Net Zero Teesside

Preliminary Environmental Information Report

Volume III - Appendices

Appendix 20B: Navigational Risk Assessment

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

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Net Zero Teesside

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20B. Navigational Risk Assessment

20.1 Introduction

20.1.1 This preliminary Navigational Risk Assessment (NRA) covers the marine works associated with the Proposed Development (i.e. those works below Mean High Water Springs – 'MHWS').

20.2 Legislative Context

Marine and Coastal Access Act

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 may 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 most-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

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.

The Teesport Harbour Revision Order 2008

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

20.2.10 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.

20.2.11 On the 01 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 08 May 2018 and currently ends on the 07 May 2028 (MMO, 2018).

20.2.12 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.

20.2.13 Engagement is ongoing with PD Ports to determine local operating procedures and potential restrictions on future works.

The Merchant Shipping Regulations 2002

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

20.2.15 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.

20.3 Purpose and Scope of the Assessment

20.3.1 As above, the Proposed Development includes works 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 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' (see Figure 20B-1) and via vessel transects (Figure 20B-2 presented at the end of this Appendix.

20.4.5 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).

20.4.6 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).

20.4.7 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.

20.4.8 Given the AIS and vessel density data limitations referenced above, further consideration is given to other mariners – such as commercial fishers and recreational mariners, within Section 20.4.

Port Activity

20.4.9 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).

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

20.4.11 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.

20.4.12 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.

20.4.13 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.

20.4.14 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.

20.4.15 As well as AIS, PD Teesport operate a Vessel Tracking System (VTS) and therefore have excellent vessel movement records; engagement is ongoing with PD Teesport and where available, additional VTS data will be utilised to support the finalised NRA in support of the ES.

20.4.16 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.

20.4.17 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.

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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

20.4.18 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).

20.4.19 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	Daily Vessel Movements	Weekly Vessel Movements	Annual Vessel Movements
2020 VTS	TBC	TBC	TBC
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 figure has been extrapolated to generate a suitable worst-case.

20.4.20 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).

Marine Works

20.4.21 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)
- 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/2014/00580 (Other Removals Licence – Teesside Windfarm Limited)

20.4.22 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).

Recreational Sailing

20.4.23 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 preliminary NRA has been informed by a qualitative review of available data, publicly available information on recreational sailing and engagement with the RYA.

20.4.24 The Royal Yachting Association (RYA) UK Coastal Atlas of Recreational Boating provides a GIS dataset of recreational boating activity around the UK (Royal Yachting Association, 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.

20.4.25 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)

20.4.26 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)
- Teesside Nautical Studies (~6.75 km)

20.4.27 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 (~1km)
- Hartlepool Marina Berth Holders Association (~7.5 km)
- Tees & Hartlepool Yacht Club (~7 km)

20.4.28 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).

20.4.29 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

20.4.30 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 kilometres 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.

20.4.31 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.

Commercial Fishing

20.4.32 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-4). Each ICES rectangle is approximately 30 national miles by 30 nautical miles and has a unique identification reference; the Proposed Development is within ICES rectangle '38E8' (Marine Management Organisation; 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.

20.4.33 There are 25 vessels of 10 m and under and 2 vessels of 10 m and over that are registered with home port status in Hartlepool (Marine Management Organisation, 2020d). 21 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.

20.4.34 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 (PEI Report, Volume III). This approach has been agreed through engagement with relevant stakeholders such as the MMO and North Eastern Inshore Fisheries and Conservation Authority (NEIFCA).

20.4.35 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.

20.4.36 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.

20.4.37 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.

20.4.38 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

20.4.39 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):

- Everest to Teesside Central Area Transmission System ('CATS') gas Trunkline and landfall (36 inch)
- Breagh Platform to Teesside gas pipeline and landfall (20 inch)
- Breagh Platform to Teesside monoethylene glycol pipeline and landfall (3 inch)
- Teesside Offshore Wind Farm (OWF) High Voltage cable landfall

20.4.40 The closest of these features is the Teesside OWF 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-5).

20.5 Marine Works

20.5.1 Chapter 5: Construction Programme and Management (PEI Report, Volume I) includes full details of the works required for the Proposed Development (including those within the UK Marine Area). A brief summary of potential marine works is detailed below within Table 20B-3.

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Table 20B-3: Marine Works Summary

Activity	Description
Abstraction Point	**Refurbishment Scenario** The intake head may be suitable for re-use with a minimal level of "construction" input or modification. Should the intake be suitable for re-use, it is likely that maintenance activities would be very minor and limited to inspection and minor primarily hand-based refurbishment tasks. Were a straightforward refurbishment possible, potential effects would primarily be related to: • The installation of screening to achieve minimal ecological impacts (i.e. to reduce the risk of fish entrapment and to comply with the Eels regulations) • Removal of any contaminated residues / dust etc • Application of paint, sealant, grout and/or other substances to ensure the intake is fit for purpose and safe to operate **Replacement Scenario** Were the intake to require more extensive refurbishment and/or replacement, several other construction activities may be required. Potential effects would primarily be related to: • The installation of a coffer dam(s) within the River Tees to provide a safe, dry and stable working area • A preparatory dredge to facilitate access to the intake and/or to install new intake infrastructure • Construction / alteration works to install new intake infrastructure • Installation of screening system(s) • The removal of a coffer dam(s)
Cooling Water Outfall	**Refurbishment Scenario** The condition of the existing discharge tunnel is unconfirmed; if it is possible to re-use the existing tunnel, any maintenance activities are likely to be very minor and limited to those described for the intake refurbishment (i.e. inspection and hand-based maintenance). **Replacement Scenario(s)** Were the outfall tunnel to require 'full' refurbishment, there are several potential scenarios for replacing the infrastructure. Under a Horizontal Directional Drill (HDD)-led scenario, potential effects would primarily relate to some or all of the activities below: • The use of an open-cut trench through the most substantial area of Dune complex at the South Gare • The presence of a HDD 'jacking rig' landward of the Dune complex at the South Gare • Pre-works bathymetry and/or magnometer surveys • HDD-led tunnelling exercise to create a replacement discharge pipeline route; insertion of pipeline membrane • 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 • The presence of vessels such as dredger(s), work boat(s) and/or barge(s) to support the refurbishment process

Activity	Description
	Were a HDD-led installation not feasible to achieve the required outfall tunnel length into the Tees Bay or were it deemed not possible on safety grounds (for example due to Unexploded Ordnance risk), a number of other construction activities would be required with potential effects primarily relating to: • Pre-works bathymetry and/or magnometer surveys • The dredging of a pipeline trench • The assembly, float and positioning of replacement pipeline tunnel sections • A flood and sink exercise; works to position the pipeline within the trench • Backfill of the dredged trench • Final assembly, pipeline jointing, connections, fabrication and ancillary commissioning works to install a safe and fit-for-purpose discharge pipeline • The presence of vessels such as dredger(s), work boat(s) and/or barge(s) to support the refurbishment process
Outfall Head	**Refurbishment Scenario** Owing to the relatively low discharge volumes and likelihood that the 'plume' would quickly dissipate, in a refurbishment scenario, the project does not foresee a requirement for retrofitting a diffuser. However, this is pending design development and the position of stakeholders such as the EA who could make a request for inclusion. **Replacement Scenario** Were the Cooling Water System (CWS) to require the emplacement of an outfall 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 • 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 marine segment of the on-shore CO_2 Export Pipeline from the Site across the dunes and Coatham Sands to below Mean Low Water will most likely be using Horizontal Directional Drilling techniques. The use of open cut techniques through the dunes and sands will also be assessed in order to allow the selection of the technique has the least residual effects on the national and international designations.
CO_2 Gathering Network	The CO_2 Gathering Network will need to cross the River Tees in two places. The crossings of the River Tees will be achieved used HDD using similar principles to the gas connection.
Natural Gas Connection	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.

20.6 Risk Assessment

Consultation

20.6.1 To help 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 and February 2020)
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)
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)
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)
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)
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.	Various technical engagement (September 2019 – February 2020)

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) have not currently published an advice note on the process of NRA however, PINs Advice Note 11 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 a 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).

Identification of Hazards

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

Table 20B-5: Hazard Summary

Activity	Assessment
Abstraction Point	**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** There are several potential hazards associated with a potential replacement scenario: • **Dredging:** the presence of a dredger within the navigational channel at the intake location may constrain vessel passage within the navigational channel. Should the vessel lose power whilst underway, there is a further risk that it could obstruct – and/or collide with – passing vessels. • **Workboat / Jack-Up:** The construction and eventual removal of a cofferdam with the use of a jack-up barge – or similar – and associated work boat(s) may constrain vessel passage within the navigational channel. A jack-up barge may present a particular hazard in terms of constraint due to the potential exclusion zones which the master or operator may adopt. • **Cofferdam:** the presence of a cofferdam within the navigational channel at the intake location may constrain passage.

Activity	Assessment
	• **Construction Works:** Were construction works required, the use of a cofferdam would provide a safe working area within the marine environment and a barrier to vessel movements within the navigational channel.
Cooling 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. **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 at the seabed in a non-navigable area; 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. • **Dredging:** the presence of a dredger within the Tees Bay may constrain vessel passage (whilst noting this is a far less-constrained body of water compared to the main Teesport navigational channel). 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. • **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. As with a dredger, 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.
Outfall Head	**Refurbishment Scenario** The project does not foresee a requirement for retrofitting a diffuser at this stage and therefore no 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

Activity	Assessment
	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, discharge head components or pipe sections 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	The project anticipates that Horizontal Directional Drilling techniques will be used to install the CO_2 Export Pipeline; no navigational risks are anticipated and this is not considered further. The use of open cut techniques through the dunes and sands would take place above MHWS – i.e. an entirely non-navigable area – and this is not considered further.
Natural Gas Connection (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 (Tees Crossing)	The CO_2 Gathering Network will need to cross the River Tees in two places. The crossings of the River Tees will be achieved used HDD using similar principles to the gas connection; no navigational risks are anticipated and this is not considered further.

Marine Users

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

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Assessment of Risks

20.6.7 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.

20.6.8 As is typical of UK NRAs, a 'Worst Credible Scenario' (WCS) approach has been taken to identify and consider navigational risks.

Table 20B-7: Risk Assessment

Activity	Assessment
Abstraction Point	**Dredging** Dredging would be undertaken for a short period within the navigational channel (likely to a single campaign of less than a week in duration). The operation of the vessel could present a risk to mariners and specifically, MAR-F and MAR-G vessel types which regularly use the Teesport navigation channel; it may also present a risk to smaller and recreational vessels (MAR-B, MAR-C and MAR-D types) particularly as they make passage toward the Estuary mouth. The operating area for the dredger would be at the Southern bank of the River Tees (i.e. the extremity of the navigable area) and only reduces a minimal area of safe navigation. MAR-B, MAR-C- MAR-D and MAR-F vessel types are small, nimble and are highly likely to be capable of navigating within safe distances of a dredger; in the event of a dredger losing power, they are highly likely to be capable of undertaking their own evasive navigation. This is safeguarded by the navigation and control capabilities the vessel must maintain in port limits as per the direction of the harbourmaster (discussed further in 20.4.13). MAR-G vessel types are far less nimble and may be unable to undertake their own evasive action in the event of a dredger losing power. The appointment of a suitably qualified contractor using appropriately maintained vessel(s) is likely to ensure the risk of loss of power is minimal; the vessel would also be required to be compliant with the harbourmaster's directions (i.e. have secondary power capability as well as other control systems). **Workboat / Jack-Up** The exclusion zone associated with this activity be likely to be applied for the duration of the cofferdam installation (around a month in duration). This activity may constrain the navigation of vessels and limit their area of safe navigation; this is primarily a risk for MAR-B, MAR-C, MAR-D, MAR-F and MAR-G vessel types. As with dredging, MAR-B, MAR-C, MAR-D and MAR-F vessels are highly likely to be capable of safe navigation alongside workboats; MAR-G vessels, being far larger, are more likely to be affected by this constraint. However, as with dredging, the vast majority of the navigation channel remains in-use and is unaffected by the workboat / jack-up. Again, 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 dependent on exact vessel length, MAR-G vessels are also likely to have their own local port pilot and/or tug support, at the discretion of the harbourmaster which would both reduce any residual risk further. **Cofferdam** The physical presence of the cofferdam would reduce the navigable width of the channel for the duration of the construction works (the duration of works is unknown so a semi-permanent presence of cofferdam for more than one year has been considered). The risk would primarily apply to MAR-F and MAR-G vessel types however, for both groups, as the cofferdam is only reducing a very minor

Activity	Assessment
	area of the channel (~20 m at the widest point), it is highly unlikely that the cofferdam would present a risk to the mariner. For MAR-B, MAR-C and MAR-D vessel types, it is expected that the very minor intrusion into the channel would be of negligible effect given the size of the cofferdam against the context of their size and navigational capability (especially given harbourmaster directions discussed above). **Construction Works** Were construction works required, the use of a cofferdam would provide a safe working area within the marine environment and a barrier to vessel movements within the navigational channel; no navigational risks are anticipated.
Cooling Water Outfall; Outfall Head	**Dredging** In a flood and sink scenario, a narrow trench would be dredged from a discharge point within the water connection corridor landward. This activity is likely to be a single campaign of dredging (the duration of the dredging is unknown but is likely to be less than 10 weeks). 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 duration is unknown but is likely to be less than 26 weeks). 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,

Activity	Assessment
	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 pipe 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. 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.

Risk Control Options

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

Table 20B-8: Risk Controls

Activity	Risk Control / Mitigation
Abstraction Point	**Pre-application** • Engagement with PD Teesport will continue to be undertaken to help inform the planned programme for works at the abstraction point; 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. • If marine works are required, an appropriate application will be made to the PD Teesport harbour master in order to obtain 'port approval' for works. This would provide a formal opportunity for PD Teesport, as statutory harbour authority, to request conditions to apply to the DML. • If marine works are required, navigational safety will be appropriately addressed within the design and build contractor specification; contractor proposals would be reviewed by someone 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** • Pending stakeholder consultation throughout the EIA process and the final extent of marine works required for the Proposed Development, an updated NRA could be secured as a Marine Licence Condition within the DML. • A Construction Environmental Management Plan (CEMP) would be adopted within the DML; this would provide relevant stakeholders, such as the MMO, the opportunity to review the measures proposed for the effective management of construction risks. Similarly, a DML condition requiring the return of a method statement would be adopted; this would provide opportunity for relevant

Activity	Risk Control / Mitigation
	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** • A Notice to Mariners condition would be adopted within the DML; this would ensure that mariners are made aware of works such that they can plan their passage past works based on a local, up-to-date account of hazards.
Cooling Water Outfall; Outfall Head	**Pre-application** • Engagement with PD Teesport will be undertaken to help inform the planned programme for works at the abstraction point; 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 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, an appropriate application will be made to the PD Teesport harbour master in order to obtain 'port approval' for works. This would provide a formal opportunity for PD Teesport, as statutory harbour authority, to request conditions to apply to the DML. • If marine works are required, navigational safety will be appropriately addressed within the design and build contractor specification; contractor proposals would be reviewed by someone 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') may be considered as part of 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. • Pending stakeholder consultation throughout the EIA process and the final extent of marine works required for the Proposed Development, an updated NRA could be secured as a Marine Licence Condition within the DML; this would be adopted if required. • A Constructive Environmental Management Plan (CEMP) could be adopted within the DML; this would provide relevant stakeholders, such as the MMO, the opportunity to review the measures proposed for the effective management of construction risks. Similarly, a DML condition requiring the return of a method statement could be adopted; this would 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.

Activity	Risk Control / Mitigation
	Construction • A Notice to Mariners condition would be adopted within the DML; this would ensure that mariners are made aware of works so they can plan passage past works based on a local, up-to-date account of hazards. • The 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 UKHO-are updated in order for chart amendments or navigational warnings to be issues.

Cost / Benefit Analysis

20.6.10 All of the risk control options identified above are proposed to be carried forward into further discussions and Deemed Marine Licence review with the MMO; no further consideration is therefore given to the cost/benefit analysis although this may be undertaken for the final Environmental Statement, informed by the outcome of this Stage 2 consultation.

Recommendations

20.6.11 It is recommended that this preliminary NRA form the basis of ongoing engagement with relevant marine stakeholders as the EIA process for the Proposed Development evolves.

20.6.12 Alongside this stakeholder engagement, it is recommended that engagement is undertaken with the MMO regarding the scope and content of the DML specifically; this includes a review of the current conditions drafted into the DML. It is recommended that this take place following Stage 2 consultation and before DCO submission.

20.6.13 As the final design and approach for marine works is refined, it is recommended that relevant marine stakeholders are kept suitably informed in order to ensure that navigational risk is suitably considered.

20.6.14 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.

20.7 Summary and Conclusions

20.7.1 At this early stage, 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 Specific navigational risks at the intake location have been considered; this includes the risk of vessels becoming constrained by works and vessels and the risk of collision as a result of a work vessel losing power. Navigational risks at the outfall tunnel and head location have also 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:

- Ongoing pre-application engagement 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;
- Additional DML conditions to ensure mariners are made fully aware of works such that they can plan safe passage; and
- ‘Standard-set’ DML marking, lighting and warning conditions to ensure any mariners

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Figures

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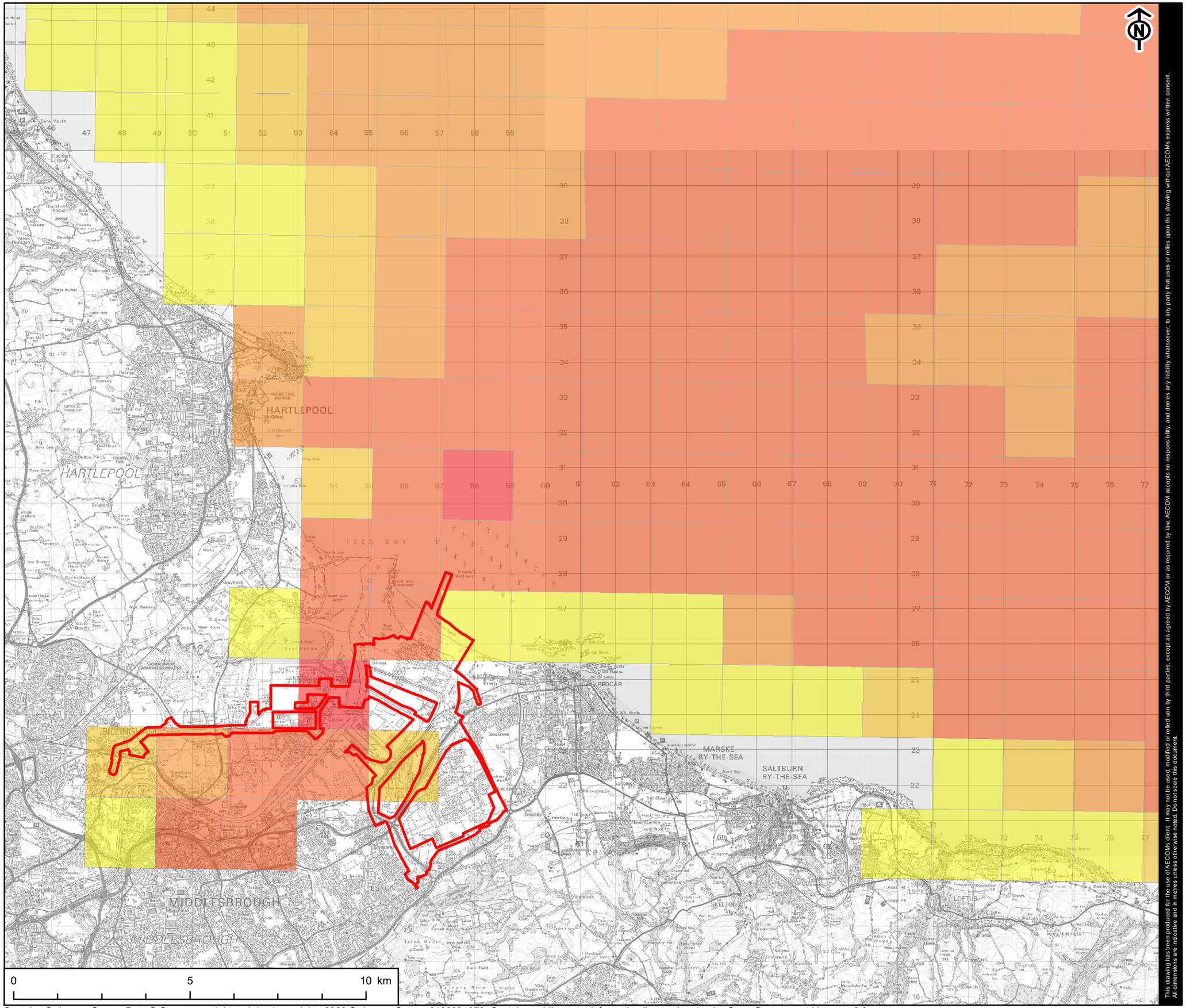
Project Management Initials: RT Designer: LC Checked: EW Approved: IC



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AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
NZT POWER AND NZNS STORAGE

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

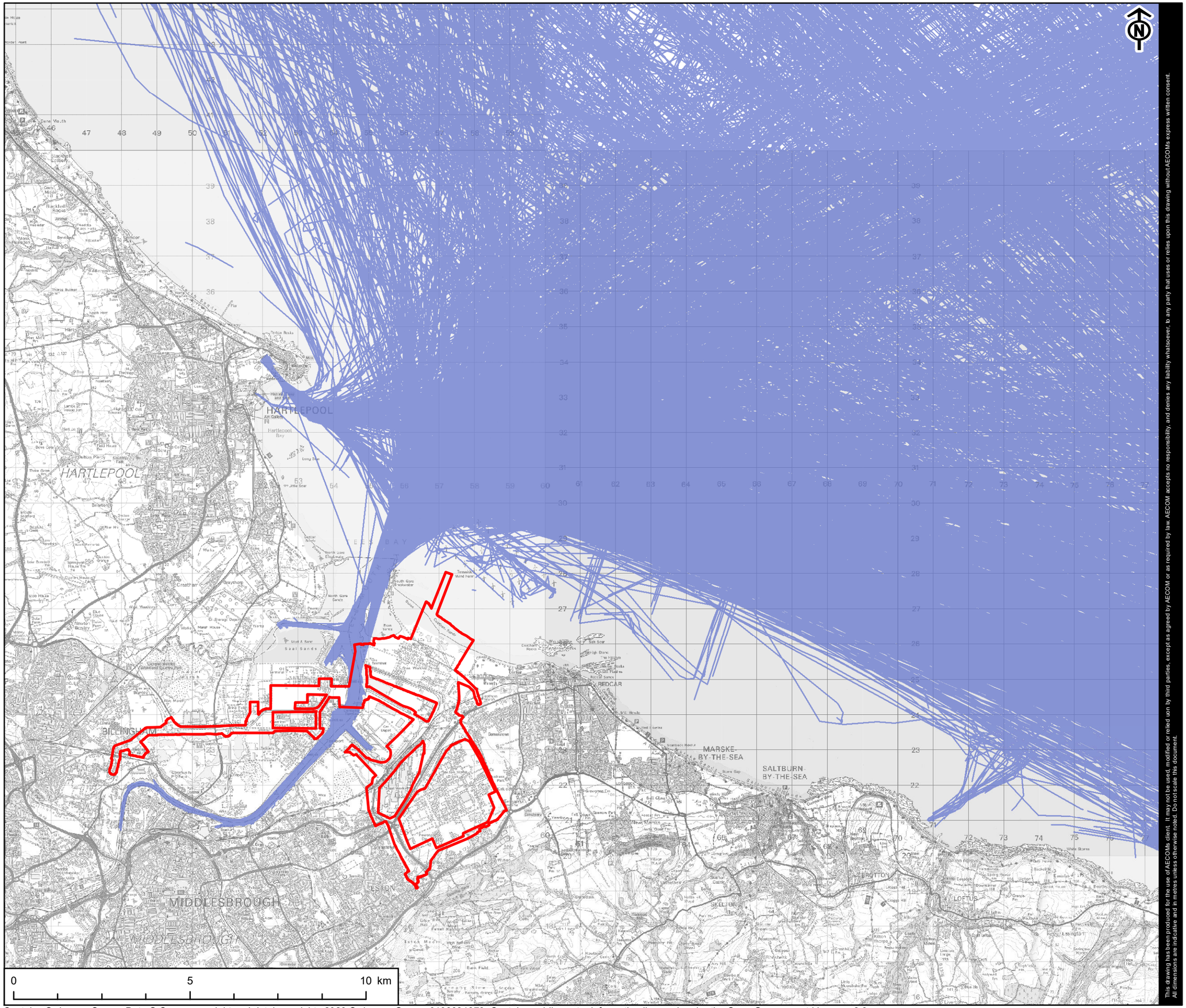
TITLE
FIGURE 20B-1
VESSEL DENSITY GRID

REFERENCE
NZT_200618_TA_S_20B-1_v2

SHEET NUMBER
1 of 1

DATE
18/06/2020

Project Management Initials: RT Designer: LC Checked: EW Approved: IC



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AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
NZT POWER AND NZNS STORAGE

KEY
- Site Boundary
- Anonymised AIS Derived Track

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

REFERENCE
NZT_200618_TA_S_20B-2_v2

SHEET NUMBER
1 of 1

DATE
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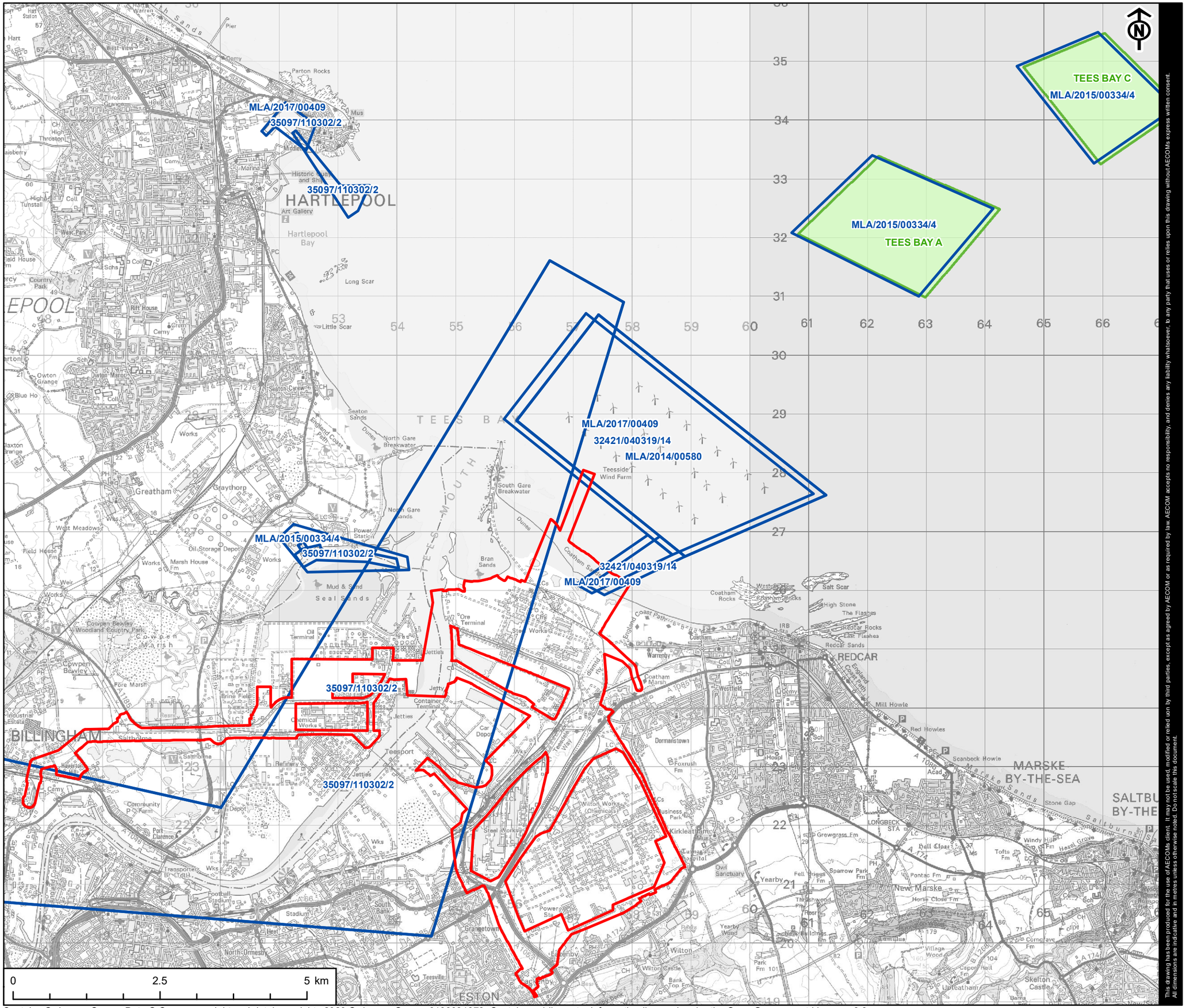

AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
NZT POWER AND NZNS STORAGE

KEY
- Site Boundary
- Disposal Site (CEFAS)
- Marine Licence Application Boundary (MMO)

TITLE
FIGURE 20B-3
MMO LICENSING DATA

REFERENCE
NZT_200618_TA_S_20B-3_v2

SHEET NUMBER
1 of 1

DATE
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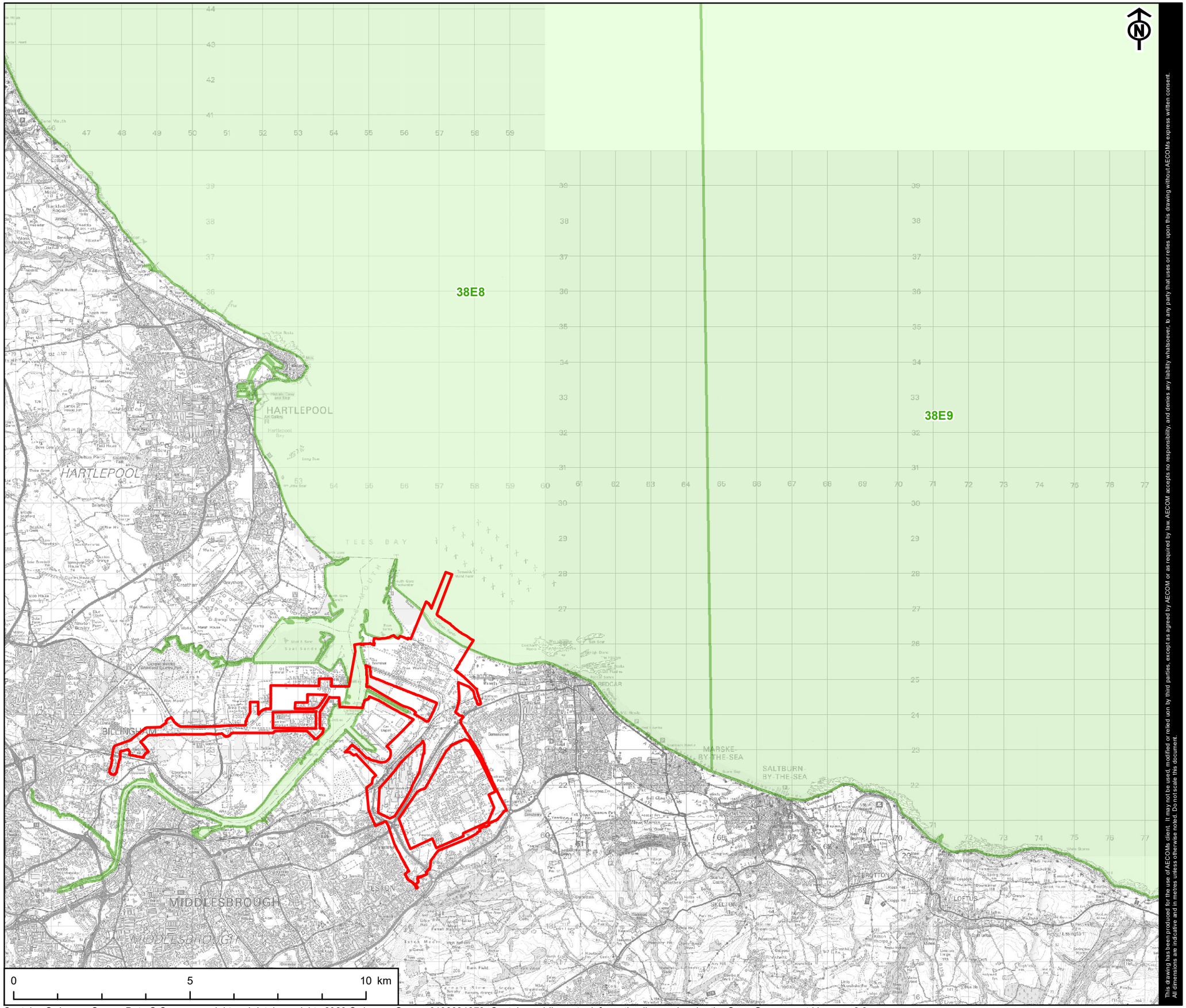
Project Management Initials: RT Designer: LC Checked: EW Approved: IC



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AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
NZT POWER AND NZNS STORAGE

KEY
- Site Boundary
- Statistical Rectangle (ICES)

TITLE
FIGURE 20B-4
ICES RECTANGLES

REFERENCE
NZT_200618_TA_S_20B-4_v2

SHEET NUMBER
1 of 1

DATE
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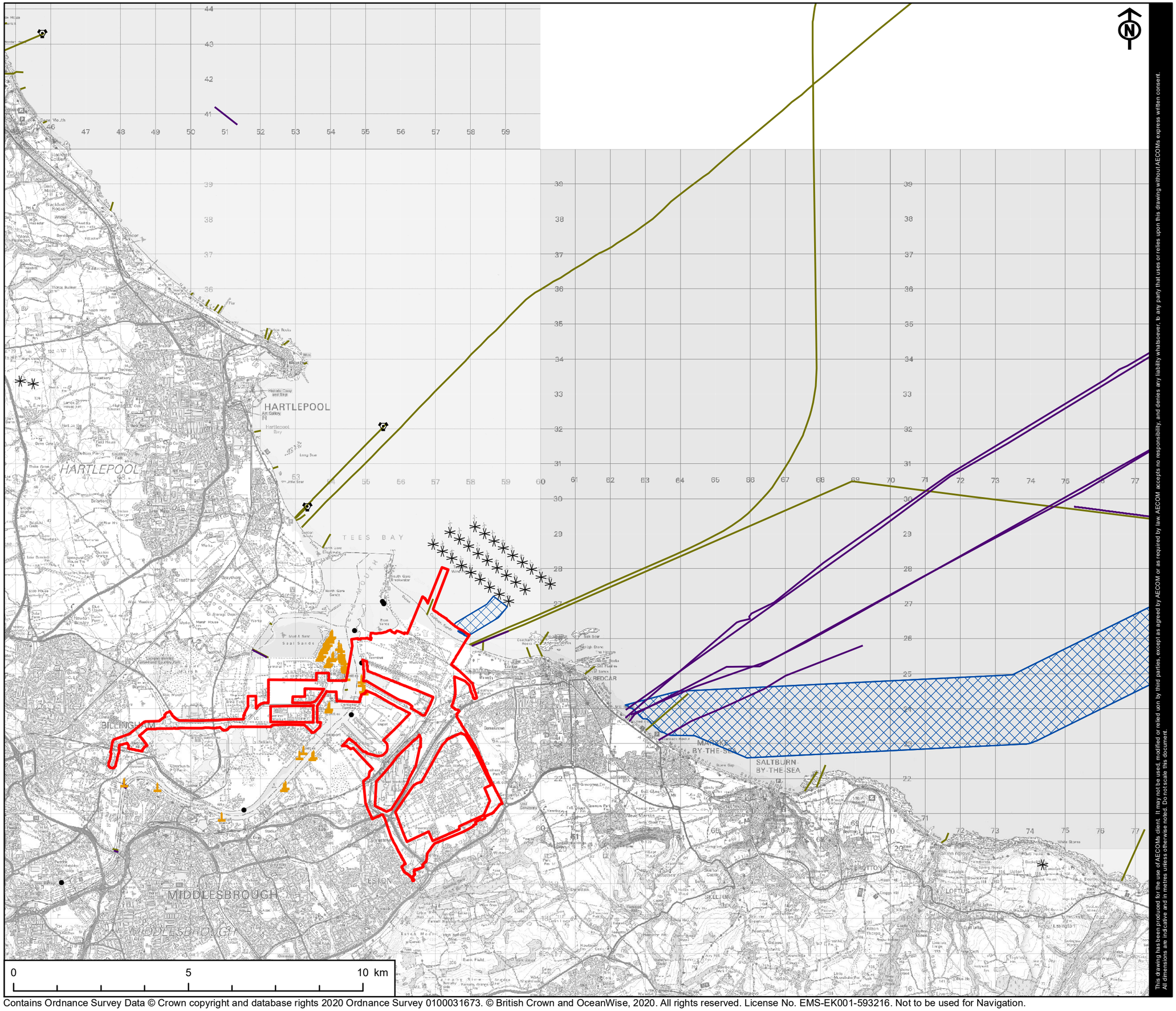

AECOM

PROJECT
NET ZERO TEESSIDE

CLIENT
NZT POWER AND NZNS STORAGE

KEY

- Site Boundary
- Diffuser
- Harbour facility
- Pile
- Offshore turbine
- Cable
- Pipeline
- Offshore Wind Cable Agreement

TITLE
FIGURE 20B-5
INDICATIVE LOCATIONS FOR CABLE AND PIPELINE FEATURES

REFERENCE
NZT_200618_TA_S_20B-5_v2

SHEET NUMBER
1 of 1

DATE
18/06/2020