Net Zero Teesside – Environmental Statement

Planning Inspectorate Reference: EN010103

Volume III – Appendices

Appendix 20B: Navigational Risk Assessment

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

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20B. Navigational Risk Assessment

20.1 Introduction

20.1.1 This Navigational Risk Assessment (NRA) covers the marine construction works associated with the Proposed Development (i.e. those works below Mean High Water Springs – 'MHWS'). Those works are outlined in more detail in Chapter 4: Proposed Development (ES Volume I, Document Ref. 6.2).

20.1.2 During construction, existing infrastructure associated with the Redcar Bulk Terminal (RBT) on the River Tees would be used to facilitate offloading of Abnormal Indivisible Loads (AIL). The Proposed Development Site benefits from excellent access to the RBT using internal roads within the Teesworks site and furthermore, a 'more by sea' transport philosophy is aligned with strategic policy including The Highways England document 'Water preferred policy guidelines for the movement of abnormal indivisible loads' (Highways England, 2016).

20.1.3 Chapter 5: Construction Programme and Management (ES Volume I, Document Ref. 6.2) provides further information on the key elements of the Proposed Development and the intended usage of RBT.

20.1.4 The terms of reference used to describe the Proposed Development in this Appendix are consistent with those defined within the main chapters of the ES (Volume I, Document Ref. 6.2).

20.1.5 This Appendix is accompanied by Figures 20B-1 to 20B-7 which are attached at the end of the report.

20.2 Legislative Context

Legislation

Marine and Coastal Access Act (2009)

20.2.1 The Marine and Coastal Access Act 2009 (MCAA) is the basis upon which the Marine Management Organisation (MMO) determine applications to undertake works – or 'licensable activities' – within English waters (Marine Management Organisation, 2009).

20.2.2 As the Proposed Development will require works within the UK Marine Area (Section 42, MCAA), a Marine Licence will be sought from the MMO. Whether this is 'Deemed' within the DCO (the preferred option) or 'Standalone', in reaching a determination, the MMO must consider several factors associated with marine works, including their potential to interfere with legitimate uses of the sea (Section 69, MCAA).

20.2.3 The MCAA sets out the legislative framework for the application of Marine Plans to relevant planning decisions in the UK Marine Area (Marine Management Organisation, 2020a). Specifically, decisions affected by marine policy documents include 'the determination of any application […]

for authorisation of the doing of any act which affects or might affect the whole or any part of the UK marine area' (Section 58, MCAA).

20.2.4 As the Proposed Development includes works within part of the UK marine area, marine policy documents are relevant to the determination process for the project. In this instance, as prescribed by the MCAA, the published draft North East Inshore and Offshore draft marine plans are the appropriate marine policy documents.

20.2.5 The plan policies considered of relevance to the Proposed Development are policy codes NE-CO-1, NE-PS-1, NE-PS-2, NE-ACC-1 and NE-DIST-1.

Convention on the International Regulations for Preventing Collisions at Sea (1972)

20.2.6 The Convention on the International Regulations for Preventing Collisions at Sea 1972 – or 'COLREGS' – sets out a series of obligations and rules which apply to 'all vessels upon the high seas'; the overall objective of the COLREGS is to ensure the safe navigation of the mariner (International Maritime Organisation, 1972).

20.2.7 The COLREGS contain a range of different technical rules which apply to the mariner in order to underpin safe navigation; it is for the mariner to ensure compliance with the COLREGS and the convention.

20.2.8 The COLREGS, whilst having relevance to the wider topic of maritime safety, do not set out any explicit requirements for NRAs. An understanding of the COLREGS is however required to understand if - and if applicable how – any proposed works may interfere with the mariner's compliance to the COLREGS obligations.

United Nations Convention on the Law of the Sea (1982)

20.2.9 The United Nations Convention on the Law of the Sea ('UNCLOS') (United Nations, 1982) sets out a range of provisions to help manage and maintain all aspects of the marine environment - 'an unprecedented attempt by the international community to regulate all aspects of the resources of the sea and uses of the ocean, and thus bring a stable order to mankind's very source of life (United Nations, 2012)'. There are several Articles within UNCLOS which relate to marine navigation and ultimately, the minimisation of risk at sea and the preservation of life.

The Teesport Harbour Revision Order (2008)

20.2.10 The marine works required as part of the Proposed Development are adjacent to the statutory harbour area managed by PD Teesport Limited (the statutory harbour authority, as prescribed by the Harbour Revision Order (HRO) 2008.

20.2.11 The Teesport HRO sets out a range of provisions for PD Teesport which include powers to undertake a range of marine works such as maintenance and improvement activities, navigational asset maintenance, construction works, surveys and dredging.

20.2.12 On the 1st May 2018, the MMO – the body responsible for the determination of HRO applications, as delegated by the Department for Transport – made a favourable determination on the extension of the Teesport HRO; this

updated HRO came into force on the 8th May 2018 and currently ends on the 7th May 2028 (MMO, 2018).

20.2.13 As the statutory harbour authority, PD Ports is responsible for vessel traffic management, the maintenance of safe navigation and for maintaining safe, navigable depths throughout the Teesport area.

20.2.14 Engagement with PD Ports was carried out in December 2019 to determine local operating procedures and potential restrictions on future works associated with the Proposed Development.

The Merchant Shipping Regulations (2002)

20.2.15 The Maritime and Coastguard Agency (MCA) is responsible for the administration of several statutory instruments with relation to the management of maritime safety.

20.2.16 Those with most relevance to this NRA are 'The Merchant Shipping (Safety of Navigation) Regulations 2002' (Maritime and Coastguard Agency, 2002). As with COLREGS, it is for the mariner to ensure compliance with these regulations but a wider understanding of the Merchant Shipping Regulations is required in order to understand how any proposed works may interfere with the mariner's compliance with them.

Guidance

Port Marine Safety Code (2016) / Port Marine Safety Code Guide to Good Practice (2018)

20.2.17 The Port Marine Safety Code (PMSC) (MCA, 2016) and the associated PMSC Guide to Good Practice (MCA, 2018) recognise the strategic significance of UK ports and the need to protect this industry.

20.2.18 The PMSC itself sets out a national standard for port safety which applies to all harbour authorities and other UK marine facilities, berths and terminals. The PMSC Guide to Good Practice provides more detailed guidance on the interpretation of the PMSC and the management of salient issues related to the operation of port facilities.

20.2.19 The PMSC and Guide to Good Practice, inter alia, provide details of key recommended measures in order to ensure maritime safety; this includes the use of a formal risk assessment and implementation of a Marine Safety Management System. Section 7.8 of the PMSC Guide to Good Practice provides specific guidance on the regulation of harbour works and when – and how – harbour authorities should be consulted on applications for marine consent[1].

20.2.20 In January 2020, PD Ports published their annual performance review for the 2019-2020 cycle (PD Ports, 2020). One of the aims of this assessment was to enhance safety within the Ports of Tees and Hartlepool by ensuring that marine navigational hazards are adequately identified, controlled and – where necessary – mitigated to acceptable levels.

[1] Following design refinement, the optionality for abstraction of water from the existing intake on the River Tees was removed meaning works are no longer within the entirety of the Teesport Harbour Area. Notwithstanding, the PMSC and Guide to Good Practice may provide a useful source of best-practice for this NRA; as encouraged by the MCA, they have been used to inform the NRA.

MCA Marine Guidance Notes (MGNs)

20.2.21 The MCA have released a series of MGNs to provide technical guidance on a range of different marine topics. MGNs of relevance to this NRA are summarised below:

- MGN 543 - Offshore Renewable Energy Installations (OREIs) – Guidance on Navigational Practice, Safety and Emergency Response Issues (MCA, 2016); and
- MGN 107 (M) – The Merchant Shipping (Carriage of Cargoes) Regulations 1999 (MCA, 1999).

20.2.22 Of primary relevance to this NRA is MGN 543. This MGN sets out a range of technical guidance surrounding the process of NRA; this has been used to inform the development of this NRA.

20.2.23 MGN 543 was developed with a primary focus on OREIs but in line with the MCA direction, may be of relevance to other power (and wider) development within 'United Kingdom internal waters'. The key elements of MGN 543 which are of relevance to this NRA are as follows:

- Section 1 (Paragraph 1.2): provides recommendations provided within the MGN should be taken into account by developers seeking formal consent for marine works;
- Section 2 (Paragraphs 2.2 and 2.4): provides signposting to relevant legislation;
- Section 3 (Paragraph 3.1): encourages consideration of recommendations as part of the Environmental Impact Assessment (EIA) process; and
- Section 3 (Paragraph 3.2): sets out the expectation that developers should evaluate all 'navigational possibilities, which could be reasonably foreseeable'.

20.2.24 MGN 107 is focused on the safe planning, preparation, transport & management and unloading of bulk cargoes. The MGN also sets out specific expectations of alignment between the mariner / bulk cargo operator and the eventual receiving facility (i.e. the port). As with the Merchant Shipping Regulations and COLREGS, it will be for any eventual contractor responsible for the AIL shipment and unloading process to adhere to the Merchant Shipping (Carriage of Cargoes) Regulations – and the MGN 107 directions – as appropriate.

20.2.25 Notwithstanding, an understanding of these requirements is required as part of this NRA to ensure that the activities planned within the River Tees neither hinder or fetter the mariner's compliance with relevant legislation and MCA direction.

20.3 Purpose and Scope of the Assessment

20.3.1 As above, the Proposed Development includes activity within both the UK Marine Area (Section 42, MCAA) and the Teesport HRO, legislative areas exploited by a range of other legitimate users of the sea.

20.3.2 The aim of this assessment is to undertake an NRA that is appropriate and proportionate to the nature and scale of the Proposed Development. The objectives of the report are to:

- collect, review and present existing information relevant to the topic of navigational risk;
- consult with relevant navigational bodies in relation to expectations for navigational safety;
- assess the potential risks arising from the marine works (below MHWS) required as part of the Proposed Development; and
- present any mitigating measures needed to minimise the risk of the Proposed Development causing either a disturbance to other legitimate users of the sea or a navigational risk.

20.4 Marine Baseline

Vessel Density

20.4.1 Automatic Identification System (AIS) data can be used to provide an insight into the average vessel density in the area surrounding the Site. AIS is a maritime safety communications system adopted by the International Maritime Organisation (IMO) in order to provide vessel information, primarily for maritime safety purposes. AIS also provides a source of information to spatially represent vessel movements to help inform planning.

20.4.2 AIS signals can be broadly categorised as Class A and Class B; class A ('AIS-A') is carried by large, international ships with a gross tonnage (GT) of 300 tonnes or more and all passenger vessels. Class B ('AIS-B') is carried by smaller vessels and is typically found on small commercial vessels, some fishing vessels and recreational vessel users. Whilst useful to characterise high-level shipping trends, AIS does have limitations; most notably, AIS provides a characterisation of commercial shipping but omits commercial vessels <300 GT, recreational vessels, fishing vessels as well as military and governmental vessels whilst on deployment.

20.4.3 The Proposed Development spans 10 density grids which are summarised below against weekly average vessel density (Marine Management Organisation, 2014):

- Grid cell ID 200,808: 7.33
- Grid cell ID 200,809: 14.50
- Grid cell ID 200,810: 57.25
- Grid cell ID 200,811: 102.42
- Grid cell ID 201,340: 199.42
- Grid cell ID 201,869: 182.67
- Grid cell ID 201,870: 29.25
- Grid cell ID 201,871: 0.17

- Grid cell ID 202,400: 19.58
- Grid cell ID 202,399: 157.42

20.4.4 AIS data can represented visually as density grids 'or heat maps'. Publicly available data from 2015 was analysed and used to inform the preliminary NRA (June 2020); since this point, additional publicly available data from 2017 has also been analysed. Commercially procured AIS data from 2018/2019 has been used to validate the analysis of publicly available data.

20.4.5 The data is illustrated on the following Figures:

- Figure 20B-1: Vessel Density Grids / Heat Maps (2015 – 2017);
- Figure 20B-2: Anonymised Vessel Transects (2015 – 2017); and
- Figure 20B-3: Historical Vessel Positions (2018 – 2019).

20.4.6 As is expected given the presence of Teesport, the higher density grids are those found within the navigational channel directly into the Estuary (i.e. 202,399, 201,869) and within the 'inner' area of Teesport itself (200,808, 200,809, 200,810, 200,811, 201,340).

20.4.7 Grids to the North East are also higher in density, representing the primary routes of commercial vessels leaving Teesport (i.e. 202,929, 202,399).

20.4.8 The grid directly to the East of the Estuary mouth and the South Gare (201,871) is much lower in density which is primarily due to this being a – predominantly – non-navigable area for larger vessels. Whilst there may be some navigable water for large vessels to the North of the grid, the area is predominantly characterised by lower depths of water, sandbanks and bars, inner shallows and the foreshore itself.

20.4.9 Given the AIS and vessel density data limitations referenced above, further consideration is given to other mariners – such as commercial fishers and recreational mariners below.

Port Activity

20.4.10 The Site is within the direct vicinity of Teesport, a major UK Port which is owned and operated by PD Ports as the statutory harbour authority. Teesport handles ~28 million tonnes per of shipping per year with dry-bulk and project cargoes (including metals, steel, Agri bulk and forest products) being primary offerings (Department for Transport, 2019).

20.4.11 Teesport is also a major port supporting the oil and gas, chemical and petrochemical industries. Whilst in close proximity to the Teesside Wind Farm, the majority of vessel activity related to the wind farm originates from other operation and maintenance bases at Hartlepool (EDF Energy Renewables, 2019).

20.4.12 The port limits begin within the outer approaches of the Tees Estuary (approximately two miles offshore) and from this point, traffic is under the control of the harbourmaster and must therefore follow Vessel Tracking System (VTS) directions. As well as issuing direction to vessels, the harbourmaster can instruct a vessel to anchor or instruct a vessel to receive a pilot for onward navigation; the harbourmaster may also create a 'clear channel route' for larger vessels.

20.4.13 All vessels which are greater than 20 m in length must enter the port through the Tees Approach Channel and in poor weather conditions where visibility is impeded, no vessel may approach the port without the consent of the harbourmaster. In order to safeguard the port and its users, pilotage is compulsory for vessels over 95 m in length or for vessels over 20 m in length if carrying a dangerous cargo. Any vessel requiring a tug, irrespective of length or beam, requires a pilot.

20.4.14 When approaching or departing from the port, mariners must confirm to the harbourmaster that they are in a seaworthy condition and have their vessel in a state where it can respond immediately to an emergency, navigational risk or port order (this includes having secondary power available and that any auto-pilotage is deactivated). The harbourmaster manages and enforces against a series of speed limits within the port limits.

20.4.15 Whilst appreciating the limitations of AIS data referenced above, the vessel density grids provide a useful estimate for Teesport traffic given the majority of vessel types accessing the facility are required to utilise AIS-A or have opted to utilise AIS-B.

20.4.16 As well as AIS, PD Teesport operate a Vessel Traffic System (VTS) and therefore have detailed records of vessel movements; engagement with PD Teesport was undertaken in December 2019 and a data request made however no response was received.

20.4.17 In the absence of data from VTS historical publicly available data has been examined in order to help provide further insight into the variability of vessel movements in the marine area surrounding the Site.

20.4.18 As well as AIS, PD Teesport operate a Vessel Tracking System (VTS) and therefore have excellent vessel movement records. Publicly available VTS data from the York Potash project was analysed from January to September 2013; Table 20B-1 below summarises the VTS data for this period.

Table 20B-1: Historical 2013 VTS

Month	Vessel Movements
January	824
February	808
March	981
April	922
May	1009
June	871
July	899
August	867
September	869

Source: York Potash Limited / Planning Inspectorate, Section 16 - Appendix 16.1 Marine navigation risk assessment, July 2014

20.4.19 Publicly available data from the Teesside Offshore Wind Farm provides a single annual figure of 13,161 shipping movements in the Tees Bay area in 2003 (Entec, 2003).

20.4.20 Given the range of data available to indicate typical vessel density, Table 20B-2 has been included below to summarise the individual sources and shipping volumes.

Table 20B-2: Shipping Data Summary

Source	Average Daily Vessel Movements	Average Weekly Vessel Movements	Annual Vessel Movements
2017 AIS*	32	226	11,795
2015 AIS*	28	199	10,369
2014 VTS*	33	232	12,108
2003 VTS	36	253	13,161

*Where historical monthly data has been made available, the busiest month has been selected and a weekly and annual average figure has been extrapolated to generate a suitable worst-case.

20.4.21 Engagement with PD Teesport has indicated that inter-annual variations are typical of the port and are reflective of peaks and troughs in cargo-specific transport and the development of marine projects (York Potash, Able UK and Teesside Offshore Wind Farm being good recent examples); this is corroborated by historical annual statistics (Department for Transport, 2008-various).

20.4.22 The Proposed Development Site benefits from excellent links with the existing Redcar Bulk Terminal (RBT) located on the south bank of the River Tees and within the Proposed Development Site boundary. RBT is a deep-water marine terminal which consists of a quay, approximately 320 m in length, which is equipped with rail mounted gantry cranes. The facility is capable of unloading up to ~40,000 tonnes of cargo per day and can accept vessels of up to 304 m in length, 48 m in beam and 17 m in draft; the RBT is capable of supporting both day and night operations (Redcar Bulk Terminal Limited, 2021).

20.4.23 There are a number of infrastructure projects within the vicinity of the Proposed Development which are either in the planning or pre-planning stages; this is discussed fully within Chapter 24: Cumulative and Combined Effects (ES Volume I, Document Ref 6.2). A proposal of relevance to the likely volume of marine traffic as part of the future baseline is the York Potash Harbour Facilities Order. Assessments provided in support of the EIA for this scheme predict an average of 93 additional vessel movements per year during ‘Phase 1’ of their development, and an average of 185 additional movements per year during ‘Phase 2’. As detailed programme information is not available, on a precautionary basis, the higher of these two figures has been considered further. The additional future vessel movements associated with this project represent a small increase against the context of existing traffic within the Estuary (specifically, an average 1.5% increase on annual movements).

Marine Works

20.4.24 Data published by the MMO via the Marine Case Management System (MCMS) and the Marine Information System (MIS) indicates the presence of several 'active' Marine Licences within the vicinity of the Proposed Development (Marine Management Organisation, 2020b; 2020c):

- 35097/110302/2 (Dredging Licence – PD Teesport Limited);
- MLA/2015/00334/4 (Dredging Licence – Able UK Limited);
- MLA/2016/00250/4 (Hartlepool Power Station Routine Drumscreen and Forebay / Intake Area Maintenance – EDF Energy Limited);
- 32421/040319/13 (Export Cable Area Construction Licence – Teesside Windfarm Limited);
- MLA/2017/00409 (Teesside Offshore Windfarm Operation and Maintenance Licence – Teesside Windfarms Limited);
- MLA/2019/00151 (Proposed Topside Works – Inter Terminals Seal Sands Limited);
- MLA/2019/00151 (Proposed Dredge Footprint, Tees/Hartlepool - Inter Terminals Seal Sands Limited); and
- MLA/2014/00580 (Other Removals Licence – Teesside Windfarm Limited).

20.4.25 Figure 20B-4 illustrates the available local licensing data within the vicinity of the Proposed Development (both active and inactive Marine Licence Application shape, polygon and line datasets). This has been refined throughout the EIA process and informed by engagement with relevant stakeholders, including the MMO.

Recreational Sailing

20.4.26 As noted above, there are several limitations to AIS; this includes the omission of most recreational vessels from the AIS datasets (AIS is not mandatory for the vast majority of recreational vessels). On this basis, the NRA has been informed by a qualitative review of available data, publicly available information on recreational sailing and engagement with the Royal Yachting Association (RYA).

20.4.27 The RYA UK Coastal Atlas of Recreational Boating provides a GIS dataset of recreational boating activity around the UK (RYA, 2018). The dataset provides spatial data which indicates intensity of recreational use, general boating areas, racing areas and cruising areas; it also provides the location of RYA clubhouses, training centres and marinas. The Site is within a 'General Boating Area' but is not within any "designated" racing or cruising areas.

20.4.28 There is a single marina in the surrounding area; its published name and distance from the Site is detailed below:

- Hartlepool Marina (~7.5 km).

20.4.29 There are five RYA training centres in the surrounding area; their published names and distances from the Site are detailed below:

- Tees Barrage International (~12.5 km);
- Longscar Powerboating (~7.5 km);
- Bob Moncur Sailing (~7.5 km);
- Tees & Hartlepool Yacht Club (~7 km); and
- Teesside Nautical Studies (~6.75 km).

20.4.30 There are five RYA clubs in the surrounding area; their published names and distances from the Site are detailed below:

- Tees Motor Boat Club (~12.5 km);
- Tees Barrage Upstream Sailing Association and Castlegate Marine Club (~12 km);
- South Gare Marine Club (Sail Section (~1 km);
- Hartlepool Marina Berth Holders Association (~7.5 km); and
- Tees & Hartlepool Yacht Club (~7 km).

20.4.31 Of these clubs, it is understood that the busiest is the Tees and Hartlepool Yacht Club which hosts a range of vessels from small dinghies and sail craft to larger racing yachts. It is understood that the majority of the club's activity is within and around the Hartlepool Bay however on occasion, mariners move South toward the Tees Bay and the South Gare (RYA, 2020).

20.4.32 Several recreational surveys have been undertaken within the Tees Bay area; this includes a publicly available Entec UK survey over the August Bank Holiday weekend in 2003 (Entec, 2003). The data-whilst almost 17 years old-does provide a useful insight into the locations popular with recreational mariners.

Other Recreational Activity

20.4.33 The British Sub Aqua Club (BSAC) maintain a scuba diving club – 'BSAC Teesside 43' – at the South Gare Breakwater (British Sub Aqua Club, 2020). At the closest point, the water connection corridor for the Proposed Development is 1.12 km from the diving club. Whilst based at the South Gare, it is understood that the diving club do not undertake diving activities from the foreshore at Coatham Sands. The club is understood to utilise a slipway at the South Gare.

20.4.34 There are no formal, published datasets available for surfing, kiteboarding or kitesurfing activities however 'The Gare' and 'Paddy's Hole' are locally reported to be popular as training and competition areas; both sites are located within close proximity to the Site.

20.4.35 As encouraged during pre-application engagement with the MMO (Marine Licensing Team), engagement with the Marine Conservation Team within the MMO was carried out in February 2021. No additional recreational (non-

licensable) activities beyond those which have already been considered within the NRA were raised.

Commercial Fishing

20.4.36 The International Council for the Exploration of the Sea (ICES) standardise the division of sea areas to underpin statistical analysis around the UK; this is achieved through 'ICES Rectangles' (see Figure 20B-5). Each ICES rectangle is approximately 30 nautical miles by 30 nautical miles and has a unique identification reference; the Proposed Development is within ICES rectangle '38E8' (MMO; Dixon et al, 2018). Commercial fishing activity within this area is characterised by Lobster, (Nephrops), Whiting and Crab effort caught primarily with 10 m and under vessels.

20.4.37 There are 24 vessels of 10 m and under and 2 vessels of 10 m and over that are registered with home port status in Hartlepool (MMO, 2021a; 2021b). Twenty of the 10 m and under vessels hold active shellfish licences; none of the 10 m and over vessels hold shellfish licences. None of the vessels hold scallop licences.

20.4.38 Discussions with NEIFCA highlighted that local fishing vessels would also be docked at Paddy's Hole, South Gare and along the Redcar Promenade, Coatham, registered with home port status in Redcar (NEIFCA Pers. Comm, 2021). Overall, there were 28 vessels of 10 m and under registered with home port status in Redcar, all of which hold shellfish licences but not scallop licences (MMO, 2021a). No vessels 10 m and over were registered with home port status in Redcar (MMO, 2021b).

20.4.39 There are challenges in characterising the exact operations, catch locations and behaviours of fishing vessels; this is primarily due to the inherent omissions in catch data gathered as part of the official statistics process which the MMO manage. A standalone commercial fishing baseline report has been prepared to help develop a detailed understanding of local fishing activity from both an ecological and a commercial perspective; this is provided within Appendix 14B: Fisheries and Fish Ecology (ES Volume III, Document Ref. 6.4).

20.4.40 This approach has been agreed through engagement with relevant stakeholders such as the MMO Licensing Team and North Eastern Inshore Fisheries and Conservation Authority (NEIFCA).

20.4.41 Technical engagement with the NEIFCA in February 2021 confirmed the minimal level of fishing activity within the Tees Bay, stating that limited potting and trapping was likely to take place, with very small numbers of local fishing vessels (under 10 m) utilising this area (NEIFCA Pers. Comm, 2021). Technical engagement with the local MMO enforcement / fisheries office in North Shields was carried out on several occasions between May 2020 and March 2021; no response was received.

20.4.42 MMO statistics indicate that demersal otter trawling and seine netting were the most prevalent fishing methods operating in the ICES rectangle 38E8. From 2013 to 2017, a total of 4,369 tonnes of fish and shellfish were landed using these methods. Nephrops and whiting were the most targeted species, with an average landed weight of 377 tonnes and 265 tonnes,

respectively. Cod, plaice, haddock and lemon sole also represented an important component of total landings by otter trawling and seine netting, representing a combined average weight of 122 tonnes.

20.4.43 The second most common fishing method used within the ICES rectangle 38E8 is potting and trapping with a total landed weight of 1,219 tonnes reported from 2013 to 2017. This method is used to target predominately lobsters and edible crabs, with an average weight of 87 tonnes and 136 tonnes landed between 2013 and 2017, respectively. In addition, and to a lesser extent, velvet swimming crab, nephrops and cod were also contributed to the total landed weight reported for potting and trapping.

20.4.44 Beam trawling, scallop dredging, drift and fixed netting, and gear using hooks, only represented a combined total of 2% of landed weight (tonnes) reported in the MMO statistics for the ICES rectangle 38E8 (2013 – 2017). Scallops comprised 88% of the total landed weight recorded for the scallop dredging fishing method, whilst mackerel dominated the reported fish catch for vessels utilising gear using hooks, representing 97% of the total landed weight. The fish and shellfish species typically targeted by drift and fixed netting were whiting and cod.

20.4.45 Whilst there is a lack of exact data to analyse individual vessel behaviours around the approximately 30 nautical mile x 30 nautical mile ICES rectangle 38E8, it is likely that some potting and trapping effort is concentrated around wreck features, the Scar rocks and the South Gare (i.e. those areas where rock, reef and bioaccumulations support higher shellfish productivity). Local reports suggest that this is almost wholly undertaken by vessels of 10 m and under and, to a limited extent, recreational/hobby fishers.

Cables and Pipelines

20.4.46 There are several subsea cables and pipelines within the vicinity of the Proposed Development (KIS-ORCA, 2020; Oil and Gas Authority, 2019; Crown Estate, 2020; British Steel Corporation, 1975):

- Existing outfall tunnel (historically serving the Redcar Steelworks Blowing and Generating Station;
- Central Area Transmission System (‘CATS’) gas Trunkline and landfall (36 inch);
- Breagh gas pipeline and landfall (20 inch) and associated monoethylene glycol pipeline and landfall (3 inch); and
- Teesside Wind Farm High Voltage cable landfall.

20.4.47 The closest of these features is the Teesside Wind Farm export cable which overlaps with the marine segment of the on-shore CO_2 Export Pipeline (i.e. the portion of the corridor between Mean High-Water Springs and Mean Low Water) (see Figure 20B-6).

Historical Incidents

20.4.48 The review of historical incident data can help to identify local incident trends, patterns and accident causation; this may form a useful indicator of potential sources of future navigational risk. A qualitative review of Marine Accident

Investigation Branch (MAIB) data has been completed to help inform the NRA; this has included recent incident reports for the locality.

20.4.49 The MAIB is an independent branch of the Department for Transport (DfT). Their core objective is to investigate accidents to determine the specific circumstances and causation with a view to this learning helping to reduce the incidence of marine accidents. The review of historical local data is aligned with the high-level principles of MGN 543 and wider methodologies for assessment of Marine Infrastructure projects.

20.4.50 On 18 April 2019, the (Turkish registered) bulk carrier '*Gulnak'* collided with the Panama registered bulk carrier '*Cape Mathilde'* which was moored alongside the RBT. Both vessels were damaged; there were no fatalities, recorded injuries or pollution events arising from the incident. In February 2020, the MAIB published incident report number 5/2020 (MAIB/Dft, 2020); this report summarises the comprehensive investigation into the incident and includes a number of conclusions and recommendations for the promotion of better vessel safety in this location which have been considered in this NRA.

20.5 Marine Works

20.5.1 Chapter 5: Construction Programme and Management (ES Volume I, Document Ref 6.2) include full details of the AIL activity and works required for the Proposed Development (including those within the UK Marine Area). A brief summary of AIL activity potential marine works relevant to the NRA is detailed below within Table 20B-3.

Table 20B-3: Marine Works Summary

Activity	Description
AIL Activity	**Use of RBT to facilitate delivery of AILs** It is proposed to import all large modular plant and components for the Low-Carbon Electricity Generating Station using the facilities at the RBT. All AILs required will be imported by sea using the existing RBT facilities and then moved to the Site using the existing internal access roads. The import of AILs through RBT will result in approximately 40 ship movements over a period of 2 years. Whilst RBT is capable of supporting day and night access, the default position is that unloading will be carried out during daylight hours with night time unloading an exception. It is assumed that shipborne loads will be able to dock using the existing wharf without modifications, however, off-loading of modular plant may require installation and temporary use of a land-based heavy lift crane situated off the RBT wharf. As a worst-case scenario, it has been assumed that preparatory works for crane installation will involve site clearance with the potential for minor land-based civil works (i.e. no additional 'marine licensable activities'). As an alternative to the use of a crane, the EPC contractor may decide to use Self Propelled Modular Transporters to take the components off the ship directly.

Activity	Description
	Further details in relation to AILs is provided within Chapter 5: Construction Programme and Management and Chapter 16 Traffic and Transportation (ES Volume I, Document Ref 6.2).
Water Discharge Connection - Treated Water Outfall	**Refurbishment Scenario** The condition of the discharge tunnel is unconfirmed; if it is possible to re-use the existing tunnel, any refurbishment and maintenance activities are likely to be minor. As a reasonable worst-case, it is predicted that works may include the potential insertion of a new reamer/outfall liner. **Replacement Scenario(s)** Pending the condition of the existing outfall infrastructure, works may be required below MHWS at Coatham Sands and within the wider Tees Bay to replace the existing discharge. Replacement will involve use of Trenchless Technologies to reach a suitable discharge point within the Tees Bay whilst minimising impact to the surrounding environment. There are several activities which may be required as part of this process; they may include but are not necessarily limited to: Pre-works bathymetry and/or magnometer surveys; • Micro-bore tunnelling exercise to create a replacement discharge pipeline route; • Punch-hole / break-out through the seabed at the intended discharge point and connection into an outfall head (if design requires it); • Final assembly, pipeline jointing, connections, fabrication and ancillary commissioning works to install a safe and fit-for-purpose discharge pipeline; and • The presence of vessels such as work boat(s) and/or barge(s) to support the refurbishment process.
Water Discharge Connection- Treated Water Outfall Head	**Refurbishment Scenario** The condition of the existing outfall tunnel head is unconfirmed; if it is possible to re-use the existing outfall head, any refurbishment and maintenance activities are likely to be minor. **Replacement Scenario** Owing to the relatively low discharge volumes proposed and to assist the dissipation of any plume, a diffuser at the outfall head will be retrofitted if the existing diffuser is no longer functional. Should the Treated Water Outfall require the emplacement of an outfall/diffuser head, several construction activities would be required; potential effects would primarily relate to: • A preparatory dredge to create a pocket for the emplacement of an outfall head; • Final assembly, float and positioning of a replacement head; • A flood and sink exercise (or similar); • Works to position the outfall head within the dredge pocket; • A short campaign of either piling or pin drilling to secure the outfall head; • Backfill of the dredged pocket around the outfall head; • The positioning of rock armouring / scour protection around the outfall head; • Final assembly, pipeline jointing, connections, fabrication and ancillary commissioning works to install a safe and fit-for-purpose discharge pipeline; and

Activity	Description
	• The presence of vessels such as work boat(s) and/or barge(s) to support the refurbishment process.
CO_2 Export Pipeline	Construction of the CO_2 Export Pipeline will be using HDD techniques under the Dunes/Sands. The direction of construction of the export route is yet to be determined, with options being from offshore to the Power and Carbon Capture (PCC) Site, or vice versa. The consenting of the part of the pipeline between MHWS and MLWS is by use of a Deemed Marine Licence (DML) included in the Application (see Section 4.7, Chapter 4: Proposed Development, ES Volume I, Document Ref. 6.2). The CO_2 Export Pipeline will extend beyond MLWS to ultimately connect to the offshore storage facility, however, consent for the section below MLWS (including the part from MLWS to 3 km offshore described above) is not being sought as a part of this Application. The Marine Licence application for the offshore section of the CO_2 Export Pipeline will require a separate environmental impact assessment. The continuation of the pipeline below MLWS (including the works below MLWS described above) is considered in the in combination effects assessment included in Appendix 24C (ES Volume III, Document Ref. 6.4). Potential cumulative and combined effects associated with shipping and navigation are considered below. Construction of the CO_2 Export Pipeline will require use of vessels such as work boat(s) and/or barge(s). The HDD is expected to be drilled from approximately 3 km off-shore, where there is a minimum 5 m water depth, to on-shore at the PCC Site (or vice versa).
Natural Gas Connection (River Tees Crossing)	If a crossing under the River Tees is required a micro-bored tunnel will be used to cross beneath the river directly from Navigator Terminals to the PCC Site.
CO_2 Gathering Network (River Tees Crossing)	The CO_2 Gathering Network will also need to cross the River Tees. The crossing of the River Tees will be achieved used either a micro-bored tunnel from Navigator Terminals to the PCC Site shared with the Natural Gas Connection or alternatively an HDD from Navigator Terminals to the northern bank of the Dabholm Gut for the CO_2 Gathering Network pipeline only.

20.6 Risk Assessment

Consultation

20.6.1 To inform this assessment, consultation has been undertaken with several relevant organisations; this is summarised below in Table 20B-4.

Table 20B-4: Consultation Summary

Organisation	Remit / Role	Engagement
Marine Management Organisation	Responsible for the determination of a Marine Licence for the Proposed Development.	EIA Scoping (March 2019) Pre-Application engagement meetings (September 2019, August 2020, February 2020, December 2020 and February 2021)

Organisation	Remit / Role	Engagement
		Stage 2 Consultation (June - September 2020)
Marine Management Organisation – Marine Conservation Team (MCT)	Responsible for managing the impacts of fishing and marine non-licensable activities on Marine Protected Areas. This is primarily achieved through joint working with determining authorities for Marine Consent (i.e. the MMO) and We can do this through voluntary measures or byelaws.	EIA Scoping (March 2019) Stage 2 Consultation (June – September 2020) Pre-Application engagement meeting (February 2021)
Maritime and Coastguard Agency	Responsible for producing legislation and guidance on maritime matters and for working to prevent the loss of life on the coast and at sea.	EIA Scoping (March 2019) Pre-Application engagement meeting (February 2020) Stage 2 Consultation (June - September 2020)
PD Teesport Limited	Statutory harbour authority responsible for ensuring safe navigation within the Teesport harbour area.	EIA Scoping (March 2019) Pre-Application engagement meeting (December 2019) Stage 2 Consultation (June - September 2020)
Trinity House	Responsible for safeguarding shipping and seafarers; hold a statutory duty as General Lighthouse Authority to deliver a reliable aids to navigation service for all mariners.	EIA Scoping (March 2019) Pre-Application engagement meeting (February 2020) Stage 2 Consultation (June - September 2020)
Teesside Offshore Windfarm Limited T/O EDF Energy Renewables	Private owner and operator of the Teesside Offshore Windfarm generation assets and export cable located within the vicinity of the Proposed Development.	Pre-Application engagement meeting (December 2019)
Royal Yachting Association	National governing body for dinghy, yacht and motor cruising, all forms of sail racing, RIBs and sportsboats, windsurfing and personal watercraft; provides advice to help ensure disruption to recreational mariners is avoided.	Data request (February 2020) Pre-Application engagement meeting (March 2020)
North Eastern Inshore Fisheries and Conservation Authority	Responsible for managing and conserving marine resources between the River Tyne and North East Lincolnshire; jointly operate with the MMO to inspect vessels in order to ensure reporting compliance and to and enforce against illegal or non-compliant fishing operations.	Stage 2 Consultation (June - September 2020) Pre-Application engagement (September 2019, February 2020 and February 2021)

Methodology

20.6.2 There is currently no standard formal UK guidance setting a prescribed methodology for how the assessment of navigational risk should be undertaken.

20.6.3 The Planning Inspectorate (PINS) has not currently published an advice note on the process of NRA however, PINS Advice Note 11: Working with public bodies in the infrastructure planning process does set out how an applicant seeking Development Consent should seek to engage with the MMO as a key marine regulator and determining authority for a Marine Licence Application (Planning Inspectorate, 2013).

20.6.4 The International Maritime Organisation Guidelines for Formal Safety Assessment 'MSC – MEPC.2/Circ.12/Rev 2' (FSA) set out a standardised process for the assessment of marine risk (International Maritime Organisation, 2013). Whilst not designed explicitly for the process of NRA, the FSA does set out five fundamental steps which may be used to structure an NRA; these are as follows:

- Identification of hazards (a list of all relevant accident scenarios with potential causes and outcomes);
- Assessment of risks (evaluation of risk factors);
- Risk control options (devising regulatory measures to control and reduce the identified risks);
- Cost benefit assessment (determining cost effectiveness of each risk control option); and
- Recommendations for decision-making (information about the hazards, their associated risks and the cost effectiveness of alternative risk control options is provided).

20.6.5 For the purposes of this assessment, the definition of 'hazard' and 'risk' are as follows:

- **Hazard:** A potential source of harm, loss or injury; and
- **Risk:** The probability of suffering harm or loss and is a measure of the frequency and consequence.

Identification of Hazards

20.6.6 Table 20B-5 below provides a summary of the key hazards associated with the Proposed Development.

Table 20B-5: Hazard Summary

Activity	Assessment
AIL Activity	During the AIL deliveries associated with construction of the Proposed Development, potential hazards could include:

Activity	Assessment
	Vessel Passage[2] • on final approaches to RBT, the presence of a large vessel may present a hazard to other mariners through collision. This may include another vessel or a fixed object, such as a mooring or wharf. **Vessel Presence** • presence of a large vessel may constrain the passage of other vessels using the River Tees; and/ or • operation of a large vessel may distract other mariners. **Docking and Unloading** • during final approach and docking, the manoeuvring of a large vessel and support craft (i.e. tugs) within the River Tees may constrain the passage of other mariners; • the docking and unloading of a large vessel may distract other mariners, including through the use of wharf/ vessel illumination during hours of darkness, if required; and • whilst docked, vessel mooring or docking failure(s) – "breakout" – may pose a hazard to both other mariners using the River Tees and neighbouring fixed objects.
Water Discharge Connection- Treated Water Outfall	**Refurbishment Scenario** In a refurbishment scenario, only minor primarily hand-based maintenance activities would be undertaken, and no potential hazards are anticipated in terms of navigational risk. The insertion of a new reamer/outfall liner is anticipated to be terrestrially led and no potential hazards for other mariners are predicted. **Replacement Scenario(s)** There are several potential hazards associated with the potential replacement scenarios: • **Survey Vessels:** the use of survey vessel(s) to undertake pre-works surveys could present a hazard within the Tees Bay. • **Punch-hole:** the punch-hole would be on the seabed itself; a no hazards to marine navigation are anticipated. • **Final assembly works:** the fabrication and assembly works themselves could present a hazard to navigation through the accidental release of engineering components or pipe sections into the Tees Bay. • **Work boat(s):** work boat(s) within the Tees Bay may constrain vessel passage. The vessels associated with a specialist installation such as this may also invoke activity-specific restrictions; jack-up barges and dive support RIBs, for example, are likely to have particular restriction requirements. Should the vessel lose power whilst underway, there is a further risk that it could obstruct – and/or collide with – other vessels within, and seaward of, the Tees Bay. Owing to the presence of several cable and pipeline features within the vicinity of the Proposed Development, there is an additional risk from loss of vessel power from a dragged anchor.

[2] The wider safe long-sea passage of the vessels involved in the construction of the Proposed Development will be the responsibility of the contractor(s) appointed to complete shipments and will be subject to standard international, national and local maritime code and regulation; it is not considered by this assessment. In order to adequately consider the potential effects arising from the construction of the Proposed Development however, the final approaches to the Proposed Development Site are considered.

Activity	Assessment
Water Discharge Connection-Treated Water Outfall Head	**Refurbishment Scenario** In a refurbishment scenario, only minor primarily hand-based maintenance activities would be undertaken, and no potential hazards are anticipated in terms of navigational risk. **Replacement Scenario** Similarly, to the replacement scenario for the discharge tunnel itself, there are several hazards associated with the potential replacement scenario for the discharge head: • **Dredging:** the presence of a dredger within the Tees Bay may constrain vessel passage. Should the vessel lose power whilst underway, there is a further risk that it could obstruct – and/or collide with – other vessels within, and seaward of, the Tees Bay. Owing to the presence of several cable and pipeline features within the vicinity of the Proposed Development, there is an additional risk from loss of vessel power; were a vessel to lose power within poor weather, anchor dragging may threaten buried cable and pipeline assets (such as the CATS pipeline, Breagh Pipeline or the Teesside Offshore Wind Farm export cables). • **Assembly, Float and Positioning works:** the vessels associated with a specialist installation activity such as this may invoke activity-specific restrictions especially during final alignment of a discharge head. This can mean that for extended periods, the vessel must remain static within a specific area; this could present a hazard should, for example, another mariner enter that vessel's operating area. • **Rock Armouring:** the hazards associated with a barge required to position rock armour are as per those described for dredging. • **Final assembly works:** the fabrication and assembly works themselves could present a hazard to navigation through the accidental release of engineering and connection components (including a discharge head) into the Tees Bay. • **Work boat(s):** as with dredging, work boat(s) within the Tees Bay may constrain vessel passage. The vessels associated with a specialist installation such as this may also invoke activity-specific restrictions; jack-up barges and dive support RIBs, for example, are likely to have particular restriction requirements. Owing to the presence of several cable and pipeline features within the vicinity of the Proposed Development, there is an additional risk from loss of vessel power; were a vessel to lose power within poor weather, anchor dragging may threaten buried cable and pipeline assets (such as the CATS pipeline, Breagh Pipeline or the Teesside Offshore Wind Farm export cables).
CO_2 Export Pipeline	Construction of the CO_2 Export Pipeline will be using HDD techniques under the Dunes/Sands. The direction of construction of the export route is yet to be determined, with options being from offshore to the Power and Carbon Capture (PCC) Site, or vice versa. The consenting of the part of the pipeline between MHWS and MLWS is by use of a Deemed Marine Licence (DML) included in the Application (see Section 4.7, Chapter 4: Proposed Development, ES Volume I, Document Ref. 6.2). The CO_2 Export Pipeline will extend beyond MLWS to ultimately connect to the offshore storage facility, however, consent for the section below MLWS (including the part from MLWS to 3 km offshore described above) is not being sought as a part of this Application. The Marine Licence application for the offshore section of the CO2 Export Pipeline will require a separate environmental impact assessment. For the aspects of construction associated with this Application, no navigational hazards are anticipated. Cumulative and combined effects are

Activity	Assessment
	considered further below, including the interfaces with the (separate) offshore HDD drilling associated with the CO_2 Export Pipeline.
Natural Gas Connection (River Tees Crossing)	For the crossing under the River Tees, 'no dig' construction techniques will be employed. Details of the method to be employed will be determined by the contractor, but it is considered most likely that horizontal directional drilling will be used to cross beneath the river; no navigational risks are anticipated and this is not considered further
CO_2 Gathering Network (River Tees Crossing)	A single corridor crossing underneath the River Tees will be required as part of the CO_2 Gathering Network ; it is anticipated that this crossing would either share the bored tunnel under the Tees with the Natural Gas Pipeline or a new crossing would be commissioned via HDD or similar no-dig technique. The routeing of the CO_2 Gathering Network across the River Tees will be either: • Via a micro-bored tunnel from Seal Sands directly to the Power and Carbon Capture (PCC) site (and shared with the Natural Gas Connection) and then below ground along the southern side of the proposed Teesworks Spine Road to the PCC Site; or • Installed using a horizontal directional drilled (HDD) bore from Seal Sands to the northern bank of the mouth of Dabholm Gut and then above ground along the northern bank of Dabholm Gut past Bran Sands Wastewater Treatment Plant and then north to the PCC Site. It will also be necessary to run a fibre-optic control cable for control of the CO_2 Gathering Network from the north bank of the Tees to the PCC Site. This will either cross the Tees via the micro-bored tunnel or, if this option is not used, using an existing services tunnel beneath the Tees. On the basis of the methods described above, no navigational risks are anticipated, and this is not considered further.

Marine Users

20.6.7 The marine users within the vicinity of the Site were grouped into categories within Table 20B-6.

Table 20B-6: Vessel Groupings

Reference	Classification	Description
MAR-A	Non-Vessel Users	Divers; Swimmers; Surfers
MAR-B	Sailing Vessel	Windsurfers; sailing dinghies
MAR-C	Yacht (Small)	Small sail or motor yachts
MAR-D	Powered Vessel (Small)	Fishing vessels of 10 m and under; small recreational powered craft such as jet skis or small Rigid Inflatable Boats (RIBs); inshore lifeboat launches
MAR-E	Unpowered Vessel (Small)	Sea kayaks; paddle boards; pedal boats
MAR-F	Commercial Vessel (Small)	Fishing vessels of 10 m and over; North Sea barges; work boats; pilot boats; harbour tugs; dive support RIBs; windfarm O&M craft; other miscellaneous support craft

Reference	Classification	Description
MAR-G	Commercial Vessel (Large – Very Large)	Bulk Tankers; passenger and transport ferries; container and other very large freight transporters;

Assessment of Risks

20.6.8 Table 20B-7 below provides a summary of each identified risk has been assessed; at this time, this has been undertaken in a qualitative manner informed by existing data, professional judgment and navigational stakeholder engagement.

20.6.9 As is typical of UK NRAs, a 'Worst Credible Scenario' approach has been taken to identify and consider navigational risks. As informed by the IMO FSA guidance, basic terminology used in this risk assessment is as follows:

- **Probability:** 'The degree of confidence in the occurrence of an event, measured on a scale from 0 to 1. An event with a probability of 0 means that it is believed to be impossible; an event with the probability of 1 means that it is believed it will certainly occur'; and
- **Risk**: 'The combination of the frequency and the severity of the consequence'. For the purposes of this NRA, risk is classified as 'low', 'medium' or 'high'.

Table 20B-7: Risk Assessment

Activity	Assessment
AIL Activity	**Vessel Passage** On final approaches to RBT, the presence of a large delivery vessel may present a hazard to other mariners through collision. This may include other vessels or a fixed object, such as a mooring or wharf. This risk is likely to apply to a range of commercial vessels and potentially some smaller powered craft also (i.e. MAR-D, MAR-F and MAR-G vessels). Prior to commencement of AIL deliveries, it is expected that the Navigational Authority – PD Ports – and the operator of the RBT facility – Redcar Bulk Terminal Limited - would attend site with the construction contractor, once appointed, in order to review access arrangements, moorings and final approach. It is expected that this would be informed by the known historic slippage of the northern bank (buoy No. 9 and buoy No. 11). Notwithstanding, based on historic clearance of the northern bank slippage and based on the existing usage of RBT and as it is an established berth, pre-docking bathymetry and/or dredging will not be required. Based on the maximum anticipated vessel size, the type of vessels using the RBT facility will be well within the maximum operating envelope of the berth.. Based on engagement with the Redcar Bulk Terminal Limited, it is understood that this type of unloading activity is routine and does not present any additional risks, over and above day-to-day activity within their facility or the River Tees. Based on the direction of the PD Teesport compliance statement with the Port Marine Safety Code (PMSC) and the Teesport Pilotage Direction (PD Ports, 2021), it is anticipated that PD Ports would mandate pilotage

Activity	Assessment
	and/ or use of supporting tug boats and support craft; this would further minimise risk on passage/ final approach. Probability of an incident arising from the passage of vessels has been allocated a value of 0.2; the risk is considered to be low. **Vessel Presence** The presence of a large vessel may constrain the passage of other vessels using the River Tees and may distract other mariners. This risk is likely to apply to the majority of vessels using the River Tees (i.e. MAR-D, MAR-F and MAR-G vessels); the potential risk for larger vessels (i.e. MAR-G) is considered to be higher owing to their beam, their less nimble nature and the known risk of collision within this area of the Estuary3. Assuming mooring on the port side, once docked, at least 70 m of sea room is available between the starboard side of a vessel and the navigable channel. Whilst the presence of a large vessel will ultimately reduce the navigable channel available temporarily within the River Tees, it is considered that there would be adequate navigable room for all other vessel types likely to use this part of the Estuary. RBT regularly has vessels of comparable size moored at this location. Probability of an incident arising from the passage of vessels has been allocated a value of 0.2; the risk is considered to be low. **Docking and Unloading** During the final approach and docking itself, the manoeuvring of a large vessel and support craft within the River Tees may constrain the passage of other mariners. This risk is likely to apply to the majority of vessels using the River Tees (i.e. MAR-D, MAR-F and MAR-G vessels) however, the potential risk for larger vessels (i.e. MAR-G) may be slightly higher owing to their beam and less nimble nature. Impact avoidance/ risk management protocols for docking and unloading would be as reported for 'passage' above, noting the likely pre-docking safety measures which are anticipated to be required by PD Ports as Navigational Authority. The docking and unloading of a large vessel may distract other mariners, including through the use of any localised wharf/ vessel illumination. Unloading during the hours of darkness is not considered likely, as previously described. Whilst docked, vessel mooring or docking failure(s) – "breakout" – may pose a hazard to other mariners using the River Tees and neighbouring fixed objects. The appointment of a suitably qualified contractor using appropriately maintained vessel(s) would reduce the risk of vessel accidents through breakout. Probability of an incident arising from the passage of vessels has been allocated a value of 0.1; the risk is considered to be low.

[3] As detailed above in Section 20.4, the MAIB published incident report number 5/2020 provides an account of a recent collision between two large vessels within the River Tees, one of which was docked at the RBT. The NRA is cognisant of this report and the key findings; they have been used to inform this NRA.

Activity	Assessment
Water Discharge Connection- Treated Water Outfall; Treated Water Outfall Head	**Dredging** In a flood and sink scenario, a pocket would be dredged at a defined location for the emplacement of an Outfall Head. This activity is likely to be a single campaign of dredging. The operation of the vessel could present a risk to mariners and specifically, MAR-A, MAR-B, MAR-C and MAR-D vessel types which are known to use the Tees Bay area by constraining the area within which they can operate. MAR-F vessel types (particularly fishing vessels of 10 m and over) may use the Northernmost area of the Tees Bay however are not expected to enter the inshore area; this is due to potting and trapping being almost wholly undertaken by vessels of 10 m and under. The Tees Bay is a large, primarily unconstrained area of navigation and it is highly unlikely that mariners would require access to the specific and very limited area of the dredger operations. In the event of a dredger losing power, MAR-B, MAR-C, MAR-D, MAR-D and MAR-F vessel types are highly likely to be capable of undertaking their own evasive action. MAR-A and MAR-E vessel types, without motorised propulsion, would be unlikely to be capable of averting a vessel without power however the intentional navigation of a MAR-A or MAR-E vessel type toward a dredger is seen as highly unlikely. Were a vessel to lose power in poor weather, anchor dragging may threaten cables and pipelines; dredging and construction works within the Tees Bay are highly unlikely in weather sufficiently poor to create this risk. Furthermore, the appointment of a suitably qualified contractor using appropriately maintained vessel(s) is likely to ensure the risk of such an incident is remote. Whilst seen as a remote risk for this operation, owing to a historical incident involving a dragged anchor causing material damage to the CATS pipeline (Marine Accident Investigation Branch, 2017), this specific risk will be discussed further with relevant navigational stakeholders to ensure it has been adequately considered. **Workboat / Jack-Up** The exclusion zone associated with this activity is likely to be applied for the duration of the discharge tunnel and outfall head installation. The Tees Bay is a large area of primarily unconstrained navigation and it is highly unlikely that mariners would intentionally navigate toward the specific limited area of the workboat / jack-up vessels. In the event of a workboat losing power, MAR-B, MAR-C, MAR-D and MAR-F vessel types are highly likely to be capable of undertaking their own evasive action. MAR-A and MAR-E vessel types, without motorised propulsion, would be unlikely to be capable of averting from a vessel without power however the intentional navigation of these vessel types toward the small working area is seen as highly unlikely. **Final assembly works** The accidental release of components or HDD sections into the Tees Bay could present a risk to all vessel types. For most large components, it is expected that if released, they would sink within the direct vicinity of the working area and then be dealt with via the formal Lost and Dropped Objects Procedure, as per the MMO Marine Licence.

Activity	Assessment
	For any potential lost components at the sea surface, whilst an unlikely event, it is highly likely that MAR-B, MAR-C, MAR-D and MAR-F vessel types would be capable of avoiding the object. MAR-A and MAR-E vessel types, whilst without own propulsion to avoid an object, are highly unlikely to intentionally navigate toward a lost comportment. The appointment of a suitably qualified contractor is likely to ensure the risk of such an incident is remote; the opportunity for relevant stakeholders to review a methodology prior to commencement of works will help ensure any local concerns are addressed and controlled if necessary.

Cumulative and Combined Effects

20.6.10 Cumulative and Combined effects are considered in full within ES Chapter 24: Cumulative and Combined Effects (ES Volume I, Document Ref. 6.2). Specific effects associated with the NRA are considered below.

20.6.11 A preliminary search for neighbouring plans, proposals and marine consent applications was undertaken in May 2020 to inform the Preliminary NRA which formed an Appendix to the Preliminary Environmental (PEI) Information Report. Since this point, a revised marine search has been completed (including a review of the current MCMS portal). Technical engagement with the MMO and responses to Stage II consultation have also been used to inform this assessment.

20.6.12 Data published by the MMO via the MCMS and the MIS indicates the presence of several 'active' Marine Licences within the vicinity of the Proposed Development (Marine Management Organisation, 2020b; 2020c). Figure 20B-3 highlights local licensing information within the vicinity of the Proposed Development (both active and inactive Marine Licence Application shape, polygon and line datasets). These features are part of the existing marine baseline; no additional plans, projects or marine consent applications have been identified within an appropriate search area around the Proposed Development Site.

AIL Activity

20.6.13 As described above, the York Potash Harbour Facilities Order is considered to be relevant to the future baseline of marine traffic in the River Tees. Assessments provided in support of the EIA for this scheme predict an average of 93 additional vessel movements per year during 'Phase 1' of their development, and an average of 185 additional movements per year during 'Phase 2'.

20.6.14 On a precautionary basis, the higher of these two figures has been considered in this assessment; the additional future vessel movements associated with this project represent a small increase against the context of existing traffic within the Estuary (specifically, an average 1.5% increase on annual movements).

20.6.15 The Marine Risk and Congestion Study (MRCS) indicates that there will increased congestion within some areas of the Estuary (and approaches, including turning circle) (Royal Haskoning, 2014). However, the majority of the congestion is by virtue of delays to/from vessels carrying polyhalite

associated with the York Potash Harbour Facilities Order rather than between these vessels and third parties. Mitigation, in the form of dredging, is proposed by the York Potash project.

20.6.16 Based on the separation between the RBT berth and the proposed polyhalite berths, and the areas of highest congestion identified within the MRCS, no additional cumulative effects in terms of navigational risk are considered likely.

CO_2 Export Pipeline

20.6.17 The consenting of the part of the pipeline between MHWS and MLWS is by use of a Deemed Marine Licence (DML) included in the Application (see Section 4.7, Chapter 4: Proposed Development, ES Volume I, Document Ref. 6.2).

20.6.18 The CO_2 Export Pipeline will extend beyond MLWS to ultimately connect to the offshore storage facility, however, consent for the section below MLWS (including the part from MLWS to 3 km offshore described above) is not being sought as a part of this Application. The Marine Licence application for the offshore section of the CO_2 Export Pipeline (hereafter 'the Offshore Works') will require a separate environmental assessment.

20.6.19 The continuation of the pipeline below MLWS (including the works below MLWS described above) is considered in the cumulative effects assessment in Chapter 24: Cumulative and Combined Effects (ES Volume I, Document Ref. 6.2). Potential cumulative and combined effects associated with shipping and navigation are considered below.

20.6.20 At this early stage, there is very little detail surrounding the offshore works associated with the CO_2 Pipeline. Based on the limited available information, it is currently anticipated that the construction of the CO_2 Export Pipeline will require use of vessels such as work boat(s) and/or barge(s). The HDD is expected to be drilled from approximately 3 km offshore, where there is a minimum 5 m water depth, to onshore at the PCC Site (or vice versa).

Water Discharge Connection

20.6.21 Vessel activity associated with construction of the Proposed Development will primarily take place within the inner reaches of the Tees Bay (i.e. around the locality of the existing Outfall Tunnel or the Replacement Outfall Tunnel). The separation distance between the Offshore Works and the working areas for the existing Outfall Tunnel and Replacement Outfall Tunnel are approximately 2.75 km and 1.25 km respectively (or 2.25 km and 750 m when likely potential exclusion zones of 500 m are applied). It is therefore considered that there is sufficient navigable room between both working areas and their associated exclusion zones.

20.6.22 In terms of vessel displacement, the marine working areas for the Proposed Development (i.e. the existing Outfall Tunnel and the replacement Outfall Tunnel) are within the vicinity of some local third party traffic (such as that associated with the Teesside Wind Farm and localised potting and trapping effort, as discussed above). On this basis, there could be some short-term temporary displacement of other mariners through the presence of workboats and potential exclusion zones. Similarly, for the Offshore Works,

there may be some temporary displacement of mariners through vessels and potential exclusion zones for this activity.

20.6.23 A typical exclusion zone for vessels such as involved in both the construction of the Proposed Development and Offshore Works (i.e. barges and jack-up rigs) is likely to be approximately 500 m. Simultaneous works at the Existing Outfall location and the potential working area for Offshore Works have been considered cumulatively; this has included application of a likely exclusion zone for each working area. In this scenario, there is approximately 2.25 km of navigable sea room between the Proposed Development and the Offshore Works. On this basis, it is considered that there is a very low risk of a potential cumulative (significant) effect on shipping and navigation arising from the simultaneous construction of the Proposed Development and Offshore Works.

20.6.24 The exact location for the Replacement Outfall, if required, has not yet been confirmed. Following a precautionary approach, the most seaward extent of the Water Connection Corridor to the south east of the Proposed Development Site has been modelled; this is highly conservative. Simultaneous works at this indicative Replacement Outfall location and the potential working area for Offshore Works have been considered cumulatively; this has included application of a likely exclusion zone for each working area. In this scenario, there is approximately 750 m of navigable sea room between the Proposed Development and Offshore Works. Figure 20B-7 illustrates the indicative working areas to inform the cumulative assessment.

20.6.25 Considering the likely potential nature, size and capability of third-party mariners utilising this area (i.e. MAR-D and MAR-F traffic), it is considered highly unlikely that their navigation would be impeded by simultaneous works and exclusion zones. On this basis, it is considered that there is a very low risk of a potential cumulative (significant) effect on shipping and navigation arising from the simultaneous construction of the Proposed Development and Offshore Works.

20.6.26 It is expected that the Offshore Works will require their own NRA and at this point, it is assumed that a detailed appraisal of navigational risks will be completed.

Risk Control Options

20.6.27 Table 20B-8 below summarises the measures identified to mitigate against the identified risks.

Table 20B-8: Risk Controls

Activity	Risk Control / Mitigation
Water Connection-Treated Water Outfall; Outfall Head	**Pre-application** • Engagement with PD Teesport will be undertaken to help inform the planned programme for works; this will ensure that local working knowledge is used to inform the timing and delivery of works in order to minimise any risk to other mariners. • Engagement with PD Teesport (and other relevant stakeholders, if required) will be undertaken to discuss the specific potential risk of anchor drag given the known historical accident report at the CATS

Activity	Risk Control / Mitigation
	pipeline. It is expected that a suitably qualified and experienced contractor, a properly maintained and capable vessel / equipment and the statutory harbourmaster controls to safeguard mariners will suitably mitigate this risk but this will be discussed in further detail, as required. • If marine works are required within the harbour authority area, an appropriate application will be made to the PD Teesport harbour master in order to obtain 'port approval' for works. Based on the anticipated locations for construction work, this is not considered likely. • If marine works are required, navigational safety will be appropriately addressed within the design and build contractor specification; contractor proposals would be reviewed by a member of the Project with suitable marine qualifications and experience. • Engagement with Trinity House and the Maritime and Coastguard Agency (MCA) will be undertaken to inform the lighting and/or marking requirements for the works. **Pre-Construction** • A Fisheries Liaison Officer ('FLO') has been included within the draft DML, informed by discussions with the MMO/IFCA; the use of a FLO may help to ensure local fishers are adequately informed as to the nature, extent and duration of marine works. Reports from other third-party infrastructure projects local to the Site have indicated that a FLO is an effective tool for helping manage any concerns within the fishing community. • A Construction Environmental Management Plan (CEMP) is conditioned within the DML; this will provide relevant stakeholders, such as the MMO, the opportunity to review the measures proposed for the effective management of construction risks. • Similarly, a draft DML condition requiring the return of a method statement has been adopted and provided to the MMO for comment; this will provide opportunity for relevant stakeholders to confirm the NRA and risk control are appropriate and proportionate for the final construction methodology. • In accordance with the requirements of the DML, all vessel masters would be provided the DML in order for them to avail themselves of the key conditions with relevance to navigational risk. **Construction** • The draft DML includes a specific procedure in the event of an object being unintentionally dropped such that the appropriate actions are agreed with the relevant marine regulatory authority – the MMO – to remediate the situation, if required. The condition also serves to ensure that for accidental deposits deemed appropriate to be left on the seabed, the relevant navigational authorities-primarily United Kingdom Hydrographic Office -are updated in order for chart amendments or navigational warnings to be issues.

Cost / Benefit Analysis

20.6.28 All of the risk control options identified above are proposed to be carried forward and have been subject to discussion with the MMO, including as part

of their review of the draft Deemed Marine Licence[4]; no further consideration is therefore given to the cost/benefit analysis.

Recommendations

20.6.29 The suite of conditions provided within the draft DML shall be used to help provided a basis for ongoing technical engagement with relevant marine stakeholders as the design of the Proposed Development progresses and ultimately, as construction commences.

20.6.30 The suite of conditions agreed in draft format with the MMO will ensure that a range of stakeholders, including those of relevance to the NRA, will have the opportunity to be involved in the discharge of post-consent, pre-construction conditions.

20.6.31 PD Teesport, as the statutory harbour authority, benefit from substantial operating experience of the River Tees, Estuary mouth, the Tees Bay and surrounding waters. It is therefore recommended that PD Teesport are engaged as the detail available on the nature, extent and duration evolves; this will allow for the project design to benefit from local working knowledge of the port area. This may include consultation on the discharge of relevant DML conditions, as required (to be determined by the MMO).

20.7 Summary and Conclusions

20.7.1 A qualitative assessment of navigational risk has been undertaken. A detailed baseline understanding of local marine activity has been established informed by engagement with relevant marine stakeholders.

20.7.2 A 'Worst Credible Scenarios' approach has been used to understand the location and nature of any navigational risks; a variety of mariners have been considered ranging from small unpowered "vessels" and recreational craft to very large commercial vessels known to use the port approaches.

20.7.3 Navigational risks at the outfall tunnel and head location have been considered; this includes the risk of vessel collision, constrained navigation and loss of components becoming a navigational hazard.

20.7.4 In all instances, the identified risks are low and can be suitably managed by risk controls to reduce them to a fully acceptable level. The primary risk reduction measures are:

- Engagement and collaboration with PD Ports to inform the final approach to marine works such that they have a minimal risk of disruption to the mariner;
- A suite of DML conditions, such as CEMP and methodology returns, to ensure that PD Ports and other relevant stakeholders are informed on final proposals; and
- Additional DML conditions to ensure mariners are made fully aware of works such that they can plan safe passage.

[4] The MMO were consulted on the draft DML in February and March 2021 in order to refine the DML for DCO submission.

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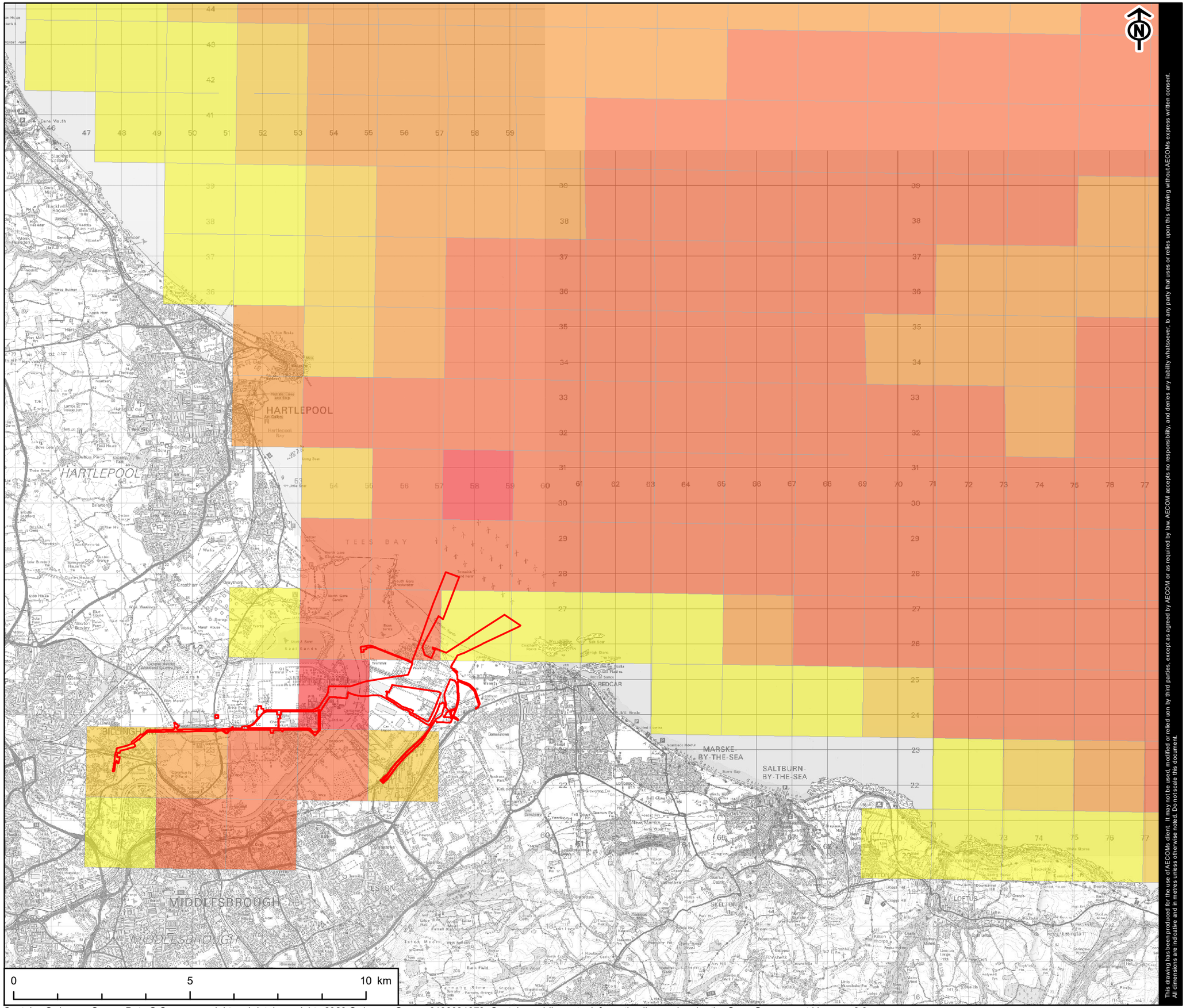
Figures

Project Management Initials: RL Designer: LC Checked: AR Approved: EW



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PROJECT
NET ZERO TEESSIDE PROJECT

Net Zero Teesside

APPLICANTS
NZT POWER LTD. AND NZNS STORAGE LTD.

KEY

- Site Boundary

Vessel Density Grid 2015 (MMO)

Total Vessels - Annual Average

- > 0 - 200
- > 200 - 500
- > 500 - 1,000
- > 1,000 - 10,000
- > 10,000

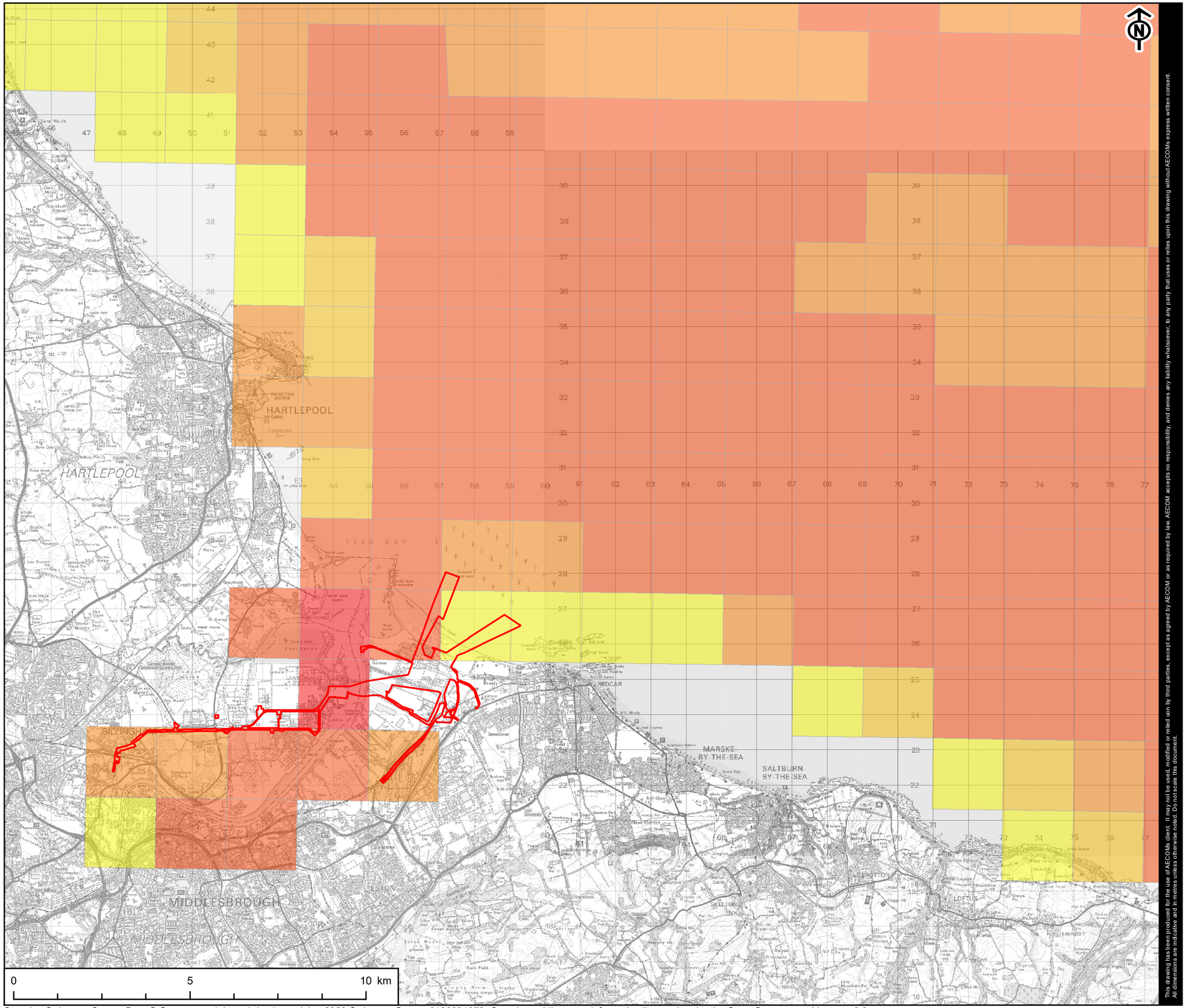
TITLE
FIGURE 20B-1
VESSEL DENSITY GRID - 2015

REFERENCE
NZT_210428_TA_S_20B-1_v2

SHEET NUMBER
1 of 2

DATE
28/04/2021

Project Management Initials: RL Designer: LC Checked: AR Approved: EW



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KEY
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Vessel Density Grid 2017 (MMO)

Total Vessels - Annual Average
- > 0 - 200
- > 200 - 500
- > 500 - 1,000
- > 1,000 - 10,000
- > 10,000

TITLE
FIGURE 20B-1
VESSEL DENSITY GRID - 2017

REFERENCE
NZT_210428_TA_S_20B-1_v2

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KEY
- Site Boundary
- Anonymised AIS Derived Track (2015)

TITLE
FIGURE 20B-2
HISTORICAL AIS VESSEL TRANSECTS (2015)

REFERENCE
NZT_210428_ESTA_20B-2_v2

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28/04/2021

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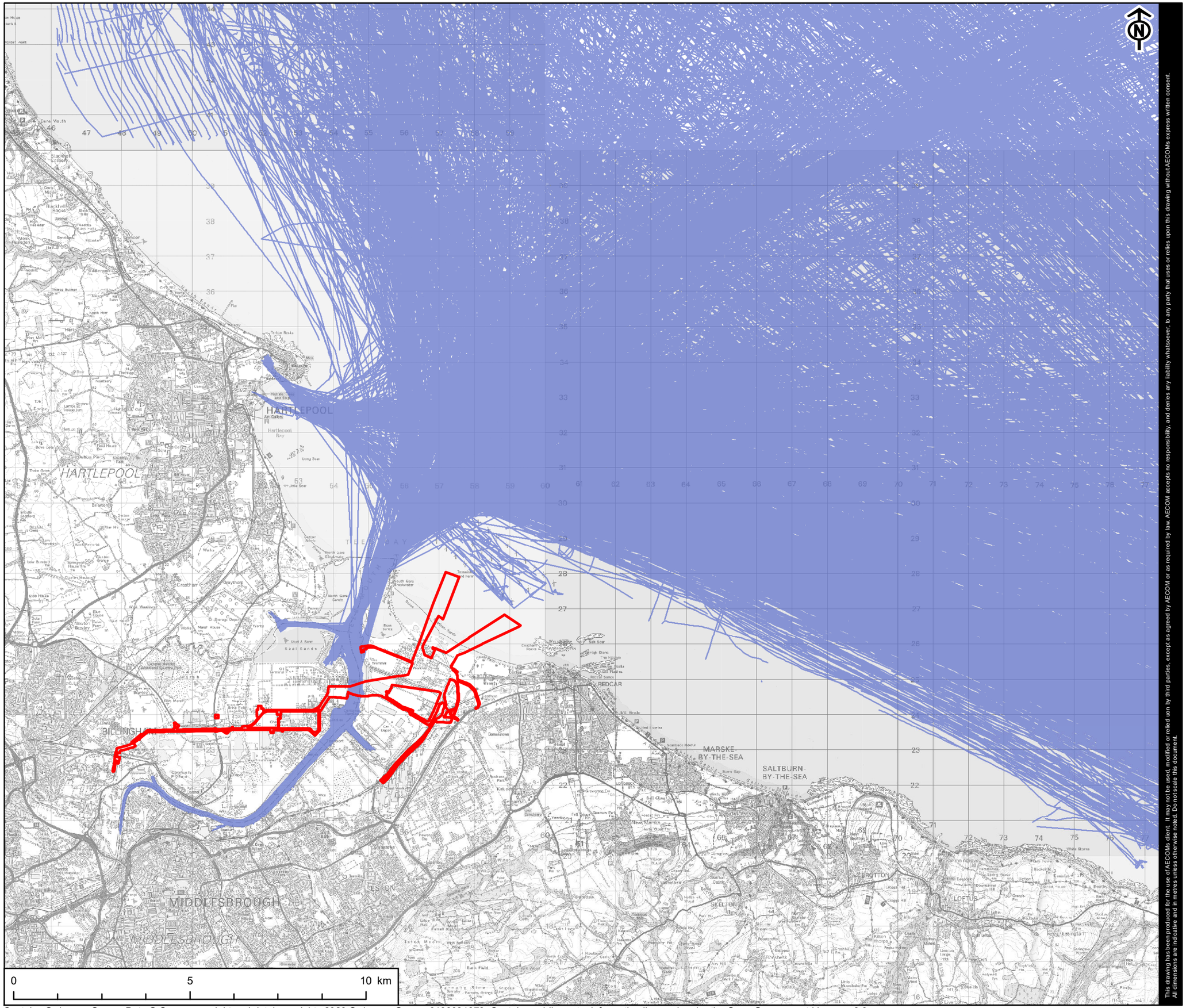

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NZT POWER LTD. AND NZNS STORAGE LTD.

KEY
- Site Boundary
- Anonymised AIS Derived Track (2017)

TITLE
FIGURE 20B-2
HISTORICAL AIS VESSEL TRANSECTS (2017)

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