2) and storage or distribution facilities (Use Class B8) with office accommodation (Use Class B1), HGV and car parking and associated infrastructure works. All matters reserved other than access.	Immediately adjacent (inland)	Application submitted but awaiting approval.	The South Industrial scheme is located in very close proximity to the proposed scheme footprint and therefore is screened into the CIA. Screened into the CIA.
NGCT	The NGCT scheme comprises capital dredging up to 4.8 million m3 of sediment from the riverbed, realignment of the approach channel, disposal of dredged material offshore, construction of a new container terminal facility and construction of various landside elements (buildings, rail terminal, road access, lighting, drainage and a pumping station). PDT is proposing to fully construct the proposed NGCT in advance of the existing Harbour Revision Order expiring on 7 th May 2028.	Approximately 1.5km downstream. Dredge footprint overlaps at Tees Dock turning circle.	Planning permission granted and implemented. Marine licence application submitted but awaiting approval.	The NGCT scheme is located in very close proximity to the proposed scheme footprint and therefore is screened into the CIA. Screened into the CIA.
Anglo American Harbour Facilities	The Anglo American Harbour Facilities scheme was granted a DCO in 2016. The DCO permits the following activities which are yet to commence: Phase 1 <ul style="list-style-type: none"> • site compounds; • construction of a 28m wide and 280m long quay including ship loads and ship loader rails; • dredging up to 750,000m³ of material from the approach channel and berth pocket; 	Immediately downstream	Marine licence granted.	The consented Anglo American Harbour Facilities is located in very close proximity to the proposed scheme footprint and therefore is screened into the CIA. Screened into the CIA.

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
	<ul style="list-style-type: none"> • lagoon habitat enhancement works; • installation of a surge bin; • installation of a conveyor system and transport towers; • construction of buildings and parking area; • erection of security fencing; • provision of ancillary infrastructure. <p>Phase 2</p> <ul style="list-style-type: none"> • extension of the quay to provide a total quay length of 486m including ship loader and ship loader rails; • dredging up to 372,000m³ of material from the approach channel and berth pocket; • installation of a second surge bin; • installation of a second conveyor within the conveyor housing installed during Phase 1; • provision of ancillary infrastructure. 			
Hartlepool approach channel	<p>PDT is proposing to undertake a programme of works within and adjacent to the existing approach channel into Victoria Harbour, located to the immediate south of Hartlepool Headland on the north-east coast of England.</p> <p>The current approach channel dimensions are limiting the size of vessels which can gain entry into the harbour. PDT is therefore proposing to deepen, realign, widen and extend the length of the approach channel, to allow Victoria Harbour to accept deeper drafted and larger beam vessels through a wider tidal window. In addition to the proposed dredge (and associated disposal of dredged material), PDT is proposing to construct an underwater retaining wall, immediately adjacent to the Middleton Breakwater, which is located at the mouth of Victoria Harbour. The underwater retaining wall is required to avoid the risk of Middleton Breakwater being undermined following the proposed dredge.</p>	Approximately 6km north	Marine licence granted	<p>Numerical modelling was undertaken in support of the Hartlepool approach channel marine licence application using the MIKE21-FM hydrodynamic model (Royal HaskoningDHV, 2018). The model has shown that under all tidal conditions, there is a clear separation of effect between the proposed scheme at Hartlepool and the planned works in the Tees estuary (i.e. the effects and impacts of the proposed scheme at Hartlepool are not predicted to extend into the Tees estuary), indicating no cumulative effect on hydrodynamics will exist. Consequently, there will in turn be no cumulative effect on sediment transport or morphology between the proposed South Bank scheme and Hartlepool approach channel. No further consideration of the Hartlepool channel scheme is therefore necessary.</p> <p>Screened out of CIA</p>

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
Ongoing maintenance dredging at Hartlepool and in the Tees estuary	This activity has been ongoing for many years.	0km	Marine licence granted for offshore disposal.	<p>Given the frequency, duration and the ongoing nature of this activity, maintenance dredging and disposal is represented in the baseline conditions for the area. However, maintenance dredging could be undertaken at the same time as the capital dredging activity required for South Bank (albeit within a different part of the estuary).</p> <p>Screened into the CIA (excluding maintenance dredging at Hartlepool channel as the effects of this would not extend into the Tees).</p>
Inter Terminals Jetty 1 refurbishment	Inter Terminals has submitted a planning application and a marine licence application to undertake refurbishment works to its existing Jetty 1 on the northern bank of the Tees estuary. The scheme involves minor 'top-side' works to the existing infrastructure at Jetty 1 and Dolphin D, and a dredge of the river bed (with associated disposal of dredged material) to extend the existing berth pocket downstream. The works would result in Dolphin D being used as an operational structure rather than simply a berthing dolphin.	Immediately adjacent to the dredge footprint	Consent in place	<p>The proposed works to Jetty 1 are highly localised and the construction works would be short term. The works are considered to be of a sufficiently small scale that there would be no significant cumulative impacts.</p> <p>Screened out of the CIA.</p>
Tees Channel Dredge	The Tees Channel Dredge project involves a proposed deepening of the Tees navigation channel, the turning circle and Tees Dock to a maximum maintained depth of 14m below CD. An Environmental Scoping Report (Royal HaskoningDHV, 2016) was submitted to the MMO alongside a request for a scoping opinion for the project in 2016; however, the environmental assessment proposed within that report has not yet been undertaken.	0km	No application submitted to date	<p>Given that the dredge footprint largely overlaps with that for South Bank (with the exception of dredging in Tees Dock, which, given its location, would have no means of affecting the hydrodynamic and sedimentary regime of the estuary system), the area would be dredged by either the South Bank project or the Tees Channel Dredge project (not both). This removes the potential for cumulative impacts to arise. The Tees Channel Dredge project, therefore, has not been considered further.</p> <p>Screened out of CIA</p>

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
Tees GasPort	<p>Trafigura is proposing a scheme to import Liquefied Natural Gas (LNG) at Teesport (within the Tees estuary), on the north-east coast of England. The proposed LNG import comprises floating storage regasification unit (FSRU) at an existing, currently unused jetty. Once the FSRU is in place, LNG carriers will berth next to the FRSU in a side-to-side mooring configuration and discharge the LNG into the FSRU before leaving again.</p> <p>In order to enable the LNG import facility to function the following works are required, referred to herein as the 'proposed works':</p> <ul style="list-style-type: none"> • Concrete and steel work repairs to the existing jetty. • Modifications to the existing mooring dolphins. • Replacement / repair of ancillary items on the existing jetty. • Modifications to onshore mooring blocks. • Dredging of the existing berth and disposal of dredged material. 	Approximately 1.5km downstream	Application submitted but no licence granted	<p>The marine licence application has been submitted. The non-statutory environment assessment undertaken in support of the marine licence application concluded that there would be no significant impact on any environmental parameters as a result of the proposed scheme. It is therefore concluded that this project should be screened out of the CIA.</p> <p>Screened out of the CIA.</p>
Anglo American Materials Handling Facility at Wilton and Storage Facility at Bran Sands	<p>Anglo American secured planning permission from RCBC for a Materials Handling Facility (MHF) on land at Wilton, Teesside, in 2015 (reference R/2014/0626/FFM). The associated Anglo American Harbour Facilities DCO was also granted under s114 (1)(a) of the Planning Act 2008 (reference SI 2016 No. 772). Together the permission and consent provide for the construction and operation of facilities to process, transfer and handle for export the material emerging from a portal at the Wilton site, which will serve the consented mine and underground materials transfer system.</p> <p>The permissions led to progression of detailed design engineering, from which emerged requirements for an amended conveyor routing, and an additional storage facility (Use Class B8) at Bran Sands, Redcar. The Storage Facility has indicative dimensions of 1300m long x 170m wide x 40m high.</p>	4km and 3.5km respectively	Both schemes are consented by RCBC	<p>No works are required within the estuary itself, with all works being located on land. The potential exists, however, for cumulative impacts to arise, and therefore this project has been screened into the CIA.</p> <p>Screened into the CIA.</p>

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
<p>Dogger Bank Teesside A and Dogger Bank Teesside B (now Sofia Offshore Wind Farm, referred to throughout as Sofia)</p>	<p>Dogger Bank Teesside was Forewind's second stage of development of the Dogger Bank Zone. Originally planned to be four separate wind farms known collectively as Dogger Bank Teesside, this stage was divided into two separate applications - Dogger Bank Teesside A & Sofia and Dogger Bank Teesside C&D. Only Dogger Bank Teesside A & Sofia was progressed through to application. The A & Sofia application comprised two wind farms, each with a maximum installed capacity of 1.2GW. They will connect to the national grid at the existing Lackenby Substation in Teesside via an export cable to be located within an export cable corridor. The Dogger Bank Teesside A & Sofia schemes both have consent, currently sharing the same DCO. The DCO states that construction should commence by August 2022. It is understood that both Teesside A and Sofia will potentially bid into the next Contracts for Difference (CfD) round in Spring 2019, which would commit the developers to construction timelines.</p>	<p>5km</p>	<p>DCO granted for the scheme which contains a deemed marine licence from the MMO</p>	<p>The consented Dogger Bank Teesside A & Sofia scheme is located within the coastal waters of Tees Bay. Although this scheme has received consent, it is yet to be constructed, and therefore the potential exists for in-combination impacts during cable-laying from underwater noise and water quality on prey species of the qualifying features of the Teesmouth and Cleveland SPA and Ramsar site.</p> <p>As neither of the consents specify timings for the construction works, it is conservatively assumed that the construction programmes could overlap.</p> <p>However, a review of the ES undertaken for the Dogger Bank scheme has confirmed that the zones of influence of both schemes would not interact, and therefore, there is no pathway for cumulative impacts with the NGCT.</p> <p>Screened out of the CIA.</p>
<p>Tees channel dredge</p>	<p>PDT is proposing to undertake a dredge of the approach channel to locally deepen from 5.1m bCD to 5.7m bCD. Consultation with the MMO has confirmed that PDT should submit a variation request to its existing maintenance dredge licence in order to dispose of the dredged material (i.e. the MMO sees the proposed dredge as a maintenance dredge activity). PDT's intention is to undertake the dredge during 2020/2021.</p>	<p>Approximately 2km upstream</p>	<p>Application submitted August 2020.</p>	<p>The MMO sees the proposed dredge as a maintenance dredge activity. Given the frequency, duration and the ongoing nature of maintenance dredging, maintenance dredging and disposal is represented in the baseline conditions for the area. However, the proposed dredge could be undertaken at the same time as the capital dredging activity required for South Bank (albeit within a different part of the estuary).</p> <p>Screened into the CIA (but considered to fall under the 'maintenance dredge' umbrella rather than a separate plan or project).</p>

Project related

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
Grangetown Prairie	An Energy Recovery Facility is proposed capable of processing up to 450,000 tonnes of waste per annum. The need for the scheme has arisen from the Tees Valley Joint Waste Strategy, which has been extended from 2020 to 2035. The proposed site is located on the former South Tees Eco Park, Grangetown Prairie, located approximately 4 miles north-east of Middlesbrough town centre.	Approximately 1.4km south-east	Outline planning permission granted in July 2020.	No works are required within the estuary itself, with all works being located on land. Given the proximity of this project to the proposed scheme footprint, the potential exists, however, for cumulative impacts to arise with regard to terrestrial receptors, and therefore this project has been screened into the CIA. Screened into the CIA.
Land at Former South Bank Works; Grangetown Prairie; British Steel and Warrenby Area	Demolition of structures and engineering operations associated with ground preparation and temporary storage of soils and its final use in the remediation and preparation of land for regeneration and development.	Approximately 1.4km south-east	Full planning permission granted May 2017	The works which are the subject of this application comprise temporary storage of soils in mounds, for its final use in the remediation and preparation of land for regeneration and development. No environmental assessment was submitted in support of the application, as no significant environmental impacts were envisaged. Given the nature of the proposed works in relation to the footprint of the proposed South Bank scheme, it is concluded that there is no pathway for cumulative impacts. Screened out of the CIA.
Land at Low Grange Farm, South Bank	Outline application for residential development (up to 1250 dwellings) (all matters reserved).	Approximately 1.6km south	Outline planning permission granted March 2016.	No works are required within the estuary itself, with all works being located on land. Given the proximity of this project to the proposed scheme footprint, the potential exists for cumulative impacts to arise to terrestrial receptors, and therefore this project has been screened into the CIA. Screened into the CIA.
Residential development	Outline planning application for up to 550 residential units with associated access, landscaping and open space.	Approximately 5.5km east	Planning permission granted July 2020	No works are required within the estuary itself, with all works being located on land. The potential

Project related

Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
	Reserved matters application (appearance, landscaping, layout and scale) following approval of outline planning permission R/2016/0663/OOM for up to 550 residential units with associated access, landscaping and open space.		Planning permission granted October 2019	exists, however, for cumulative impacts to arise, and therefore this project has been screened into the CIA. Screened into the CIA.
Teesside Combined Cycle Power Plant	Construction of a 1,700mwe combined-cycle gas turbine power station at Wilton International.	Approximately 4km south-east	Order made April 2019	No works are required within the estuary itself, with all works being located on land. The potential exists, however, for cumulative impacts to arise, and therefore this project has been screened into the CIA. Screened into the CIA.
Lianhetech, Seal Sands (Stockton Council)	Proposed new buildings, plant upgrade, swale and associated access and car parking provision	Approximately 1.5km north	Planning permission granted February 2020	No works are required within the estuary itself, with all works being located on land. Given the separation distance between the proposed scheme and this other project, and its location to the north of the river with significant industrial development in-between, it is considered there is no pathway for cumulative impacts. Screened out of CIA.
New cinema development	Demolition of existing cinema and replacement with a new cinema including external terraces, landscaping and temporary sea wall	Approximately 7km east	Planning permission granted August 2020	The proposed works for this project are located approximately 7km east at the coastal margin. Given the separation distance between the proposed scheme and this other project, with significant industrial development in-between, it is considered there is no pathway for cumulative impacts. Screened out of the CIA.
Engineering operations at Metals Recovery Area	Demolition of existing buildings/structures and engineering operations associated with ground remediation and preparation of land for development.	Approximately 500m east	Application submitted and awaiting decision	No works are required within the estuary itself, with all works being located on land. Although the proposed works are in close proximity to the

Project related



Plan or project	Description and timing	Distance from proposed scheme	Status	Screening assessment rationale, including potential effects and impacts
				proposed scheme, the works are very minor in nature of no cumulative impacts are predicted. Screened out of CIA.

27.5 Cumulative assessment of development in and adjacent to the Tees estuary

27.5.1 Introduction

A detailed CIA was undertaken for the Anglo American Harbour Facilities, which considered all relevant plans and projects at the time in and adjacent to the Tees estuary. The findings from that CIA are therefore directly relevant to this CIA. The key issues identified as part of the Anglo American Harbour Facilities CIA are presented below and supplemented with information to take account of other relevant plans and projects which were not considered (as they were not proposed at the time) within the Anglo American Harbour Facilities CIA.

27.5.2 Hydrodynamics and sedimentary regime

The proposed scheme has the potential to result in the following cumulative impacts with the NGCT, Anglo American Harbour Facilities schemes and the ongoing maintenance dredging in the Tees estuary:

- dispersion of suspended sediment during capital dredging and deposition at the offshore disposal site;
- changes to tidal propagation;
- changes to wave conditions;
- changes to tidal currents; and
- changes to the sediment budget.

There is no pathway for cumulative impacts to arise with any other plan or project screened into the assessment as the other projects are either located on land, or far enough away to ensure the zones of influence do not overlap.

The potential for cumulative impacts to arise between the projects that have been scoped into the CIA, an assessment of the significance of such impacts and recommendation of appropriate mitigation measures (where appropriate) are also presented in the subsections below.

Maintenance dredging at Hartlepool and within the Tees estuary has been on-going for many years. Given the frequency, duration and the ongoing nature of this activity, maintenance dredging and disposal is represented in the baseline conditions for the conditions. However, the implications for water quality (increased suspended sediment concentrations) are relevant to the CIA.

Dispersion of suspended sediment and deposition on the seabed during capital dredging

All projects scoped into the CIA involve will involve capital dredging. This activity will create a plume of sediment which will disperse throughout the estuary according to the prevailing currents, prior to settling on the riverbed and seabed.

During the capital dredging works for the proposed scheme, other port facilities on the Tees will remain operational. Maintenance dredging is, therefore, expected to continue throughout the capital dredge period. The capital dredge is also expected to influence the maintenance dredging requirements during and immediately after the period of construction. This is because fine material will be released into suspension, some of which will then settle in the various maintained areas.

The extent of the sediment plume created by capital dredging is heavily dependent on the dredging plant that is adopted, and this is determined by (amongst other factors) the nature of the bed and the dredge

volume. The EIAs for the schemes scoped into the CIA have made informed assumptions about the most likely dredge plant that would be adopted and, in some cases, assumed that different types of plant would be used for dredging different sediment types as part of the same project. As noted in **Section 6.5.2**, it is important to note that figures showing the “maximum extent of sediment plume dispersion and deposition” do not represent a plume that would occur at any one point in time (such plumes are shown in the timestep plots). Rather, this type of figure shows the areas of the river channel or offshore area that will become affected by a plume at some point during the dredging or disposal activities (in some areas this will be on a single occasion, in other areas it will be on multiple occasions) and the maximum magnitude of change that will be experienced at that point and are therefore referred to as maximum ‘zones of influence’. Consequently, for the purposes of this CIA, the maximum zones of influence of sediment plume dispersion and deposition footprint has been identified from the EIA studies undertaken for each project and the CIA assumes that the construction phases of the projects could be implemented at the same time.

Table 27.2 summarises the conditions that result in the maximum zones of influence and **Figures 27.1 to 27.3** presents a summary of the results of the predictive modelling of suspended sediment concentration and deposition onto the riverbed and seabed.

Table 27.2 *Summary of conditions used in the predictive modelling of the maximum zones of influence of sediment plume dispersion and deposition onto the river and/or seabed during capital dredging*

Project	Modelled conditions used to inform CIA
South Bank Wharf (proposed scheme)	Combined maximum zone of influence from Stages 1 - 4 inclusive of the dredging activities (BHD and TSHD in the berthing pocket, river channel and tees Dock turning circle)
Anglo American harbour Facilities	TSHD in low river flow, spring tide
NGCT	TSHD dredging sand in the approach channel in low river flow, spring tide

A review of all EIA studies for the above projects highlights that the maximum increase in suspended sediment in the water column was predicted to be in close proximity to the dredger, with plume dispersion resulting in a significantly reduced concentration of suspended sediment beyond the source of the plume.

For the NGCT studies, significant deposition of sediment was also only predicted in close proximity to the dredging (and reclamation for NGCT) over the slack water period. In practice, much of this deposited material will be re-dredged as part of the capital works for each scheme. At the peripheries of each plume, the enhanced SSC values will be barely distinguishable from the background levels. Furthermore, as the deposited material will be unconsolidated, it is expected to disperse as tidal currents increase with no long-term accumulation on the riverbed or seabed at the initial point of deposition.

It should be noted that the potential for cumulative effects only arises should the dredging for the proposed scheme, NGCT scheme and Anglo American Harbour Facilities schemes coincide (which is considered to be highly unlikely). Under such circumstances, the effect would be a greater increase in SSC than predicted for the proposed scheme alone, and a larger predicted zone of influence than the proposed scheme alone. The effect would be additive rather than interactive (i.e. the predicted impacts of each project would not interact to result in an impact that is of greater or lesser magnitude than the sum of the impacts in isolation).

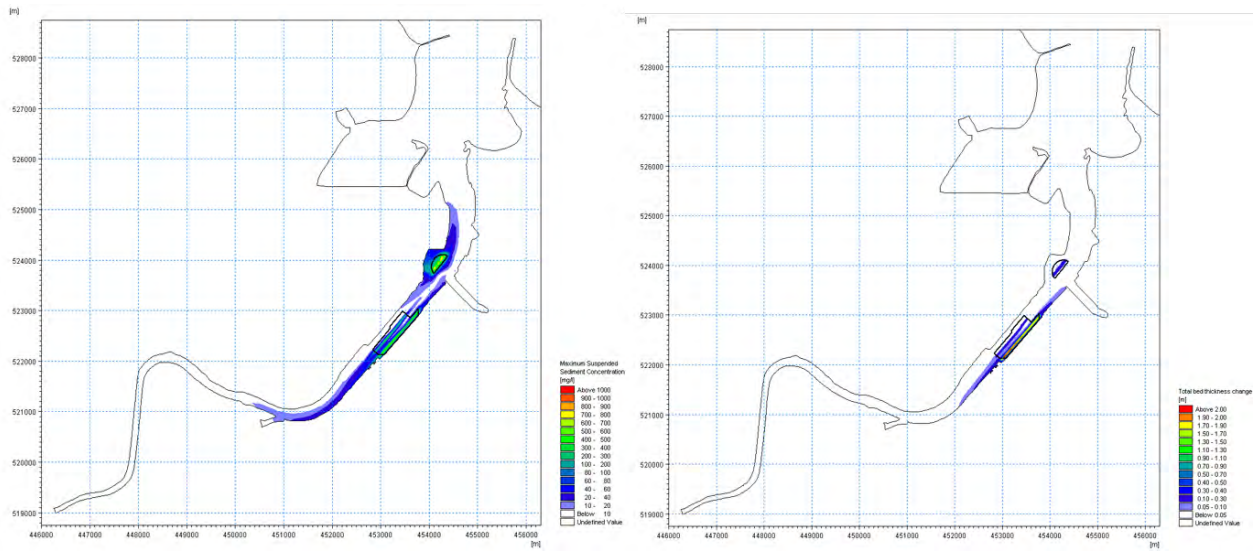


Figure 27.1 Predicted maximum increase in SSC (near-bed layer) (left) and deposition on the riverbed (right) as a result of the proposed scheme [Note: plots show sediment plume impacts arising from dredging activities during Stages 1 - 4 inclusive of the capital dredging programme]

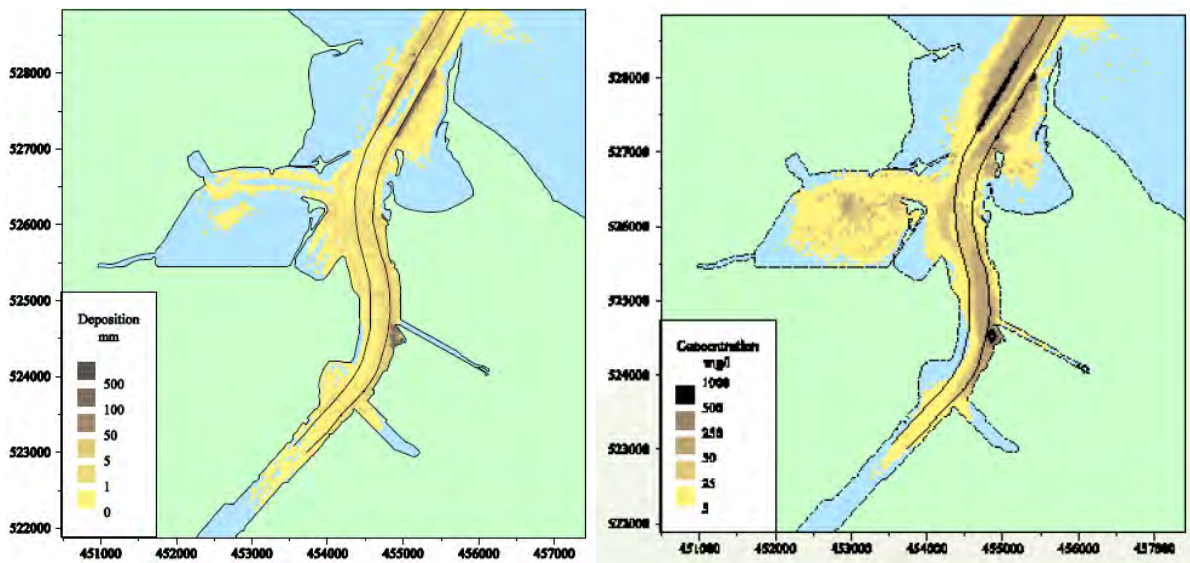


Figure 27.2 Predicted increase in SSC (left) and deposition on the seabed (right) as a result of the NGCT (Royal Haskoning, 2006)

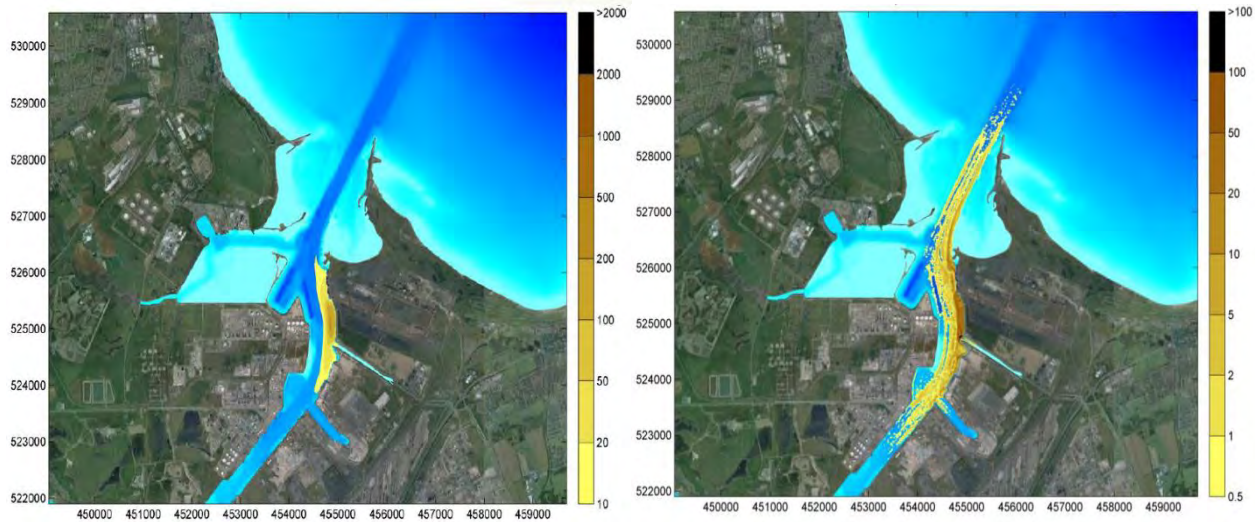


Figure 27.3 Predicted increase in SSC (left) and deposition on the seabed (right) as a result of the Anglo American Harbour Facilities (Royal HaskoningDHV, 2014)

The potential impacts of the maintenance dredging programme in the Tees are considered within the Maintenance Dredging Baseline Document (Royal Haskoning, 2008). This consideration is specifically in the context of the implications of maintenance dredging for the Teesmouth and Cleveland Coast SPA and Ramsar site and comprises assessment of the following:

- potential for impact on the morphology of the SPA and Ramsar site;
- effect of increases in suspended sediments during maintenance dredging on food resources of SPA interest features;
- remobilisation and redistribution of sediments (which may be contaminated); and,
- increased noise levels (disturbance) during maintenance dredging.

The Maintenance Dredging Baseline Document 2008 concluded that maintenance dredging represents a potential supply of fine material to Seal Sands, with the timing of maintenance dredging in relation to the state of the tide being an important control on the supply of fine material to this intertidal area. Overall, however, the Maintenance Dredging Baseline Document concluded that the maintenance dredging activity does not appear to be having (or has historically had) an impact on the designated site that would alter or affect its condition.

The WFD assessment presented in the latest annual update to the Maintenance Dredging Baseline Document (Royal HaskoningDHV, 2019) concluded that, at water body level, maintenance dredging at current permitted levels has no significant impact on estuary morphology, marine ecology and marine water quality.

Mitigation measures to limit the suspension of sediment and subsequent deposition of sediment during capital dredging have been proposed for the Anglo American Harbour facilities and the NGCT. For the former project, mitigation comprises the use of specialist dredging equipment (i.e. an enclosed grab loading into a sealed barge) for dredging of unconsolidated material to minimise resuspension in the water column. This requirement is specified because of the elevated concentration of contaminants within the dredged sediment, and this measure would limit sediment release into the water column as far as practicable. The implications of the potential cumulative effects identified above on other environmental parameters (e.g. sediment and water quality, marine ecology, ornithology, fish and fisheries) is discussed below.

Potential effects on tidal propagation

Design calculations for the proposed scheme showed an increase in the existing tidal prism of the estuary by less than one percent (0.8% to one decimal place), which is not deemed to be a cause of significant estuary-wide change in hydrodynamics. The NGCT is predicted to have a very small effect on water levels (tidal range in the Tees estuary is predicted to be increased by less than 4mm, with the tide arriving up to 2 minutes earlier). The EIA studies undertaken for the Anglo American Harbour Facilities predicted that there will be no impact on tidal propagation or water levels due to the limited area of proposed dredging for this project. Hence, no cumulative impacts are predicted to arise.

Predicted effect on wave conditions

There is no predicted effect on local wind-generated waves at the site of the proposed scheme since the changes in hydrodynamics are so small and localised. Swell waves do not penetrate far into the estuary and, therefore, are not predicted to be affected by the proposed scheme.

Wave modelling for the NGCT considered the wind and swell components separately. It is predicted that wind waves within the estuary will be affected by the reflective properties of the terminal but, it is also predicted that such waves will be unaffected by the increased depth of the channel. Swell waves (long period waves from offshore) do not penetrate far into the estuary and, therefore, are not predicted to be affected by the proposed NGCT. Swell waves, however, will be affected by the increased depth of the channel in the lower estuary that will arise from capital dredging for the NGCT.

The EIA studies undertaken for the Anglo American Harbour Facilities showed that the harbour facility itself does not have the potential to affect swell waves; therefore there is no potential for cumulative effect on wave conditions due to the proposed scheme and this aspect is not assessed further within the CIA.

Predicted effect on tidal currents

Numerical modelling was undertaken for the proposed scheme in its operational phase during both neap and spring tides, with a mean daily river flow through the Tees Barrage (20 cumecs). Modelling showed that the proposed new quay alignment and capital dredge will not significantly affect the existing baseline hydrodynamic conditions. Although there will be flow newly occurring in the area of the new quay, peak flows will be low. Elsewhere, there will be a general small magnitude reduction in baseline flows varying during different phases of the tidal cycle, but these changes always remain within the reach immediately opposite the proposed scheme. In summary, there will be no measurable change to tidal currents at the Tees Dock turning circle and no estuary scale effects on baseline hydrodynamic conditions.

Modelling studies undertaken for the NGCT predict that current speed changes, of low magnitude, will occur in the vicinity of the NGCT development (1.5km downstream of the proposed scheme) and at the mouth of the estuary. A decrease in current speeds of up to 0.10m/s is predicted in the vicinity of the terminal, with increases of a similar order of magnitude closer to the shores of the estuary. This area (adjacent to the proposed reclamation) is predicted to experience the greatest effect on flows. Further downstream at the mouth of the estuary, very little effect on tidal current speeds is predicted (decreases in current speeds of the order of 0.05m/s).

The Anglo American Harbour Facilities EIA predicted that currents will be reduced within the deepened areas. Some current speed increases are predicted on the shoreline adjacent to the works, suggesting that the dredging is predicted to draw some of the flow to the south side of the estuary, although such effects are shown to be relatively localised to the proposed works. Based on the above, no cumulative impact is predicted to occur.

Changes to estuarine sediment budget

The results of the numerical hydrodynamic modelling showed that the proposed scheme will not significantly affect the existing baseline hydrodynamic conditions. There will be general small magnitude reduction in baseline flows varying during different phases of the tidal cycle, but always remaining largely within the reach immediately opposite the new quay. This reduction in baseline flows may lead to a slight increase in deposition of sediment which would be positive in areas adjacent to the north bank opposite the quay, as it will help the existing mudflat be sustained in light of sea level rise. In the main channel the deposition will require periodic dredging to maintain the design depths (a 10% increase in annual maintenance dredging requirement is expected to be sufficient).

The proposed scheme will result in direct effects to the existing inter-tidal and sub-tidal morphology of the Tees estuary. It is estimated that there will be a loss of 25,000m² of existing intertidal habitat, a creation of 55,000m² of new subtidal habitat and 325,000m² of existing subtidal habitat will be impacted (by the proposed dredge).

The NGCT is predicted to have some effect on estuary morphology and the ES described these changes for various zones within the estuary. The ES for the NGCT concluded that the effect of construction on tidal propagation will be minor, with no change in elevation of either high or low water downstream of the site of the proposed scheme. A minor increase in the level of low water of the order of 2mm (at low water on spring tides) was predicted at the site of the NGCT. It was estimated that the effect of this change will be to convert approximately 30 to 40m² of intertidal habitat on the North Tees mudflat to very shallow subtidal habitat under these tidal conditions.

The ES for the NGCT described the potential integrated effect of the scheme on physical processes which have the potential to combine to result in an effect on estuarine morphology. For the deepened approach channel, reduced through-depth flows were predicted which, combined with a strengthened near-bed landward flow, were expected to result in the increased import of fine material to the Tees estuary from offshore; with the potential to increase the maintenance dredging requirements by about 10%. No increase in sandy infill was predicted. A small morphological effect is predicted at Seal Sands, with an increase in the supply of fine material to Seal Sands via Seaton Channel. No changes to tidal flow were predicted in this area. No significant effects were predicted at North Gare and Bran Sands as a result of the NGCT.

The Anglo American Harbour Facilities will not make any changes to the outer sections of the approach channel. It can be concluded that there will be no effect on the supply of material into the Tees estuary from offshore as a result. In addition, no changes to sediment transport in the predominantly sandy areas around Teesmouth were anticipated, and so no effect on sand transport was predicted.

The Anglo American Harbour Facilities are predicted to result in a localised redistribution of sediment deposition in response to predicted changes in current speeds due to the works. It was predicted that this very small change in the overall fine sediment regime will not alter the present frequency of, or methodology used for, maintenance dredging, and no effect on sediment supply to intertidal areas throughout the Tees estuary will occur. Consequently, no effect on the morphology of intertidal areas was predicted due to the Harbour Facilities.

The ongoing maintenance dredging programme in the Tees estuary represents a potential supply of fine material to Seal Sands. However, the latest annual update to the Maintenance Dredging Baseline Document (Royal HaskoningDHV, 2019) concludes that no means have been identified by which the current maintenance dredging regime could adversely affect the overall estuary morphology and the ongoing morphological processes at work. Based on the above, it is concluded that there is no potential for

cumulative impacts to arise to the estuarine sediment budget as a result of the projects screened into the assessment.

27.5.3 Marine sediment and water quality

In relation to marine sediment and water quality, the proposed scheme has the potential to result in the following cumulative impacts with the NGCT, Anglo American Harbour Facilities schemes and the ongoing maintenance dredging in the Tees estuary as follows:

- dispersion of suspended sediment during marine works, dredging and disposal; and,
- changes to water quality associated with the release of sediment contamination.

The combined effects on SSC is presented in Section 27.5.2 above. To summarise, the potential for cumulative effects only arises should dredging for each scheme coincide. Under such circumstances, the effect would be a greater increase in SSC than predicted for the proposed schemes alone, and a larger predicted zone of influence than the proposed scheme alone. However, overlaying the plots does not indicate these increases are likely to be significantly greater than those reported for the schemes alone. In addition, the predictions made for each project represent sediment plume dispersion under specific tidal conditions (to enable a realistic worst case to be identified and assessed). It is unlikely, therefore, that the timing of the projects and their respective programmes of capital dredging will coincide to result in a scenario where sediment plumes combine at peak concentration (as predicted by the EIA studies for each project) at any location. Additionally, mitigation is outlined for all three schemes which would reduce plume extents across the estuary and navigational safety is unlikely to support dredging on different sides of the estuary at the same time.

In terms of maintenance dredging, there is the possibility that maintenance dredging could occur at the same time as the proposed scheme, however, it is likely to occur in another area of the estuary. Given the relatively localised effects to the dredger produced in the hydrodynamic modelling assessment for the proposed scheme, it is considered unlikely that the plumes would overlap. As a result, there may be a spatial increase in SSC within the estuary but no additive increase in SSC.

In relation to sediment contamination, data collected to inform the EIAs indicates that concentrations are similar throughout the estuary where regular maintenance dredging occurs. As a result, and noting the comments regarding cumulative effects of SSCs above, it is unlikely that concentrations of contaminants would combine to push water quality concentrations closer to EQS than assessed for the schemes alone. Where the EIA reports larger contaminant concentrations, such as for Anglo American Harbour Facilities, additional mitigation measures are identified to reduce any resulting sediment plume as far as possible and therefore remove the risk of releasing contamination into the water column.

All other potential effects such as discharge of surface water, demolition activities or accidental spills and leaks would be managed using best practice measures to remove the risk to the water environment as far as possible and therefore cumulative effects are not predicted.

27.5.4 Land quality and geology

It is recognised that there are a number of other plans and projects in the surrounding area which could result in cumulative impacts with the proposed scheme on land quality, the closest of which is the SIZ application to the immediate south of the proposed scheme footprint. However, due to the nature of the other proposed schemes and the regulatory regime under which they will be constructed, appropriate mitigation measures would be incorporated into the design of each and thus remove the potential for

significant cumulative effects to occur. As a result, **no cumulative impacts** on identified receptors with regard to land quality and geology are predicted.

Mitigation measures and residual impact

No mitigation measures are required. There would be **no cumulative residual impact**.

27.5.5 Marine ecology

Loss of intertidal habitat

As noted in **Section 9**, the proposed scheme is predicted to result in the loss of 2.5ha of intertidal habitat within the footprint of the proposed scheme, where the intertidal area will be dredged to create the berth pocket. The significance of this impact is reported to be minor adverse due to the low value nature of the intertidal and limited sensitivities of the key species.

The NGCT scheme would also result in the direct loss of intertidal due to reclamation, estimated to be 1.19ha. The other nearby relevant scheme is the consented Anglo American Harbour Facilities scheme, which would also result in the direct loss of intertidal due to reclamation (for the solid quay) and revetment installation (for the open quay). The maximum area of intertidal loss for the Anglo American Harbour Facilities scheme would be associated with the solid quay and was calculated as 3.6ha.

In light of the quality of intertidal habitat present with the footprint of the NGCT scheme and Anglo American Harbour facility scheme, the receptor (benthic habitats) was considered to be of low value; but the magnitude of the effect would be medium for NGCT and high for the Anglo American Harbour Facility scheme.

The impact on intertidal area as a consequence of the proposed schemes referred to above are spatially distinct and the overall impact is therefore additive as opposed to cumulative (i.e. there would not be an interaction between the various project that would result in a net greater effect on intertidal area).

Smothering of benthic invertebrate communities due to deposition of sediment dispersed during capital dredging

Sediment deposition resulting from the dredging for the proposed scheme will largely be within the proposed dredged footprint. Deposition that occurs in other parts of the river is predicted to be much lower, typically less than 5cm, within the same area of river that is affected by the zone of influence from the sediment plumes.

As mentioned in **Section 6** and **Section 9.5.2**, parts of the timeseries plots of changes in riverbed thickness (deposition) from the sediment plume model were extracted at a series of points within the affected river reaches (relating to locations of mudflats, as shown on **Figure 6.51**). Sediment deposition at all of these locations were predicted to be immeasurable (**Figure 6.53**).

The predicted footprints of sediment deposition for the NGCT and the Anglo American Harbour Facilities are largely similar; however, the effect of the NGCT dredge is larger, with deposition predicted to extend into Seaton Channel and onto Seal Sands. As the deposition footprint for the Anglo American Harbour Facilities project is predicted to be within that of the NGCT deposition footprint, the direct effect of NGCT will have the overriding impact on the benthic community. However, the predicted deposition as a result of the NGCT and the Anglo American Harbour Facilities is anticipated as being in the order of a few millimetres. This deposition is likely to be temporary due to the unconsolidated nature of the sediment, and the cumulative impact is predicted to be negligible.

Maintenance dredging is targeted at areas that require dredging to maintain navigable depths and, although it would result in some losses of material into the water column, deposition onto the seabed due to maintenance is predicted to be insignificant. Given this, a cumulative impact is not expected.

Effects on benthic invertebrate communities due to effects on the morphology of intertidal and subtidal habitats

The proposed scheme is not predicted to have an effect on sediment supply into the estuary. The very minor changes in the hydrodynamic regime, specifically currents, may lead to a slight increase in sediment deposition on the North Tees mudflat (**Section 6**).

The studies for the NGCT scheme concluded that there would not be a change in the supply of fine sediment to the Tees (specifically Seal Sands, as assessed in the NGCT ES). NGCT was not predicted to affect the sediment budget of the estuary and, therefore, was assessed that there would be no impact on morphology of intertidal areas.

Based on the above, it is concluded that there will be no cumulative effect on the maintenance dredging commitment within the Tees and, therefore, no cumulative impact on the supply of material to intertidal and subtidal areas or effect on morphology of estuarine habitats.

27.5.6 Marine mammals

The potential exists for a cumulative underwater noise impact to arise from the proposed scheme, should it be undertaken at the same time as the NGCT, Hartlepool approach channel and Anglo American Harbour Facilities schemes.

There would be no potential for any PTS cumulative impacts as each project would ensure adequate mitigation is adopted to reduce the risk of any such impact from occurring. However, there could be the potential for cumulative underwater noise impacts to result in the disturbance of marine mammals.

The potential impact ranges for any disturbance from each of these projects are likely to be similar to those modelled for piling and dredging for the Hartlepool approach channel (**Table 27.3**).

Table 27.3 *Maximum predicted impact ranges (and areas) for TTS or fleeing response for piling and dredging based on NMFS (2018) criteria for Hartlepool approach channel scheme modelling*

Potential impact / receptor	Species / group	Criteria and thresholds (NMFS, 2018; Southall <i>et al.</i> , 2019)	Maximum predicted impact range (km)
TTS / fleeing response from piling at NGCT, Hartlepool approach channel and Anglo American Harbour Facilities schemes	Harbour porpoise	Unweighted SPL _{peak} 196 dB re 1 µPa	0.43km
	Minke whale	Unweighted SPL _{peak} 213 dB re 1 µPa	0.03km
	Grey seal and harbour seal	Unweighted SPL _{peak} 212 dB re 1 µPa	0.04km
TTS / fleeing response during dredging South Bank Port Facility, NGCT, Hartlepool approach channel and Anglo American Harbour Facilities schemes	Harbour porpoise	153 dB re 1 µPa HF SEL _{cum}	0.7km
	Minke whale	179 dB re 1 µPa MF SEL _{cum}	<0.01km

	Grey and harbour seal	181 dB re 1 μ Pa PW SEL _{cum}	<0.01km
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As a worst-case scenario, the maximum number of harbour porpoise, minke whale, grey seal and harbour seal that could be disturbed has been estimated based on the maximum impact ranges during piling at the NGCT, Hartlepool approach channel and Anglo American Harbour Facilities schemes and / or during dredging at the proposed South Bank scheme, NGCT, Hartlepool approach channel and Anglo American Harbour Facilities schemes (**Table 27.4**).

Table 27.4 *Maximum number of individuals (and % of reference population) that could be at risk of temporary auditory injury (TTS) or a fleeing response from cumulative impacts of piling and dredging at the proposed scheme, NGCT, Hartlepool Approach Channel and Anglo American Harbour Facilities schemes*

Potential impact	Receptor	Maximum number of individuals (% of reference population) from cumulative impacts	Magnitude for cumulative impacts
TTS / fleeing response from <u>piling</u> – cumulative impacts from NGCT, Hartlepool approach channel and Anglo American Harbour Facilities	Harbour porpoise	0.9 harbour porpoise (0.0003% of NS MU) based on the SCANS-III Block O density of 0.888/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of the reference population anticipated to be exposed to effect).
	Minke whale	0.00009 minke whale (0.000004% of CGNS MU) based on the SCANS-III Block O density of 0.01/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of the reference population anticipated to be exposed to effect).
	Grey seal	0.0015 grey seal (0.00002% of the NE England MU) based on density of 0.10/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of the reference population anticipated to be exposed to effect).
	Harbour seal	0.007 harbour seal (0.008% of the NE England MU; 0.005% of the Seal Sands haul-out site) based on density of 0.46/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of the reference population anticipated to be exposed to effect).
TTS / fleeing response during <u>dredging</u> – cumulative impacts from NGCT, South Bank, Hartlepool approach channel and Anglo American Harbour Facilities	Harbour porpoise	5.6 harbour porpoise (0.002% of NS MU) based on the SCANS-III Block O density of 0.888/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).
	Minke whale	0.00001 minke whale (0.00000005% of CGNS MU) based on the SCANS-III Block O density of 0.01/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).

Potential impact	Receptor	Maximum number of individuals (% of reference population) from cumulative impacts	Magnitude for cumulative impacts
	Grey seal	0.0001 grey seal (0.000002% of the NE England MU) based on density of 0.10/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).
	Harbour seal	0.00064 harbour seal (0.0008% of the NE England MU; 0.0005% of the Seal Sands haul-out site) based on density of 0.46/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).
TTS / fleeing response during <u>piling and dredging</u> – cumulative impacts from NGCT, South Bank, Hartlepool approach channel and Anglo American Harbour Facilities	Harbour porpoise	6.5 harbour porpoise (0.002% of NS MU) based on the SCANS-III Block O density of 0.888/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).
	Minke whale	0.0001 minke whale (0.0000004% of CGNS MU) based on the SCANS-III Block O density of 0.01/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).
	Grey seal	0.002 grey seal (0.00003% of the NE England MU) based on density of 0.10/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).
	Harbour seal	0.008 harbour seal (0.01% of the NE England MU; 0.006% of the Seal Sands haul-out site) based on density of 0.46/km ² .	Negligible / very low magnitude (temporary effect with less than 1% of reference population anticipated to be exposed to effect).

The magnitude of the potential cumulative impacts for TTS and fleeing response as a result of piling and / or dredging noise from the proposed scheme, NGCT, Hartlepool approach channel and Anglo American Harbour Facilities schemes, is negligible / very low for harbour porpoise, minke whale, grey seal and harbour seal, with less than 1% of the references populations likely to be temporary disturbed (**Table 27.4**).

Taking into account the receptor sensitivity of medium for TTS and fleeing response and the potential magnitude of the effect, along with the temporary nature of the disturbance, the impact significance for disturbance as a result of cumulative underwater noise impacts from piling and dredging activities on harbour porpoise, minke whale, grey seal and harbour seal, has been assessed as **negligible** (**Table 27.5**).

Mitigation measures and residual impact

No mitigation measures are required to reduce the potential disturbance of marine mammals from cumulative underwater noise impacts. The residual impact would be of **negligible** significance.

Table 27.5 *Assessment of impact significance for cumulative underwater noise impacts from piling and dredging activities on marine mammals*

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation	Residual impact
TTS or fleeing response from cumulative impacts during piling and dredging at the proposed scheme, NGCT, Hartlepool approach channel and Anglo American Harbour Facilities	Harbour porpoise	Medium	Negligible / very low	Negligible	None required.	Negligible
	Minke whale		Negligible / very low	Negligible		Negligible
	Grey seal		Negligible / very low	Negligible		Negligible
	Harbour seal		Negligible / very low	Negligible		Negligible

27.5.7 Terrestrial ecology

The following projects are considered to be of relevance with regard to this section of the CIA:

- South Industrial Zone.
- NGCT.
- Ongoing maintenance dredging.
- Tees channel dredge.

Given the separation distance between the proposed scheme footprint and the other projects outlined in **Table 27.1**, there is no pathway for cumulative impacts to arise. Other plans and projects are therefore not considered further below.

Disturbance impacts to otter during construction

Of the proposed projects which have been screened into the cumulative impact assessment, all have potential to have an impact on foraging/commuting otters through collision with vessel or disturbance from noise and light pollution. The impacts to otter associated with the proposed scheme are limited due to the lack of suitable habitat within its footprint. The mitigation outlined for the proposed scheme reduces the potential impacts to otter to an acceptable level during the construction and operation phases. Should any of the other developments have potential to cause an adverse impact upon otter, it is assumed they will be subject to similar mitigation measures to minimise any potential effects, including reduced vessel speeds, and use of appropriate lighting regimes. As such, the proposed scheme is not anticipated to cause impacts worse than **minor adverse** in significance when considered cumulatively with the other projects.

Mitigation measures and residual impact

No additional mitigation is proposed and the residual cumulative impact would be of **minor adverse**.

Impacts to terrestrial fauna during construction

The adjacent landside project at the South Industrial Zone is included within the CIA for potential impacts to terrestrial fauna, notably bats, invertebrates, breeding birds, brown hare and hedgehog.

The footprint of the proposed scheme occupies a small strip of land adjacent to the proposed South Industrial Zone development. The proposed scheme footprint is considered to be peripheral habitat, offering limited foraging potential for species utilising the footprint of the adjacent development (276.77 ha) to spill across to. The removal of the additional limited habitat within the proposed scheme footprint would not cause an impact of greater significance to that already assessed within the much larger footprint of the adjacent landside EIA development. In addition, once the larger area of habitat from the landside development is removed, the footprint of the proposed scheme would become fragmented with little to no functional linkage with other habitats in the area and its biodiversity value would be even less than it currently is.

Of relevance to the proposed scheme, ecology surveys for the adjacent landside EIA development recorded:

- Expansive and good quality habitat for invertebrates (dingy skipper, grayling, mainly associated with an abundance of birds foot trefoil on the Open Mosaic Habitat (OMH). Also, although bird's foot trefoil was recorded within the ephemeral/ruderal habitat within the proposed scheme footprint, the OMH was not found to be present.
- Opportunities for breeding ground nesting birds, including BcOCC red -list species within areas of trees, scrub, wetland, grassland and OMH. No red list species were recorded within the proposed scheme footprint which is the subject of this report, although grassland and scrub habitat was found to support nesting green and (one) amber species.
- A significant population of brown hare within grassland, sparsely vegetated land and OMH, which has potential to use the grassland within the footprint of the proposed scheme.
- Foraging habitat for bats (including on the invertebrate assemblage).

As a more sizable development, the landside EIA proposes a number of mitigation measures including off site habitat compensation to achieve Biodiversity Net Gain (BNG) which addresses the impacts of habitat loss on these receptor groups and reduces potential impacts to an acceptable level. The South Tees Regeneration Masterplan Environment & Biodiversity Strategy will include for habitats and species within the footprint of the proposed scheme. As such, the proposed scheme is not anticipated to cause impacts worse than **minor adverse** in significance when considered cumulatively with the landside EIA.

Mitigation measures and residual impact

No mitigation measures are required and the residual cumulative impact would be of **minor adverse**.

Light pollution impacts on foraging and commuting otters and bats

There is potential for commuting otters and bats to be disturbed by light pollution from the operation of the proposed scheme along with all other proposed schemes in the area, which may produce light pollution in the area. There will be no habitat potential for either species within the footprint of the proposed scheme itself and the impacts associated with the proposed scheme are limited due to the lack of habitat within its footprint. The mitigation outlined for the proposed scheme reduces the potential impacts to otter to an acceptable level during the operation phase. Should any of the other developments have potential to cause an adverse impact to otter, it is assumed they will be subject to similar mitigation measures to minimise any potential effects, including lighting regimes. As such, the proposed scheme is not anticipated to cause impacts worse than **minor adverse** in significance when considered cumulatively with the other projects.

Mitigation measures and residual impact

No mitigation measures are required and the residual cumulative impact would be of **minor adverse**.

27.5.8 Marine and coastal ornithology

Construction phase impacts on feeding and food resources due to reductions in marine water quality

The potential exists for a cumulative impact to arise from the potential SSC increases during the construction of the proposed scheme, should it be undertaken at the same time as the dredging required for the NGCT, Anglo American Harbour Facilities schemes, the Hartlepool Channel deepening and the maintenance dredging works that exist within the Tees estuary. As stated in **Section 12.5.2**, the main receptor that may be affected by this cumulative effect is breeding common terns that forage within the Tees, since there may be temporary displacement of prey resources or a reduction in foraging ability.

In order for a potential cumulative impact to manifest, the dredging campaign for the proposed scheme would need to coincide with at least one of the other dredging campaigns noted above, and both would need to be undertaken during the common tern breeding season (i.e. May to August). In the unlikely event that this occurs, the zones of influence from dredging would create an additive effect, as demonstrated in **Figures 27.1 to 27.3**. In other words, a larger predicted zone of influence would be predicted than that arising from the proposed scheme alone. In essence, this creates a larger area of habitat potentially 'lost' to foraging activity on a temporary basis. Clearly, the magnitude of the additive effect would be greater with more dredge campaigns ongoing at any one time.

In the absence of suitable mitigation, this could potentially result in an increased risk to subtidal foraging within the Tees. However, the mitigation measure described for the proposed scheme in **Section 12.5.2** (i.e. dredging along the axis of the river rather than across it to ensure that, at any one time, sediment plumes occupy only half of the river cross section) has also been proposed for the NGCT project. For the Anglo American Harbours facilities scheme, specialist dredging equipment (i.e. an enclosed grab loading into a sealed barge) will be used for dredging of unconsolidated material to minimise resuspension in the water column. When assessed separately, all projects considered in the assessment are anticipated to have a minor impact at worst (with the mitigation measures in place). With mitigation measures in place for all schemes, the combined impact will be reduced as far as possible, and the risk of creating total barriers to prey fish movement and stretches of turbid water stretching the width of the river is minimised.

As stated in **Section 12.5.2**, common terns forage only in the top layer of the water column and are likely to be relatively insensitive to increased SSC. Given the 9,400ha foraging range within the SPA (Natural England, 2018a), the area affected even by the combined plumes is likely to be low (for example, should Stage 2 of the proposed capital dredging coincide with the Hartlepool Channel deepening works, the two dredging plumes together will still affect only around 0.5% of the SPA subtidal habitat (Royal HaskoningDHV, 2015)). However, the additive effect of the sediment plumes from separate dredging campaigns cannot be completely avoided if the campaigns are undertaken simultaneously, therefore the cumulative effect is anticipated to be **minor adverse**.

Construction and operation phase noise disturbance

The potential also exists for a cumulative noise disturbance impact to arise from the proposed scheme, should it be undertaken at the same time as the NGCT, Anglo American Harbour Facilities schemes and the SIZ development immediately landward. However, with the mitigation measures outlined in **Section 12.5.4** (i.e. shrouding employed at the piling rigs) in place, there is anticipated to be (at worst) a minor impact on waterbirds at North Tees Mudflat, and negligible impact further downstream (including at Vopak Foreshore). Given that effects (if any) from the proposed scheme are not expected to include significant displacement of birds, and noise from the other schemes is not anticipated to have a significant effect on the North Tees Mudflat (noise levels at the mudflat from the other projects considered are expected to be

lower than the disturbance thresholds set out in e.g. Cutts *et al.*, 2009 and 2013), there is not expected to be any significant cumulative impact.

Loss of supporting habitat

While the proposed scheme, in isolation, will result in a loss of 2.5ha of comparatively low-value habitat (see **Section 12.5.1**) at South Bank, the impact on waterbirds is considered to be minor. By comparison, loss of supporting habitat was considered a negligible impact in the EIAs for both the Anglo American Harbour Facilities scheme and the NGCT scheme, and a CIA undertaken for the latter (which considered both schemes together) did not assess cumulative habitat loss as a significant impact. Given that other projects (even in combination) would have a negligible impact, the cumulative effect with the proposed scheme would not be expected to be any more significant than when considering the proposed scheme in isolation.

The proposed SIZ development immediately landward of the proposed scheme footprint contains an area of intertidal referred to as The Slems. The Supplementary ES (Lichfields, 2020) reports that as The Slems does not contain a suitable foraging resource for wintering bird species, including those species that contribute towards the Teesmouth and Cleveland Coast SPA and Ramsar wintering waterbird assemblage, mitigation relating to the effect of the loss of intertidal mud specifically in relation to these species is not necessary. Based on the above, there is no pathway for the proposed scheme to result in in-combination impacts to occur to over-wintering bird species with the SIZ development.

27.5.9 Fish and fisheries

Changes in marine water quality due to dredging activity

The potential exists for a cumulative impact to arise from the potential SSC increases during the proposed scheme, should it be undertaken at the same time as other plans and projects in the Tees estuary which require dredging, including the NGCT, Anglo American Harbour Facilities and the ongoing maintenance dredging works. The main receptors that may be affected by this cumulative effect are migratory species, such as salmonids and eels, since, as described in **Section 13.5.1**, temporary barrier effects formed by sediment plumes may deter such species from migrating to and from spawning sites.

Should two or more of the dredging campaigns for the proposed scheme, the NGCT scheme, the Anglo American Harbour facilities scheme and the ongoing maintenance dredging be undertaken simultaneously, the respective sediment plumes could result in an additive effect, as demonstrated in **Figures 27.1 to 27.3**. In other words, a larger predicted zone of influence would be predicted than would be the case when considering the proposed scheme in isolation. In essence, this increases the risk of barrier effects forming and preventing migration, should the dredging be undertaken during the peak migration season.

Significantly, the effect of a combined plume is not likely to result in a different behavioural response in fish compared with the effect of the projects in isolation, although the increased plume footprint may increase the risk of such responses being exhibited. However, the mitigation measure described for the proposed scheme in **Section 13.5.1** (i.e. dredging along the axis of the river, rather than across it to ensure that, at any one time, half of the river cross section is relatively unaffected) has also been proposed for the NGCT project, and other mitigation measures have been proposed for the Anglo American Harbour facilities scheme (including seasonal restrictions on proposed works).

With mitigation measures in place for all schemes, the combined impact will be reduced as far as possible, and the risk of creating total barriers to migratory fish movement is minimised. However, the additive effect of the sediment plumes from separate dredging campaigns cannot be completely avoided if the campaigns are undertaken simultaneously, and the cumulative effect is anticipated to be **minor adverse**.

Mitigation measures and residual impact

No further mitigation measures are possible (or necessary). The residual cumulative impact would **be minor adverse**.

Underwater noise

Underwater noise from the proposed scheme is predicted to arise from both dredging and land-based pile driving activities (see **Section 13.5.3** and **13.5.4**). While there is anticipated to be negligible impact from the land-based piling, there may be minor adverse impacts from the dredging noises which could potentially result in temporary localised redistribution of fish within the estuary. It is not expected to significantly affect the upstream and downstream movements of migratory fish.

Should the dredging campaign for the proposed scheme coincide with dredging from one or more of the NGCT scheme, the Anglo American Harbour facilities scheme and the ongoing maintenance dredging, the individual zones of influence may be combined to form a larger area over which there are elevations in noise level above the background with the Tees. This is not likely to result in a different behavioural response in fish, but it may increase the area over which such responses may be expected.

Given the regularity of maintenance dredging within the channel, resident and migratory fish in the estuary are anticipated to be relatively habituated to such noises, plus the mitigation measures in place will help to reduce the magnitude of impacts from individual dredges. It has to be recognised that underwater noises originating from different sources will be detectable across larger areas of the river than when considered in isolation, though it is highly unlikely that there would be more than one or two dredge campaigns ongoing at any one time. As such, the cumulative effect is predicted to be **minor adverse**.

Mitigation measures and residual impact

No further mitigation measures are possible (or necessary). The residual cumulative impact would **be minor adverse**.

27.5.10 Commercial and recreational navigation

Potential effect on commercial navigation during construction

During the construction phase of the proposed scheme, there is potential for a cumulative navigation impact to arise should the timing of the construction phases of the projects included in the CIA coincide. Such an impact could include potential delays to shipping, increased collision risk, obscuring navigation aids and the presence / interference of activities on other operators.

The proposed South Bank scheme is in close proximity to the footprints of the NGCT and the Anglo American Harbour Facilities scheme. The South Bank dredge footprint will pass adjacent to the site of the Anglo American Harbour Facilities and the NGCT dredge footprint (overlapping with the proposed dredge at the Tees Dock turning circle).

There is a range of mitigation measures that are typically adopted during construction works to manage the risks to navigation. These measures comprise the following:

- one-way control of vessels and potentially re-timing of commercial vessel movements – this will be implemented via the VTS;
- deployment of additional buoys (as required) to mark construction areas and to warn other shipping of the works that are taking place;
- red lights will mark the location of the construction works (e.g. at either end of the construction site) as an aid to navigation;
- Trinity House will be consulted prior to the implementation of changes to buoyage and lighting that may be required during construction; and,

- a Notice to Mariners will be issued which will set out all of the above measures.

It is anticipated that the implementation of these measures will effectively manage the risks to commercial navigation, should the construction phases of the relevant projects coincide. It is likely that there will be some effect on commercial navigation due to the need to adjust movements to accommodate any ongoing works, but the potential cumulative impact is predicted to be of **negligible** significance.

Mitigation measures and residual impact

No mitigation measures are required beyond those to be embedded into the proposed scheme and those to be taken account of during construction of the other projects in the Tees estuary. The residual cumulative impact would be of **negligible** significance.

Potential implications for vessel traffic management associated with increased commercial activity during operation

It is anticipated that the proposed scheme will result in an increase in traffic of approximately 390 vessel calls per year (equating to an additional 32 vessel calls per month). It is anticipated that the NGCT will result in an increase in traffic of approximately 100 movements per month in the estuary, whilst the Anglo American Harbour Facilities ES reported that there will be an increase in the annual shipping traffic of 191 vessels. It is therefore evident that the implementation of each scheme would result in increased vessel movements within the Tees during the operational phase.

The NRA has considered the potential for cumulative impacts on navigation as a result of the aforementioned schemes. The assessment concluded that all potential cumulative hazards were acceptable (from a navigation risk perspective), with all risks classified as negligible or low, with the exception of impact on ship contact risk which was assessed as being as low as reasonably possible. The mitigation measures outlined above would be adopted during the operational phase of the proposed scheme in order to manage cumulative navigational risks. As a result, significant cumulative impacts are not anticipated.

Mitigation measures and residual impact

No mitigation measures are required beyond those to be embedded into the proposed scheme and those to be taken account of during operation of the other projects in the Tees estuary. The residual cumulative impact would be of **negligible** significance.

27.5.11 Traffic and transport

The primary assessment identifies that the proposed schemes traffic demand would result in a negligible impact. It is therefore concluded that there is no pathway for cumulative impacts with other projects and **no cumulative impacts** are predicted.

Mitigation measures and residual impact

No mitigation measures. There would be **no residual cumulative impact**.

27.5.12 Archaeology and cultural heritage

Cumulative direct physical impacts upon heritage assets are not anticipated to occur as the footprints of the projects screened in **Table 27.1** do not overlap. As construction works are spatially discrete, direct impacts from the projects and plans screened in for cumulative impact assessment will not, therefore, also occur during the construction phase of the works proposed below mean high water springs. The only exceptions to this are the dredging footprint for the Tees Dock turning circle (which is also included as part of NGCT

dredge footprint), and the landward part of the proposed scheme of this application (which overlaps in part with the South Industrial Zone scheme).

However, as the dredging for the turning circle will only take place once, either for NGCT or for the scheme proposed here, this will not constitute a cumulative impact. The same argument also applies to the landward part of the proposed scheme footprint which overlaps in part with the South Industrial Zone footprint (resulting in a conclusion that cumulative impacts would not occur).

Any direct impacts associated with the proposed works on land will be fully mitigated, and agreed through a WSI to be prepared for agreement with RCBC prior to works commencing. Direct impacts will not subsequently occur cumulatively as part of the proposed works below mean high water springs, which themselves will be addressed through a protocol for archaeological discoveries and WSI.

With regard to cumulative indirect physical impacts, the assessment of cumulative impacts for the hydrodynamics and sedimentary regime (**Section 27.5.2**) concludes that no significant cumulative impacts are predicted to arise. Therefore, there is no pathway for cumulative indirect physical impacts to heritage assets to occur.

With regard to cumulative impacts upon the setting of heritage assets, and specifically the Transporter Bridge, the landscape and visual assessment of cumulative impacts concludes that there will be no significant cumulative landscape and visual effects upon sites within the study area (**Section 27.5.15**). Due to the limited intervisibility between sites, the existing overarching industrial / urban character within the study area and the existing context of extensive industry and infrastructure features, it is likewise concluded that no cumulative impacts upon the setting of heritage assets will occur.

27.5.13 Noise and vibration

Noise disturbance impacts to human receptors may occur as a result of cumulative traffic flows on the local road network, particularly during the construction phase. Noise impacts associated with increased road traffic flow were assessed as part of the NGCT EIA (Royal HaskoningDHV, 2020), Anglo American Harbour Facilities (Royal HaskoningDHV, 2014), Anglo American Materials Handling Facility and for a residential development on Kirkleatham Lane schemes. Changes in traffic flows associated with all schemes were considered not significant. Construction traffic impacts for the landside application at the South Industrial Zone were not undertaken at the time of this assessment; however, construction traffic impacts associated with the proposed scheme are considered not significant and indicate negligible impact, at worst. Therefore, significant cumulative impacts with the proposed scheme are considered unlikely and are temporary, local and reversible.

As detailed above, impacts during the construction phase at noise sensitive receptors within South Tees Business Parks associated with the proposed scheme are considered not significant. Separation distances between other schemes and South Tees Business Parks are all greater than 1km with the exception of the landside application at the South Industrial Zone site. South Tees Business Parks is predominantly industrial, and therefore considered low sensitivity as detailed in **Table 17.5**. Noise associated with the proposed scheme, predicted at the eastern boundary of the South Tees Business Parks, are more than 5 dB below the magnitude of effect criteria outlined in **Table 17.7**. Therefore, cumulative construction noise impacts with other schemes are considered unlikely. Given the above, cumulative noise impacts are considered to be **not significant**.

Mitigation measures and residual impact

No mitigation measures are required and there would be **no residual cumulative impact**.

27.5.14 Air quality

During construction, cumulative impacts of dust emissions would only occur where the boundaries of the works are within 700m of each other, as impacts of dust are not considered to be significant beyond 350m of a site boundary. With the exception of the planning application submitted for the proposed South Industrial Zone (reference R/2020/0357/OOM) and the Anglo American Harbour Facilities projects, all other projects are located at a greater distance than 700m from the proposed scheme and therefore cumulative dust impacts would not be experienced. The South Industrial Zone and the Anglo American Harbour Facilities would be required to implement best-practice construction dust minimisation methods during their construction phases; should these construction phases be undertaken concurrently, the implementation of these measures would ensure that significant impacts would not occur. This also applies to construction phase plant emissions.

A number of the cumulative projects screened into the assessment will generate additional vessel movements. Emissions from these vessels, coupled with process emissions from stack-based industrial sources such as the Anglo American MHF, the Grangetown Prairie energy recovery facility and the Teesside CCGT power plant, may give rise to cumulative impacts at receptors. With regard to human receptors, given the spatial separation between most of the cumulative projects and the proposed scheme it is unlikely that emissions dispersed across these distances would give rise to significant cumulative impacts at sensitive receptors. These projects would also be located at a distance from the sensitive saltmarsh and dune habitats within the Teesmouth and Cleveland Coast SPA and SSSI, and therefore it is unlikely that significant cumulative impacts would occur in these areas. Furthermore, the industrial processes would be required to operate under an Environmental Permit, the aim of which is to minimise the impacts of emissions to air by compliance with appropriate emission limits and maintenance regimes.

Impacts may also occur as a result of cumulative traffic flows on the local road network. Impacts of road traffic were assessed as part of the proposed South Industrial Zone development and were found to be not significant, with concentrations of all pollutants below their respective air quality Objectives. Changes in traffic flows associated with the proposed scheme were also considered to have an insignificant air quality impact, and therefore significant cumulative impacts are considered unlikely.

Given the above, cumulative air quality impacts are considered to be **not significant**.

Mitigation measures and residual impact

No mitigation measures. There would be **no residual cumulative impact**.

27.5.15 Landscape and visual

There will be no additional, combined effects to physical landscape features due to the construction and operation of other plans and projects within the zone of influence arising due to the proposed scheme. There would be no significant combined effects on landscape character, aesthetic or perceptual aspects due to limited intervisibility between sites and the existing overarching industrial / urban character within the study area.

There is limited intervisibility between the proposed scheme footprint and the development sites of other plans and projects due to intervening large scale industrial and urban conurbations that restrict views across the relatively flat topography. Visual receptors at elevated vantage points to the south / south eastern study area would obtain distant, in-combination views of development sites. Views would be in context of existing extensive industry and infrastructure features.

Assessment of sites within the study area that may incur cumulative landscape and visual effects concludes that there will be **no significant cumulative impacts**.

Mitigation measures and residual impact

No mitigation measures. There would be **no residual cumulative impact**.

27.5.16 Flood risk and coastal defence

Section 20 of this EIA report has confirmed that there would be no direct or indirect impact on flood risk and coastal defences a result of the proposed scheme. Therefore, there will be no additional, combined effects to flood risk and coastal defence features due to the construction and operation of other plans and projects arising due to the proposed scheme, as the other projects are either located on land, or far enough away to ensure the zones of influence do not overlap. No cumulative impacts are predicted.

Mitigation measures and residual impact

No mitigation measures are required. There would be **no residual cumulative impact**.

27.5.17 Socio-economics

A review of supporting documentation for the identified cumulative schemes has enabled an estimation of the anticipated employment impacts – during both the construction and operational phases – which are presented here on an aggregate basis. A review of the cumulative schemes indicates a wide variety of major employment-generating schemes ranging from the offshore wind energy sector, to renewables and energy recovery, to a container terminal and a mineral processing and refining facility. It also includes the South Industrial Zone landside development located immediately adjacent to the proposed scheme and whose operation is intrinsically linked to the proposed scheme. The cumulative schemes also include residential development which has the potential to generate employment during construction phases. Due to the variation in approaches to the assessment and the presentation of employment impacts it is not possible to accurately quantify the aggregate employment effects; rather an estimate is presented. This approach does, however, provide a broad indication of the magnitude and significance of cumulative impacts.

As referenced above, the operation of the proposed South Industrial Zone landside development for distribution/warehousing uses is intrinsically linked to the operation of the proposed quay (the proposed scheme). The socio-economic chapter of the ES for the landside development (July 2020) assessed the following anticipated environmental impacts and their significance:

- Construction employment: supporting between 855 – 915 direct and indirect FTE jobs per annum throughout an 8 year construction phase (temporary, medium term and moderate beneficial);
- Construction economic output: generating between £50.1 - £53.4 million of direct and indirect GVA per annum throughout the construction phase (temporary, medium term and substantial beneficial);
- Operational employment: supporting up to 4,180 direct, indirect and induced FTE jobs at the regional level (permanent and substantial beneficial); and
- Operational economic output: generating up to £180 million of direct GVA per annum (permanent and substantial beneficial).

If all the cumulative schemes came forward for development, without the proposed scheme, it is likely that the construction of these schemes could lead to the generation of approximately 6,565 jobs (including direct, indirect and induced employment). Subject to there being no issues with regard to the availability of labour, it is reasonable to consider that the delivery of all cumulative schemes could represent a substantial and

beneficial effect in terms of construction industry employment. Given that the cumulative schemes are likely to be built out at different times and that not all labour is likely to be local, the availability of construction labour is unlikely to be an issue.

If all the cumulative schemes came forward for development, without the proposed scheme, it is estimated that these could deliver in the region of 14,380 operational jobs (encompassing direct, indirect and induced effects). For reasons outlined above, this figure only represents an estimate since it reflects a spread of approaches: for some, only an assessment of gross direct impacts was made whereas others made allowances for net additionality/displacement and considering the multiplier (indirect and induced) employment effects throughout the wider economy. Notwithstanding, it is considered that the scale of estimated operational employment represents approximately 7% of the total workforce within the AOI (comprising Redcar and Cleveland, Middlesbrough and Stockton-on-Tees). Clearly, the delivery of this many jobs could have a significant interaction with the local labour market and could result in a tightening of the job market and bidding up of wages locally. However, the impact of these could be reduced by virtue of the fact that the delivery of these jobs would, in theory, be generated over a wider time period and across a range of sectors. In this context, the cumulative effect during the operational phase is likely to represent a substantial and **beneficial effect**.

Mitigation measures and residual impact

No mitigation measures. There would be a **substantial beneficial residual cumulative impact**.

27.5.18 Use of natural resources

As noted in **Section 23** of this report, although there will be a requirement for the use of natural resources during construction and operation, this is not considered to be significant / unusual for a project of this nature (and no significant natural resource demands are anticipated). Further assessment regarding the use of natural resources has therefore not been undertaken within this EIA. It is therefore concluded that there is no pathway for cumulative impacts to arise with any of the other plans or projects screened into the assessment.

Mitigation and residual impact

No mitigation measures are required. There would be **no residual cumulative impact**.

27.5.19 Disaster risk

As noted in **Section 24** of this report, disaster risks are not applicable to the proposed scheme. It is therefore concluded that there is no pathway for cumulative impacts to arise with any of the other plans or projects screened into the assessment.

Mitigation and residual impact

No mitigation measures are required. There would be **no residual cumulative impact**.

27.5.20 Human health

As no cumulative impacts are predicted with regard to noise and air quality, it is concluded that there would be no cumulative impacts with regard to human health of local residents.

Mitigation and residual impact

No mitigation measures are required. There would be **no residual cumulative impact**.

27.5.21 Climate change

As the global atmosphere is the receptor for the carbon and GHG assessment, where the effects of emissions are global, the assessment is considered to be inherently cumulative in nature. Other projects in the region will therefore contribute to GHG emissions but will be subject to their own GHG reduction measures schemes within their sectors, and are also factored in a general sense to future UK carbon projections. The future carbon budgets should include assumptions about scale of future development and its carbon efficiency. Therefore, no other projects or plans were considered cumulatively in the assessment.

27.5.22 Disposal of dredged material

The proposed scheme involves the requirement to dispose of up to 1,800,000m³ of dredged material offshore, should no beneficial re-use options be forthcoming prior to the dredge taking place. **Section 26** concludes that the disposal of dredged material will have a negligible impact on fisheries, marine ecology and marine mammals, and no impact on navigation; hence, no significant cumulative effects are predicted.

Mitigation and residual impact

No mitigation measures are required. There would be a residual cumulative impact of **negligible** significance to fisheries, marine ecology and marine mammals, and **no residual cumulative impact** to navigation.