KEADBY 3
CARBON CAPTURE
POWER STATION

A collaboration between **SSE Thermal** and **Equinor**

Document Ref: 6.3.22

Planning Inspectorate Ref: EN010114

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

Land at and in the vicinity of the Keadby Power Station site, Trentside, Keadby, North Lincolnshire

Environmental Statement
Volume II - Appendix 12C: Navigational Risk Assessment

The Planning Act 2008

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

Applicant: Keadby Generation Limited

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DOCUMENT HISTORY

Document Ref	6.3.22/Appendix 12C: Navigational Risk Assessment
Revision	VP2.0 – Minor edits following stakeholder engagement and plans showing updated Order Limits
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GLOSSARY

Abbreviation	Description
ABP	Associated British Ports - UK port operator with a network of 21 ports across Britain.
ALARP	As Low as Reasonably Practicable
AIL	Abnormal Indivisible Load
AIS	Automatic Identification System - a maritime safety communications system.
CCP	Carbon Capture Plant
CCUS	Carbon Capture, Usage and Storage
COLREGS	The Convention on the International Regulations for Preventing Collisions at Sea 1972 – sets out a series of obligations and rules which apply to all vessels upon the high seas.
CSD	Cutter Suction Dredger
DCO	A Development Consent Order - made by the relevant Secretary of State pursuant to The Planning Act 2008 to authorise a Nationally Significant Infrastructure Project.
DfT	Department for Transport
DTI	Department for Trade and Investment
FEED	Front End Engineering Design
FSA	Formal Safety Assessment - a structured and systematic methodology, aimed at enhancing maritime safety.
GT	Gross tonnage
ICES	The International Council for the Exploration of the Sea - standardise the division of sea areas to underpin statistical analysis around the UK.
MAIB	Marine Accident Investigation Branch
MCA	The Maritime and Coastguard Agency - responsible for the administration of several statutory instruments with relation to the management of maritime safety.

Abbreviation	Description
MCAA	The Marine and Coastal Access Act 2009 - the basis upon which the Marine Management Organisation determine applications to undertake works – or 'licensable activities' – within English waters
MCMS	Marine Case Management System - the online portal provided by the Marine Management Organisation (MMO) where users can utilise an interactive assistance tool, search the marine licence public register and submit enquiries to the MMO.
MGN	Marine Guidance Note – a method of issuing technical advice to mariners administered by the Maritime and Coastguard Agency.
MIS	Marine Information System - an interactive tool for marine licensing applicants and decision makers, supporting marine plan implementation.
MMO	Marine Management Organisation - created in 2009 by the Marine and Coastal Access Act. MMO is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs.
NAABSA	'Not Always Afloat But Safely Aground'; used to refer to a pocket on a tidal waterway where vessels may ground safely at low water for docking.
NRA	Navigational Risk Assessment - identifies and assesses the hazards and risks affecting vessel navigation.
OHL	Overhead Line
RYA	The Royal Yachting Association - the national body for dinghy, yacht and motor cruising, all forms of sail racing, RIBs and sports boats, windsurfing and personal watercraft.
SSC	Suspended Sediment Concentration
UNCLOS	United Nations Convention on the Law of the Sea (1982) - sets out a range of provisions to help manage and maintain all aspects of the marine environment.
VTS	Vessel Traffic Service – IMO standardised system used to track and monitor vessel movements.
WCS	Worst Credible Scenario - the highest consequence scenario identified that is considered plausible or reasonably believable.

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Revision History for Version VP2.0

Item	Nature of Revision
1	Minor error, section 4.2.6 refers to Neap house being operated by ABP Humber. ABP confirmed that it is operated by PD Ports and therefore should come under 4.2.1.
2	Figure 12C.1 – 12C.10 updated to reflect Order Limits for material change application

1.0 INTRODUCTION

1.1 Overview

1.1.1 The scope of this Navigational Risk Assessment (NRA) covers the potential marine works associated with the Proposed Development (i.e. those works below Mean High Water Springs – 'MHWS') and also any potential freshwater works associated with the Keadby and Stainforth Canal.

1.1.2 Based on the anticipated scale, nature and extent of works and understanding of the area, a qualitative approach has been adopted within this NRA and this has been agreed within The Scoping Opinion (**Appendix 1B** (ES Volume II – **Application Document Ref. 6.3**)). Within the Order Limits, the River Trent has been identified as a potential water abstraction option and as a discharge location; a preferred potential water abstraction location has also been identified on the northern bank of the Keadby and Stainforth Canal.

1.1.3 During construction, the existing infrastructure associated with the Waterborne Transport Off-loading Area on the River Trent – "Railway Wharf" would also be used to facilitate offloading of Abnormal Indivisible Loads (AIL) as has been undertaken recently for Keadby 2 Power Station construction. The use of Railway Wharf is aligned with strategic policy including The Highways England document 'Water preferred policy guidelines for the movement of abnormal indivisible loads' (Highways England, 2016), which states that it is government policy to avoid road transport as far as possible by using alternative modes, such as water. Railway Wharf has also been demonstrated, through Keadby 2 Power Station construction, to be an effective means of bringing AIL to the area. **Chapter 4**: The Proposed Development and **Chapter 5**: Construction Programme and Management (ES Volume I - **Application Document Ref. 6.2**) provide further information on the key elements of the Proposed Development.

1.1.4 The Proposed Development includes the following elements (the location of each Work No. within the Proposed Development Site is shown on the Works Plans (**Application Document Ref. 4.3**):

- a new build carbon capture enabled electricity generating station fuelled by natural gas and with a gross output capacity of approximately 910 megawatts (MWe) unabated ('the Low Carbon Gas Power Station' - **Work No. 1**) comprising:
  - a CCGT plant (**Work No. 1A**);
  - cooling infrastructure for the CCGT (**Work No. 1B**);
  - a CCP (**Work No. 1C**);
  - natural gas reception facility (**Work No. 1D**);
  - generating station supporting uses including administration and control buildings, raw water storage tanks and permanent laydown areas for operation and maintenance activities (**Work No. 1E**);

- A high pressure natural gas pipeline to supply the CCGT (**Work No. 2A**) and a gas compound for the Applicant's apparatus (**Work No. 2B**) (**Natural Gas Connection**);
- Electrical power export lines from the Low Carbon Gas Power Station to the existing 400 kilovolt National Electricity Transmission Systems substation (**Work No. 3A – Electrical Connection Area to National Grid 400 kilovolt (kV) Substation**); and up to 132 kilovolt underground electrical cables (**Work No. 3B - Potential Electrical Connection to Northern Powergrid Substation**);
- Water supply connections works (**Water Connection Corridor**) to provide cooling and make-up water to the Low Carbon Gas Power Station, comprising either:
    - intake structures and underground and/ or overground water supply pipeline(s) running between Work No. 1E and the Stainforth and Keadby Canal (**Work No. 4A – Canal Water Abstraction Option**); or
    - in the event that the canal abstraction option is not available, works to the existing cooling water supply pipelines running between Work No. 1E and existing intake structures within the River Trent (**Work No. 4B – River Water Abstraction Option**);
- Use of an existing outfall and associated pipework for the discharge of used cooling water and treated wastewater to the River Trent (**Work No. 5 - Water Discharge Corridor**); and
- Retention, construction and subsequent removal of existing temporary haulage route (**Work No. 10A – Additional Abnormal Indivisible Load Route**) and the maintenance, strengthening and improvement of the existing jetty, and placement of mobile cranes (**Work No. 10B – Waterborne Transport Offloading Area**).

2.0 LEGISLATIVE CONTEXT

2.1 Marine and Coastal Access Act

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

2.1.2 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).

2.1.3 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).

2.1.4 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; the UK Marine Policy Statement (MPS) and its relevance to the Proposed Development is discussed within **Chapter 7:** Legislation and Planning Policy (ES Volume I - **Application Document Ref. 6.2**) whilst Marine Plans are considered in further detail below.

2.1.5 The East Inshore and East Offshore Marine Plans (Department for Environment, Food and Rural Affairs, 2014) establish the plan led system for the marine area in which the riverine parts of the Site are located.

2.1.6 In Section 2, the vision and objectives for the East marine plan areas are stated; the vision for the East marine plan area is summarised below:

"By 2034, sustainable, effective and efficient use of the East Inshore and East Offshore Marine Plan Areas has been achieved, leading to economic development while protecting and enhancing the marine and coastal environment, offering local communities new jobs, improved health and well-being. As a result of an integrated approach that respects other sectors and interests, the East marine plan areas are providing a significant contribution, particularly through offshore wind energy projects, to the energy generated in the United Kingdom and to targets on climate change"

2.1.7 A review of plan policies of general relevance to the project are considered in full within **Chapter 7:** Legislation and Planning Policy (ES Volume I - **Application Document Ref. 6.2**); key policies of relevance to the NRA are summarised below:

- **Policy ECO1**: Cumulative impacts affecting the ecosystem of the East marine plans and adjacent areas (marine, terrestrial) should be addressed in decision-making and plan implementation.
- **Policy ECO2**: The risk of release of hazardous substances as a secondary effect due to any increased collision risk should be taken account of in proposals that require an authorisation.
- **Policy GOV2**: Opportunities for co-existence should be maximised wherever possible.
- **Policy GOV3**: Proposals should demonstrate in order of preference:
  - that they will avoid displacement of other existing or authorised (but yet to be implemented) activities;
  - how, if there are adverse impacts resulting in displacement by the proposal, they will minimise them how, if the adverse impacts resulting in displacement by the proposal, cannot be minimised, they will be mitigated against or;
  - the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts of displacement.
- **Policy PS1**: Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance should not be authorised in International Maritime Organization designated routes.
- **Policy PS2**: Proposals that require static sea surface infrastructure that encroaches upon important navigation routes […]should not be authorised unless there are exceptional circumstances. Proposals should:
  - be compatible with the need to maintain space for safe navigation, avoiding adverse economic impact;
  - anticipate and provide for future safe navigational requirements where evidence and/or stakeholder input allows; and
  - account for impacts upon navigation in-combination with other existing and proposed activities.

2.1.8 **Policy PS3**: Proposals should demonstrate, in order of preference:

- that they will not interfere with current activity and future opportunity for expansion of ports and harbours;
- how, if the proposal may interfere with current activity and future opportunities for expansion, they will minimise this;
- how, if the interference cannot be minimised, it will be mitigated; and
- the case for proceeding if it is not possible to minimise or mitigate the interference.

2.1.9 **Policy TR1**: Proposals for development should demonstrate that during construction and operation, in order of preference:

- they will not adversely impact tourism and recreation activities;

- how, if there are adverse impacts on tourism and recreation activities, they will minimise them;
- how, if the adverse impacts cannot be minimised, they will be mitigated; and
- the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts.

2.1.10 More widely, the East Marine Plan recognises the importance of Navigational Safety; Paragraph 247 - 248 state that:

"*Navigational safety is equally important beyond International Maritime Organization routes as well as port and harbour areas (which are addressed directly under plan policies PS1, PS3, and DD1 respectively) and has been particularly highlighted by stakeholders in the development of these marine plans* […] *Decision-makers should take into account and seek to minimise any negative impacts on shipping activity, freedom of navigation, and navigational safety and ensure that their decisions are in compliance with international maritime law* […] "

2.2 Convention on the International Regulations for Preventing Collisions at Sea

2.2.1 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).

2.2.2 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.

2.2.3 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.

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

2.3.1 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.

2.4 The Humber Conservancy Act 1852 (and subsequent)

2.4.1 The River Humber Conservancy Act of 1852 was the first of several Conservancy Acts for the Humber and wider surrounds. The initial 1852 Act created a body responsible for the management of the Humber and surrounds – the so-called the "River Humber Conservancy Commissioners". The Act also conferred powers to the River Humber Conservancy Commissioners; the broad purpose of these powers was to maintain and improve navigable areas within and around the River Humber.

2.4.2 Section 9 of one of the 1899 Conservancy Act also provides a power for Associated British Ports (ABP) to grant licences for the execution of works such as landing stages, slipways, piers, jetties and also 'any protective or other works' (ABP, 2014).

2.4.3 The works required within the River Trent as part of the Proposed Development are entirely within the statutory harbour area managed by ABP Humber, being within the River Trent seaward (north) of the Stone Bridge at Gainsborough.

2.5 The Humber Navigation Bylaws 1990

2.5.1 The Humber Navigation Byelaws ('The Byelaws') provide a series of directions from ABP Humber, as the statutory harbour authority, focused on the management of a safe and efficient harbour area.

2.5.2 The Byelaws are divided into five key sections:

- General duties of masters of vessels;
- Lights and signals;
- Mooring and management of vessels;
- Conduct of persons; and
- Penalty for contravention of byelaws, responsibility and defence.

2.6 The Merchant Shipping Regulations 2002

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

2.6.2 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 as part of this NRA in order to understand how any proposed works may interfere with the mariner's compliance with them.

Guidance

2.7 MCA Marine Guidance Note (MGN)

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

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

2.7.2 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 help inform the development of this NRA. MGN 543 was developed with a primary focus on Offshore Wind 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): 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 EIA process; and
- **Section 3** (Paragraph 3.2): sets out the expectation that developers should evaluate all 'navigational possibilities, which could be reasonably foreseeable.'

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

3.0 PURPOSE AND SCOPE OF THE ASSESSMENT

3.1.1 The Proposed Development includes works within both the UK Marine Area (Section 42, MCAA) and areas of the Humber within the control of ABP Humber as statutory harbour authority.

3.1.2 In order to ensure a robust assessment of the likely significance of the environmental effects of the Proposed Development, the NRA has been undertaken adopting the principles of the 'Rochdale Envelope' approach, where appropriate. This involves assessing the maximum (or where relevant, minimum) parameters for the elements where flexibility needs to be retained (such as the building dimensions or operational modes for example).

3.1.3 For the NRA specifically, the exact extent, nature and duration of activities within the River Trent and/ or the Stainforth and Keadby Canal cannot be determined in the absence of an appointed contractor(s) including, where relevant, (marine) construction contractor. On this basis, a reasonable worst-case has been established for these working areas based on historical experience (including associated with the construction of Keadby 2 Power Station), professional judgment and technical feedback from relevant maritime stakeholders.

3.1.4 Justification for the need to retain flexibility in certain parameters is outlined in this Appendix and also in **Chapter 6**: Consideration of Alternatives (ES Volume I – **Application Document Ref. 6.2**). For works within the (tidal) River Trent, the draft DML includes methodology and Construction Environmental Management Plan (CEMP) 'returns' in order to enable the MMO's detailed review of construction activities; a draft DML is included within the draft DCO (**Application Document Ref. 2.1**).

3.1.5 The aim of this assessment is to undertake an NRA that is appropriate and proportionate to the nature and scale of risks to navigation associated with 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.

4.0 MARINE BASELINE

4.1 Vessel Density

4.1.1 Automatic Identification System (AIS) data can be used to provide an insight into the average vessel density in the area surrounding the Proposed Development 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.

4.1.2 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 <300GT, recreational vessels, fishing vessels as well as military and governmental vessels whilst on deployment.

4.1.3 The Proposed Development is within a single vessel density grid – Grid ID 171732. Density grid '171203' is approximately 200m to the south of the Proposed Development Site whilst density grid '172261' is approximately 500m to the north.

4.1.4 AIS data can represented visually as density grids 'or heat maps'. Publicly available AIS data from the MMO has been obtained for both 2015 and 2017 (MMO, 2017); this is reported in density grids (**Figure 12C-1:** Vessel Density Grids (ES Volume II **– Document Ref. 6.3**)) and as anonymised AIS-derived transects (**Figure 12C-2:** Anonymised AIS Derived Track Lines (ES Volume II **– Document Ref. 6.3**)).

4.1.5 In addition, more recent AIS data from 2019 has been procured (Marine Traffic, 2021); this is reported as anonymised vessel points (**Figure 12C-7:** Historical Vessel Positions (2019) (ES Volume II **– Document Ref. 6.3**)).

4.1.6 These figures show that the Humber Estuary itself – and approaches – feature a far greater vessel density than the River Trent; this is largely attributable to the nature of the Humber Estuary as a major shipping hub.

4.1.7 The Port of Hull spans multiple individual locations along the north and south bank of the Humber Estuary and handles approximately 10 million tonnes of cargo per year (ABP Humber, 2021). The Port offers a range of different services including:

- Agribulks;
- Bulk Energy;
- Construction;

- Containers;
- Cruise;
- Forest Products;
- Liquid Bulks;
- Offshore Wind;
- Project Cargo;
- Ro-Ro and Ferries; and
- Steel and other metals.

4.1.8 The closest (major) Port of Hull facility[1] to the Proposed Development is 'River Trent [Port]'; annual freight data indicates that this facility handles approximately 1.05 million tonnes of cargo (Department for Transport, 2020). ABP Humber data indicates an average of ~24,500 vessel movements per annum across the Humber and River Trent; a summary of historical vessel movements within ABP Humber's jurisdictional area is detailed in Table 1 below (ABP Humber, 2021a).

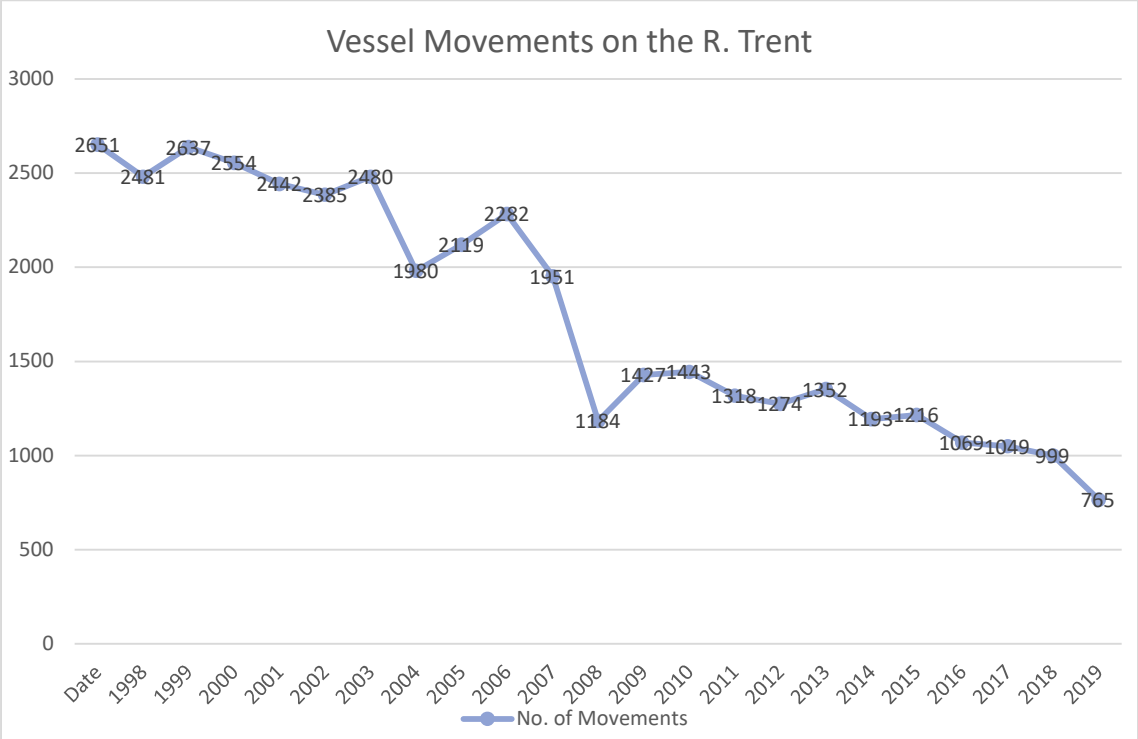
Table 1: Historical Vessel Movements

Vessel Movements					
	2016	**2017**	**2018**	**2019**	**2020**
ABP Acts	16,161	16,997	17,092	15,499	13,747
VLS Moves	1,070	1,022	1,068	930	842
Non VLS Moves	15,091	15,975	16,024	14,569	12,905
PEC Acts	8,715	8,543	8,545	9,126	7,904
Total Movements	24,876	25,540	25,637	24,625	21,651

4.1.9 ABP Humber data and analysis for the River Trent has also been reviewed, as presented in **Diagram 1**. This shows a general downward trend in vessel traffic on the River Trent. It is considered that this general downward trend may be explained (amongst other reasons) by industrial decline for core local industries (including steel).

[1] Smaller ABP Humber facilities are located further south, closer to the Proposed Development Site, at Neap House. This is discussed further in Section 4.2.

Diagram 1: Historical Vessel Movements on the River Trent



4.1.10 Data gathered by the MMO related to the movement of the following short-sea shipping types (MMO, 2021) has also been analysed:

- cargo vessels (general);
- non-port service craft;
- port service craft;
- recreational vessels; and
- tankers.

4.1.11 Of these vessel types, 'cargo vessels' are the only vessel type which have been recorded navigating within the direct vicinity of the Proposed Development; the southernmost extent of this data is density grid '173849'. 'tankers' enter a much more limited area of the River Trent with the southernmost extent of this data being density grid '173849'. The vast majority of the other vessel types are recorded east of the Humber Bridge.

4.1.12 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.

4.2 Port Activity

PD Ports

4.2.1 The Proposed Development Site is within the direct vicinity of Keadby, a port which is owned and operated by PD Ports. PD Ports operate a selection of individual facilities under the Keadby umbrella:

- Keadby (approximately 20m south of the Proposed Development Site);
- Grove Wharf/ Groveport (1.5km north-east of the Proposed Development Site); and
- Port of Howden (16.5km north-west of the Proposed Development Site).

4.2.2 A range of commodities are handled at these locations; this includes Agribulks, Dry Bulk Cargo, Forest Products, Offshore, Project Cargo and Steel/ Metals. Pre-application engagement with PD Ports was carried out in March 2021, with responses helping to inform the content of this NRA.

4.2.3 It is understood that Railway Wharf, whilst privately owned, is commonly used in conjunction with the Keadby port facility; this includes the use of access through PD Ports assets.

4.2.4 PD Ports operates a smaller (single) port facility – Neap House – which is approximately 1.5km to the north-east of the Proposed Development Site (affiliated to Grove Wharf/ Groveport).

RMS Trent Ports

4.2.5 RMS Trent Ports operate a number of additional port facilities within the vicinity of the Proposed Development Site including:

- Gunness (700m south-east of the Proposed Development Site on the eastern bank of the River Trent);
- Flixborough (3km north-east of the Proposed Development Site); and
- Althorpe Wharf (1km south of the Proposed Development Site).

4.2.6 A variety of different commodities are handled through these locations; largely, this is consistent with cargoes noted in Section 4.2.2 above although RMS Trent Ports has a particular focus on steel-based cargo.

ABP Humber

4.2.7 No publicly available information has been identified specifying the typical cargoes handled by this facility; however, engagement with ABP Humber has provided an indication that cargoes are typical of those handled at facilities operated by PD Ports and RMS Trent Ports.

4.2.8 On approaching the Humber, the master of a vessel must give notice to ABP Humber (i.e. Vessel Traffic Service (VTS) Humber) to provide details of the

vessel's arrival at, departure from or movement within the Humber. Once within the Humber itself, there are a series of reporting points which the master of a vessel must report when passing (these are published via Notice to Mariners).

4.2.9 There are a range of other reporting and safety requirements which are specified within the Humber Navigation Byelaws 1990.

4.2.10 As well as AIS, ABP Humber, as the statutory Harbour Authority, operate a bespoke system to safely manage, monitor and control the safety of navigation on the river, which is called Port and Vessel Information System, or 'PAVIS' (ABP Humber, 2021b).

4.3 Marine Works

4.3.1 Data published by the MMO via the Marine Case Management System (MCMS) and the 'Explore Marine Plans' database (or 'EMP database', formerly the Marine Information System), indicates the presence of several 'active' Marine Licences within the immediate vicinity of the Proposed Development (Marine Management Organisation, 2020b; 2020c):

- MLA/2014/00183/2 (SSE Keadby Power Station: Keadby Power Station Intake / Outfall Dredging and associated 'disposal to sea');
- MLA/2018/00547 (Environment Agency: Keadby TAO Trent Side Outfall Refurbishment); and
- MLA/2016/00207/1 (Severn Trent Water: Outfall Repairs at Gunness and Althorpe).

4.3.2 **Figure 12C-3:** MMO Licensing (ES Volume II **– Document Ref. 6.3**) highlights local licensing information within the vicinity of the Proposed Development Site (both active and inactive Marine Licence Application point, polygon and line datasets).

4.3.3 Of these activities, MLA/2018/00547 and MLA/2016/00207/1 are relatively minor activities; these operation and maintenance (O&M) and refurbishment works are understood, from public records, to have been completed.

4.3.4 MLA/2014/00183/2 is an active maintenance and dredging licence which is in place for the Keadby Power Station area along the River Trent. A review of the MLA and supporting documentation has been carried out, alongside relevant consultation responses to the MMO 'case'. Concurrently, engagement with the (operational) Keadby 1 Power Station has been carried out.

4.3.5 **Diagram 2** shows that the River Trent has high Suspended Sediment Concentrations (SSC). This turbidity, and the nature of the Trent as a narrow, tidal River at this location leads to high levels of siltation – and potential fouling risk – at both the existing Keadby Power Station intake and outfall.

Diagram 2: Keadby 1 Power Station intake (left) and outfall (right) taken during outage

4.3.6 Keadby Power Station periodically dredges a wide area of the River Trent and locally disposes of arisings; this is represented as the MLA/2014/00183/2 polygon in **Figure 12C-3:** MMO Licensing (ES Volume II **– Document Ref. 6.3**). This activity typically involves the following vessels:

- Cutter Suction Dredger (CSD): this is a dredging vessel equipped to operate in a range of different conditions, including narrow/ navigational channels. The most frequently used CSD locally is the 'John M', which is a maximum of 39m in length and 5.95m in beam.
- Bucket Dredger: bucket dredging can be undertaken from a specialist dredge-specific vessel or a multitude of multi-purpose vessels. The most frequently used Bucket Dredger locally is the 'Collingham', a barge-based multi-purpose vessel of 43.8m in length and 8.56m in beam.

4.3.7 Alongside existing, consented dredging and disposal, Keadby Power Station periodically maintains the intake and outfall areas using a combination of hand-based maintenance from shore (exploiting the use of the gantry system at the intake for example) and river-based dive operations, again by hand. This activity typically involves the following vessel:

- Survey/ Workboat; Safety Vessel: a general-purpose, small single crew workboat. This is a non-specialist, general purpose vessel although typical dimensions are a length of 12m and a beam of 4.9m.

4.4 Recreational Sailing

4.4.1 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).

4.4.2 The 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.

4.4.3 The Proposed Development is not within a 'General Boating', 'Cruising' or 'Racing' area; the closest RYA boating area ('General Boating') is at the mouth of the River Trent, approximately 11km to the north of the Proposed Development Site.

4.4.4 There are several waterside marinas to the south of the Proposed Development, beyond the tidal reaches of the River Trent, at Newark. This includes Kings Marina, Newark Marina and Farndon Marina which provide a range of day, short trip, residential and wintering moorings.

4.4.5 Whilst AIS datasets would appear to indicate a general lack of recreational activity within the immediate vicinity of the Proposed Development Site, the nature of this inland waterway (being linked to the wider Humber Estuary) and the presence of marinas to the south means recreational passage is highly likely. Targeted engagement with the RYA was carried out in February and March 2021 to provide a summary of marine works (RYA Pers. Comm, 2021).

4.4.6 In line with recommendations of the RYA, MCA and Trinity House, contact was made with the closest marinas in March 2021; however, despite contact attempts, no responses were received. A preliminary review of data available on berth usage suggests that the three closest marinas have a total of approximately 650 berths spanning recreational/ temporary, wintering and semi-permanent use. Vessel types vary but mostly appear to be day boats, barge craft/ narrow boats and other small recreational craft.

4.5 Other Recreational Activity / Other Mariners

4.5.1 Approximately 85m to the south of the Proposed Development Site is a Boat Station; it is understood that this is an affiliated site between British Rowing and the Scunthorpe branch of the Sea Cadets. It is understood that this boat station is used for craft storage and limited periodic use. Targeted engagement was carried out with British Rowing/ Scunthorpe Sea Cadets to explain the nature of works and to identify any potential concerns between February and April 2021 (Sea Cadets Pers. Comm, 2021).

Diagram 3: Keadby Boat Station on the Stainforth and Keadby Canal

[2]

4.5.2 The Canal and River Trust (CRT) describe the Stainforth and Keadby Canal as a 14.9-mile-long, three-lock waterway. Immediately to the south of the Proposed Development Site at Railway Wharf (Waterborne Transport Offloading Area) is the Keadby Swing Bridge/ Keadby Lock; as well as providing access to and from the (tidal) River Trent, the CRT list a number of facilities at this location such as showers, bathrooms, water and moorings (CRT, 2021).

Diagram 4: Keadby Lock where the Stainforth and Keadby Canal enters the River Trent

[2] Image Credit: C Johnstone, 2021

4.5.3 There is only one live listing under CRT Notices and Stoppages for the Stainforth and Keadby Canal; this is a specified set of Lock shift times for the Keadby Lock for October to April (08:00 – 16:00 inclusive). Prior to this, a low-season notice was in place requiring that skippers of all craft wishing to book passage must contact the lock keeper in advance to ensure optimum passage; this notice terminated on the 30 April 2021 (CRT, 2021).

4.5.4 British Canoeing list the Stainforth and Keadby Canal as a 15-mile-long accessible route for canoeists (noting that a licence is required which in this instance, is from CRT) (British Canoeing/GO Paddling, 2021.

4.5.5 There is understood to be sporadic angling undertaken along the banks of both the River Trent and Stainforth and Keadby Canal; this includes leased fishing rights and activity associated with Scunthorpe Anglers who permit recreational day and night fishing along the south bank of the Stainforth and Keadby Canal (Scunthorpe Anglers, 2021).

4.6 Commercial Fishing

4.6.1 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 12C-4:** ICES Rectangles (ES Volume II **– Document Ref. 6.3**)). 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 '36E9' (Marine Management Organisation; Dixon et al, 2018).

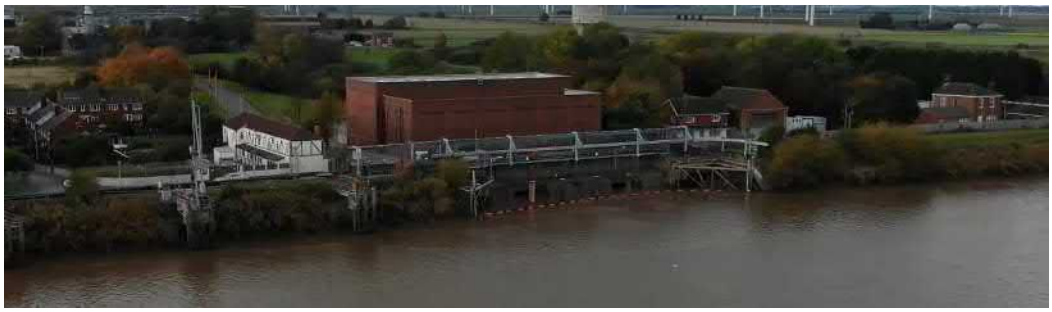
4.6.2 Whilst there is a statistical rectangle covering the area of the River Trent which the Proposed Development overlaps, it is understood that commercial fishing activity at this inshore location is extremely limited owing to the lack of commercially-targeted species and distance from primary fleet fishing ground outside of the Humber Estuary. Any 'commercial fishing' activity at this inshore location on the River Trent is expected to be sporadic.

4.7 Industrial Features

4.7.1 There are a range of industrial features surrounding the Proposed Development, as identified by **Figure 12C-5:** Industrial Data (ES Volume II **– Document Ref. 6.3**). To the north of the Proposed Development, a single Overhead Line (OHL) bisects the Water Discharge Corridor before crossing the River Trent to the east. A further two OHL are directly north of the Water Discharge Corridor (both cross the River Trent west to east).

4.7.2 Approximately 10m south of the Water Discharge Corridor is an Unidentified Shoreline Construction; site walkover and historical mapping indicates that this is an outflow point from Sewer Drain to the west. Further south, the River Water Abstraction Option overlaps with a Shoreline Construction (Wharf, Quay); this is the Keadby 1 Cooling Water System abstraction point. This feature includes stop sticks/ pontoons, course screens, an inspection/ maintenance gangway and the water intakes themselves (see **Diagram 5**, below).

Diagram 5: Keadby 1 Power Station cooling water intake/ pump house



4.7.3 The AIL Receiving Berth to the south is intersected from north to south with an Unidentified Shoreline Construction; industrial mapping plots this as a single feature, approximately 500m in length, running from the Keadby 1 Power Station pump house to Railway Wharf, across the Stainforth and Keadby Canal and onward, to a point approximately 100m south of Keadby Pumping Station. This construction comprises several distinct components; from north to south, these are:

- fendering, mooring dolphins, gangways and associated infrastructure (including lighting and marking) with loading/ unloading of bulk product from PD Keadby;
- reinforced concrete quay (north of Keadby Canal) – Railway Wharf – associated with PD Ports (Keadby);
- four sets of lock gates serving the Keadby Canal and westward, a swing bridge spanning the Keadby Canal which is owned and maintained by Network Rail;
- reinforced concrete quay (south of Keadby Canal) – Railway Wharf – associated with PD Ports (Keadby); and
- riverside pumping/ discharge infrastructure associated with Keadby Pumping Station, an asset managed by the Environment Agency which serves to manage water levels within The Hatfield Drain, River Torne and South Drain (collectively known as the Three Rivers).

4.8 Historical Incidents

4.8.1 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. Analysis of both Marine Accident Investigation Branch (MAIB) and ABP Humber data has been completed to help inform the NRA; this is summarised below.

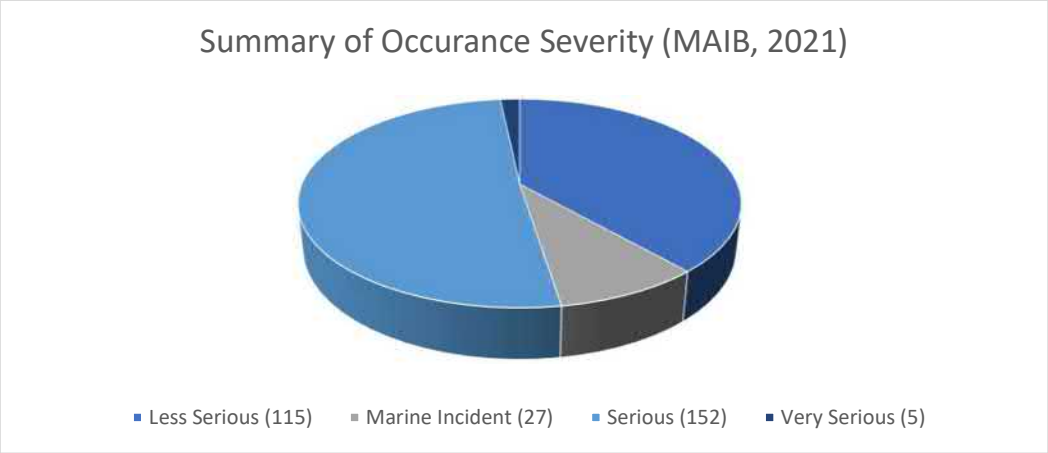
MAIB Database

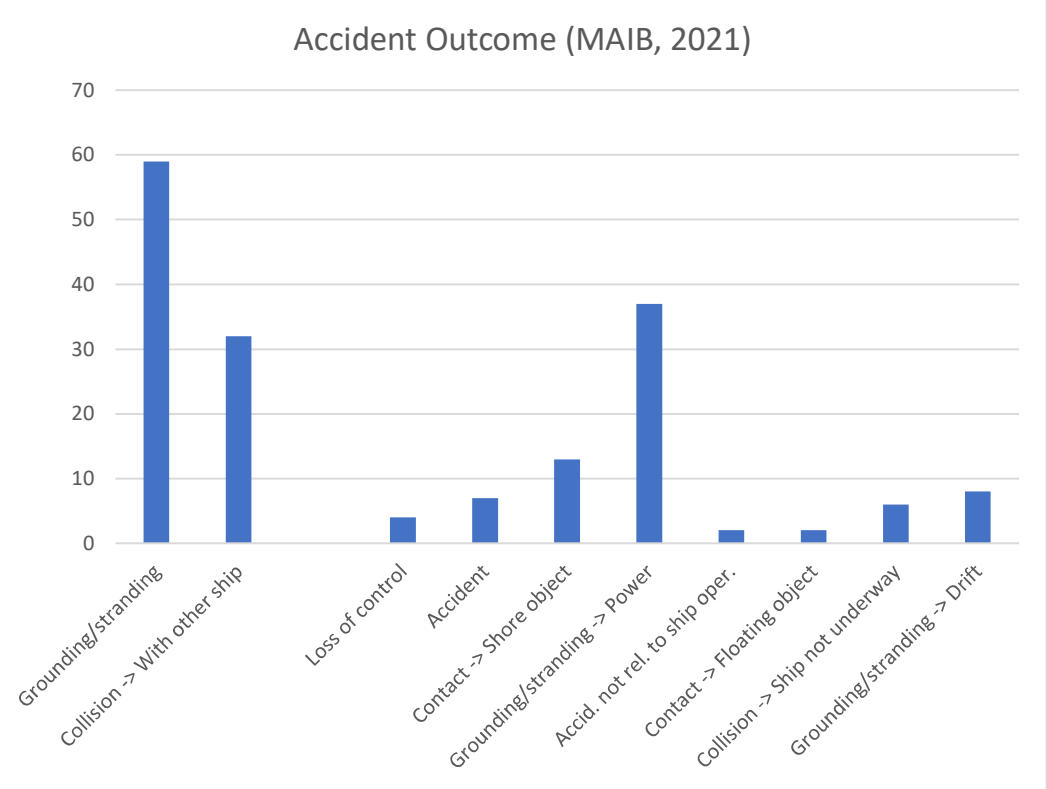
4.8.2 The MAIB is an independent branch of the Department for Transport (DfT). Their core objective is to investigate accidents to determine the specific circumstances and causation with a view to this learning helping to reduce the

incidence of marine accidents. The review of historical local data is aligned with the high-level principles of MGN 543 (refer to Section 2) and wider methodologies for assessment of Marine Infrastructure projects, such as those produced by the Department for Trade and Industry, DfT and MCA (DTI, 2005).

4.8.3 In February 2021, a data request was submitted to the of the DfT; a data response covering an area bounded by 53.13 to 53.72 degrees latitude and -0.83 to -0.67 degrees longitude was received in March 2021 (this was inclusive of the areas of the River Trent surrounding the Proposed Development) (DfT/MAIB, 2021). Analysis of this data has been carried out and is summarised in **Figure 12C-6:** Historical Marine Accident Investigation Branch (MAIB) Data (ES Volume II **– Document Ref. 6.3**) and **Diagram 6** below; the NRA is cognisant of this.

Diagram 6: Analysis of MAIB Data





ABP Humber Data

4.8.4 In February 2021, NRA workshops were held relevant marine stakeholders, including ABP Humber, Trinity House, CRT and MCA. Subsequently, historical data was provided by ABP Humber in April 2021 (ABP Humber, 2021b) to inform this NRA. Historical data regarding vessel incidents within ABP Humber's jurisdictional area and the River Trent is summarised in Table 2 and Table 3 respectively.

Table 2: Vessel Incidents (I of II)

Vessel Incidents (Jurisdictional Area)					
	2016	**2017**	**2018**	**2019**	**2020**
Impact with Structure	23	70	63	57	32
Temporary Grounding	4	17	26	13	10
Grounding Over A Tide	4	9	7	4	5
Collision Between Vessels	0	5	8	11	3
Contact with Floating Mark	0	1	5	8	2

Table 3: Vessel Incidents (II of II)

Vessel Incidents (River Trent)					
	2016	**2017**	**2018**	**2019**	**2020**
Impact with Structure	0	1	3	1	1
Temporary Grounding	1	3	3	5	1
Grounding Over A Tide	1	3	5	1	0
Collision Between Vessels	0	0	0	0	0
Contact with Floating Mark	0	0	0	0	0

4.8.5 Local (qualitative) information was also provided by ABP Humber; key matters to consider were related to moorings, safe access, hydrographic surveying and cargo unloading.

4.8.6 A range of local information on the specific tidal conditions at Keadby, and likely risks, was also provided; this included confirmation of the possibility of a tidal bore at Railway Wharf (“the Trent Aegirs”). The NRA has taken into consideration this data and local knowledge.

5.0 MARINE WORKS AND AIL MOVEMENTS

5.1 Overview

5.1.1 **Chapter 4:** The Proposed Development and **Chapter 5**: Construction Programme and Management (ES Volume I – **Application Document Ref. 6.2**) provide details of the works that may be required for the Proposed Development (including those within the UK Marine Area). A brief summary of potential marine works is detailed below within Table 4.

Table 4: Summary of Marine Works and anticipated AIL Movements

Activity	Description
Canal Water Abstraction Option	The preferred cooling method is hybrid cooling of both the CCGT and CCP using water abstracted from the Stainforth and Keadby Canal (**Work No. 4A** - Canal Water Abstraction Option). Should this option be selected, an intake structure would be constructed within the canal with equipment to comply with the Eels (England and Wales) Regulations 2009 (HMSO, 2009) ('the Eels Regulations'). It is expected that this may comprise 2mm eel screens, baffles and fish return system (similar to that approved by the Environment Agency and that has been constructed for Keadby 2 Power Station) together with intake pipework, a wet well pumping station and chlorination plant. A pipeline would be constructed from this inlet into the Proposed PCC Site broadly following the route consented for Keadby 2 Power Station and shown on **Application Document Ref. 4.9**. Should the Canal Water Abstraction Option be progressed, construction activities that may be required include (but are not limited to): • pre-works survey(s) along the Keadby Canal wall; • installation of a cofferdam within Keadby Canal to provide a safe, dry and stable working area; • construction of hoarding, flood protection (where necessary) appropriate temporary hazard warning, screening, lighting and signage as well as removal and reinstatement of mooring points (comparable to that used on the recently constructed intake for Keadby 2 – see **Diagram 7**, below); • construction/ alteration works to install new intake infrastructure; • installation of screening system(s); • removal of cofferdam; and • completion of post-construction surveys, as required.

Activity	Description
	Depending on the extent of construction works which are 'shore-led', this process would likely involve the use of a workboat or support barge (to act as a stable platform from which piling could be carried out). Smaller specialist workboats may also be required, comparable to those used for the construction of the Keadby 2 Power Station intake. The worst-case predicted ingress of the cofferdam into the Keadby Canal is approximately 10m (comparable to the Keadby 2 Power Station intake construction, shown in **Diagram 7,** below); potential workboat locations are provided within **Figure 12C-8:** Indicative Workboat Locations (ES Volume II – **Document Ref. 6.3**)). **Diagram 7 Cofferdam in-situ during Keadby 2 Power Station construction** 
Potential River Water Abstraction Point	In the event that the preferred abstraction of cooling water from the Stainforth and Keadby Canal is not feasible, the existing Keadby 1 Power Station abstraction would be upgraded. The location of the existing abstraction in the River Trent is shown on **Diagram 8**.

Diagram 8: Existing abstraction for Keadby Power Station

At this early stage in the design and planning process, ahead of completion of the Front-End Engineering Design ("Pre-FEED"), it is not possible to predict the exact nature of works that may be required within the River Trent. This would be confirmed following detailed design and would at that stage take into account the operating requirements of the Proposed Development, site-specific proposals from the construction contractor(s) undertaking the works and be subject to agreement with relevant marine stakeholders in accordance with the draft DCO (**Application Document Ref. 2.1**).

Two potential scenarios have been identified in relation to the required upgrade works in order to assess the reasonably foreseeable worst-case effects.

Scenario A

The existing intake on the River Trent is anticipated to be suitable for re-use for the Proposed Development, subject to necessary upgrades to meet prevailing regulatory requirements and to secure an adequate supply at a stable volume of cooling water to the Proposed Development. Under this scenario, several construction activities may be required; including but not limited to:

- boat or shore-led pre-works survey(s) along the River Trent, including diving operations where required;
- isolation of the existing cooling water system intake and insertion of stop gates to ensure a safe working area;
- manual removal of silt and marine growth which may have accumulated within the forebay/ surge pit;

Activity	Description
	• removal, replacement and upgrades to screening, as required; • general repair, upgrades and repurposing of the existing intake structure (including gantry system, concrete supports, hazard dolphins as well as any lighting and marking required); • recommissioning of the cooling water system, including flushing and testing; and • completion of post-construction surveys, as required. **Scenario B** In the event that works described in Scenario A are not viable in order to upgrade the existing intake, additional construction activities may be required; this includes but is not limited to: • boat or shore-led pre-works survey(s) along the River Trent, including diving operations where required; • installation of a cofferdam in order to create a dry, safe working area; • construction of hoarding, flood protection (where necessary) appropriate temporary hazard warning, screening, lighting and signage as well as removal and reinstatement of mooring points; • isolation of the existing cooling water system intake and insertion of stop gates to ensure a safe working area; • manual removal of silt and marine growth which may have accumulated within the forebay/ surge pit; • removal, replacement and upgrades to screening, as required; • general repair, upgrades and repurposing of the existing intake structure (including gantry system, concrete supports, hazard dolphins as well as any lighting and marking required); • recommissioning of the cooling water system, including flushing and testing; and • completion of post-construction surveys, as required. The predicted worst-case ingress of the cofferdam into the River Trent is approximately 22m from MHWS. Under Scenario B, depending on the extent of construction works which are 'shore-led', this process would likely involve the use of a workboat to act as a stable platform from which piling could be carried out to erect the cofferdam. Smaller specialist workboats may also be required, comparable to those which

Activity	Description
	are periodically used as part of the O&M campaigns at the existing intake for Keadby 1 Power Station. Potential workboat locations are provided within **Figure 12C-8:** Indicative Workboat Locations (ES Volume II **– Document Ref. 6.3**) and the indicative maximum extent of the cofferdam is shown on **Figure 12C.10:** Historical Vessel Positions (K2 AIL Deliveries) (ES Volume II **– Document Ref. 6.3**)
Water Discharge Corridor Outfall	**Refurbishment** The existing discharge outfall in the River Trent is shown on **Diagram 9**; it is anticipated that the existing outfall is suitable for re-use and that any maintenance activities are likely to be minor and limited to inspection and hand-based maintenance. This may be either shore-led or supported by small specialist workboats, comparable to those which are periodically used for Keadby 1 Power Station O&M activities at this location. **Diagram 9: Existing Keadby 1 Power Station outfall** 

6.0 RISK ASSESSMENT

6.1 Consultation

6.1.1 To inform this assessment, consultation has been undertaken with relevant marine stakeholders; this is summarised below in Table 5.

Table 5: Consultation Summary

Organisation	Remit/ Role	Engagement
Associated British Ports Humber	Statutory harbour authority responsible for ensuring safe navigation within the Humber Estuary area; the appropriate Navigation Authority for the location of the Proposed Development on the River Trent.	Section 42 Consultation (January 2021). Pre-Application engagement meeting (February 2021 and April 2021). Data request (February 2021).
Canal and River Trust	Custodians of a large number of inland waterways in England and Wales; inherited the responsibilities of the state-owned British Waterways in 2012.	Section 42 Consultation (January 2021). Pre-Application engagement meeting (February 2021).
Department for Transport (DfT) Marine Accident Investigation Branch - MAIB	Document, record and manage historical incident reports arising from maritime accidents.	Data request (February 2021).
Keadby Power Station – Operations and Maintenance (O&M) Team	SSE's Keadby 1 O&M team periodically maintain the site-wide cooling water system intake and outfall infrastructure.	Engagement meeting (February 2021).
Keadby Sea Cadets / British Rowing	It is understood that the Scunthorpe branch of the Sea Cadets use a Boat Station alongside the Stainforth and Keadby Canal; this is understood to be affiliated with both British Rowing and the Sea Cadets. This location is	Pre-Application engagement (February - April 2021).

Organisation	Remit/ Role	Engagement
	primarily understood to be a storage site.	
Marine Management Organisation	Responsible for the determination of a Marine Licence for the Proposed Development.	EIA Scoping (June 2020). Section 42 Consultation (January 2021). Pre-Application engagement meetings (January 2021). Confirmatory NRA meeting (March 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 (June 2020) – no response received. Section 42 Consultation (January 2021). Pre-Application engagement meeting (February 2021).
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.	Pre-Application engagement (February 2021 – March 2021).
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.	Section 42 Consultation (January 2021). Pre-Application engagement meeting (February 2021).

6.1.2 Through the statutory and additional technical engagement, the NRA has benefitted from the advice and guidance of a wide range of national stakeholders and local information. Outputs from two NRA workshops held in February 2021 are included in Annex A; key local experience is summarised below.

6.1.3 ABP Humber reported that they were closely involved in the pre-planning and safe operation of Railway Wharf for AIL deliveries required during the construction of Keadby 2 Power Station. Similarly, PD Ports has reported that they have significant operating experience using the Keadby Port / Railway Wharf for the delivery of AIL; this includes support during the use of Railway Wharf for Keadby 2 Power Station AIL deliveries.

6.1.4 For Keadby 2 Power Station, in collaboration with ABP Humber (for pilotage), PD Ports acted as Shipping Agency; use of Railway Wharf itself was agreed under licence. The CRT reported that they worked closely with ALE / Mammoet, (heavy lift contractor for Keadby 2 Power Station AIL deliveries), to ensure users of the Stainforth and Keadby Canal were notified of potential closures. Both PD Ports and ALE/Mammoet were engaged throughout the pre-application period (AECOM Pers. Comm, 2021); this historical experience and where available, data, has helped to inform the NRA.

6.2 Methodology

6.2.1 There is currently no standardised formal UK guidance or prescribed methodology for how the assessment of navigational risk should be undertaken.

6.2.2 The IMO 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 sets out five fundamental steps which may be used to structure a NRA:

- 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).

6.2.3 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.

6.3 Identification of Hazards

6.3.1 Table 6 below provides a summary of the key hazards associated with the Proposed Development that are considered relevant to the NRA.

Table 6: Hazard Summary

Activity	Assessment
Canal Water Abstraction Option	There are several potential hazards associated with the construction of the Canal Water Abstraction Option: • **Workboat /Barge:** the construction and eventual removal of a cofferdam may involve the use of a barge or large workboat. The presence of workboat(s) may constrain vessel passage along the Stainforth and Keadby Canal and/ or act as a potential distraction to mariners. • **Cofferdam:** the presence of a cofferdam within the Stainforth and Keadby Canal may constrain passage and/ or act as a potential distraction to mariners.
Potential River Water Abstraction	**Scenario A** In the event that the intake can be adequately upgraded via primarily shore-based works, there are few potential hazards associated with this activity. The primary potential hazard relates to limited boat-based surveys and potentially specialist diving operations. **Scenario B** In the event that further works are required to upgrade the existing intake, there are a number of additional potential hazards in addition to those described under Scenario A, including: • **Workboat / Barge:** the construction/ removal of a cofferdam is likely to involve the use of a barge or large workboat. The presence of work boat(s) may constrain vessel passage along the River Trent and/ or act as a potential distraction to mariners. At this location on the River Trent, any workboat/ barge may also interrupt third-party operations. • **Cofferdam:** depending on its extent, the presence of a cofferdam within the navigational channel of the River Trent at the intake location may constrain passage of vessels and/ or act as a potential distraction to mariners.
Cooling Water Discharge Outfall	**Refurbishment** Only minor primarily hand-based maintenance activities would be undertaken which may be either shore-led or supported by small specialist workboats, comparable to those periodically used for Keadby 1 Power Station O&M activities. Hazards are

Activity	Assessment
	therefore predicted to be minimal and associated only with the presence of a workboat in the River Trent.
AIL Movements	During the AIL deliveries associated with construction of the Proposed Development, potential hazards could include: **Vessel Passage[3]** • on final approaches to Railway Wharf, the presence of a large vessel (i.e. up to 82m in length and 12m in beam) may present a hazard to other mariners through collision. This may include another vessel or a fixed object, such as a mooring of wharf. **Vessel Presence** • presence of a large vessel may constrain the passage of other vessels using the River Trent; 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 Trent may constrain the passage of other mariners; • during use of the NAABSA[4] berth, depending on the condition of the riverbed, the vessel may not achieve a stable unloading position. Listing into the Trent may cause a hazard to 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;

[3] 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.

[4] A NAABSA ('Not Always Afloat But Safely Aground') berth is a pocket on a tidal waterway where vessels may ground safely at low water for docking. It is typical that pre-berthing inspections are required to ensure that the soft sediment/ silt bed is even to support safe and stable docking.

Activity	Assessment
	• whilst docked, vessel mooring or docking failure(s) – "breakout" – may pose a hazard to both other mariners using the River Trent and neighbouring fixed objects; and • whilst docked, the presence of a vessel may pose a risk to users of the Stainforth and Keadby Canal particularly when attempting to navigate through the lock gates (noting that when docked at Railway Wharf, mooring lines are likely to be required across the canal entrance to secure larger vessels against reinforced mooring points at the Keadby Port platform on the south side of the canal).

6.4 Marine Users

6.4.1 The marine users within the vicinity of the Proposed Development Site were grouped into categories within Table 7, below.

Table 7: Vessel Groupings

Reference	Classification	Description
MAR-A	Non-Vessel Users	Divers; swimmers; surfers.
MAR-B	Sailing Vessel	Windsurfers; sailing dinghies.
MAR-C	Recreational Vessel (Small)	Small sail or motor yachts; canal boats; day trip cruisers.
MAR-D	Powered Vessel (Small)	Fishing vessels of 10m and under; small recreational powered craft such as jet skis or small Rigid Inflatable Boats (RIB); inshore lifeboat launches.
MAR-E	Unpowered Vessel (Small)	Sea kayaks; paddle boards; pedal boats.
MAR-F	Commercial Vessel (Small)	Fishing vessels of 10m and over; North Sea barges; work boats; pilot boats; harbour tugs; dive support RIB; windfarm O&M craft; small-medium dredging vessels; other miscellaneous support craft.
MAR-G	Commercial Vessel (Large – Very Large)	Bulk tankers; container and other very large freight transporters.

6.5 Assessment of Risks

6.5.1 Table 8 below provides a summary of each identified risk has been assessed; this has been undertaken in a qualitative manner informed by existing data, professional judgment, and navigational stakeholder engagement.

6.5.2 A 'Worst Credible Scenario' (WCS) 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';*
- **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 8: Risk Assessment

Activity	Assessment
Canal Water Abstraction Option	**Workboat/ Barge** The use of a workboat/ barge in order to construct the cofferdam would involve positioning and securing a vessel and completion of a piling campaign. Based on the anticipated size and maximum extent of the cofferdam, it is predicted that the construction of the cofferdam would take approximately three months. The use of a workboat/ barge within the Stainforth and Keadby Canal could present a risk to mariners (primarily, MAR-B and MAR-C vessel types) and also smaller unpowered craft/ recreational users (MAR-B and MAR-E vessel types). The use of a workboat/ barge will take place along the northern bank of the Stainforth and Keadby Canal. MAR-B and MAR-C vessel types at this location are predicted to be relatively small (maximum length of 20.9m and beam of 5.8m, based on the neighbouring lock constraints). Any potential workboats, if required, would be constrained by the same restrictions at Thorne Lock. On this basis and considering the remaining width of navigable water available within the Stainforth and Keadby Canal beyond the cofferdam, it is considered that there is a low risk of collision. The appointment of a suitably qualified contractor using appropriately maintained vessel(s) would reduce the likelihood of any collision risk. It is anticipated that Notices to Mariners/ local Canal Notices will be issued in order to ensure that mariners are aware of the planned activities. Probability of incident arising (presence of workboat/ barge): **0.1** Risk: **low**.

Activity	Assessment
	Cofferdam Construction, Presence & Removal The construction, presence and removal of a cofferdam within the Stainforth and Keadby Canal channel at the intake location may pose a risk to MAR-B and MAR-C vessel types; it is predicted that following construction, the cofferdam would be in-situ for the required construction period (estimated to be approximately 3 months) followed by a period of removal (estimated to be similar to the installation period). On the basis of the limited ingress into the Canal (up to 10m), it is considered that the navigable area between the southernmost extent of the cofferdam and the opposite bank of the Stainforth and Keadby Canal would be adequate to allow safe passage of vessels. Once constructed, it is estimated that there would be approximately 25m of navigable channel; based on the small vessels which use the Canal, it is considered that there is a low risk of collision between mariners and the cofferdam wall.  The appointment of a suitably qualified contractor using appropriately maintained vessel(s) is likely to ensure the risk of such a collision is low. In addition, it is anticipated that Notices to Mariners/ local Canal Notices will be issued in order to ensure that mariners are aware of the planned activities. Appropriate hazard warning, screening, lighting and signage would be installed, as required (comparable to the recently constructed intake for Keadby 2 Power Station). Engagement with the CRT would be undertaken to provide up-to-date information on activities planned along the Canal as was undertaken for Keadby 2 Power Station. Probability of incident arising from the presence of the cofferdam: **0.2** Risk: **low**.

Activity	Assessment
Potential River Water Abstraction Point	Scenario B for the River Water Abstraction Option considers the worst-case potential extent of refurbishment works and has therefore been used to assess impacts on other mariners for the purposes of the risk assessment. **Workboat(s)/ Barge(s)** The use of various vessels in order to carry out the construction of the cofferdam would involve positioning and securing of a vessel and completion of a piling campaign. Based on the worst-case dimensions for the cofferdam, construction could take approximately three months. Whilst available data indicates that overall traffic volumes at this location are relatively low, the use of a workboat(s)/ barge(s) within the River Trent could present a risk to a range of mariners (MAR-B, MAR-C, MAR-D, MAR-E, MAR-F and MAR-G vessels) i.e. recreational and commercial craft which use the River Trent. The use of a workboat(s)/ barge(s) would take place along the western bank of the River Trent, approximately 125m north of Railway Wharf. Available data indicates that vessel types navigating the River Trent will vary up to an approximate maximum size of 82m in length and 12m in beam. Based on the maximum extent of the cofferdam/ working area and approximate width of typical workboats (<6m in beam), it is considered that workboat movements will not preclude navigation along the River Trent for the majority of vessels including the majority of shallower draft vessels (i.e. MAR-B, MAR-C, MAR-D, MAR-E and MAR-F vessels). However, considering the close proximity between the working area and the area of the River Trent which larger vessels would likely use, the potential risk for MAR-G vessels is considered to be higher. The appointment of a suitably qualified contractor using appropriately maintained and operated vessel(s) would reduce the risk of an incident. In addition, Notices to Mariners will be issued in order to ensure that mariners are aware of the cofferdam and planned activities. Probability of an incident arising from the presence of workboat(s)/barge(s):**0.3** Risk **medium**. It is considered that further mitigation and management of this

Activity	Assessment
	is required; as discussed in Section 6.6, to be secured by a requirement of the Draft DCO (**Application Document Ref. 2.1**). **Cofferdam Construction, Presence & Removal** The construction, presence and removal of a cofferdam within the River Trent at the intake location may pose a risk to MAR-B, MAR-C, MAR-D, MAR-E, MAR-F and MAR-G vessel types. It is anticipated that the cofferdam will be required for two separate periods, with an intervening gap. The first circa three-month period will comprise inspections, measurements and cleaning of the existing structure to inform the detailed design of works required to upgrade or reconstruct the existing infrastructure. The installation would take place during the second period which it is envisaged may be up to circa five months. A two-stage cofferdam installation would reduce the duration of the cofferdam being present in the water, and consequently, reduce potential navigational risks). Following initial inspections, the detailed design will seek to minimise the extent of any cofferdam required given the associated benefits to mariners and to the wider environment at this location which is afforded statutory protection for biodiversity (Humber Estuary Ramsar/Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI). On the basis of the maximum anticipated extent (up to 22m) into the River Trent, it is considered that the passage of larger (i.e. MAR-G) vessels will not be compromised. For the remaining vessel types (MAR-B, MAR-C, MAR-D, MAR-E and MAR-F), it is considered that there will be sufficient navigable channel to allow safe passage. Notices to Mariners will be requested and issued via ABP Humber, as the Navigational Authority, in order to ensure that mariners are aware of the planned activities and the presence of the cofferdam. Appropriate hazard warning, screening, lighting and signage would be installed, as required (secured by a requirement of the Draft DCO (**Application Document Ref. 2.1**)). Probability of an incident arising from the presence of the cofferdam:**0.3** Risk: **medium**.

Activity	Assessment
	It is considered that further mitigation and management of this is required as described in Section 6.6, to be secured by a requirement of the Draft DCO (**Application Document Ref. 2.1**).
Water Discharge Corridor Outfall	**Workboats** As only minor primarily hand-based maintenance activities would be required at the discharge outfall (either shore-led or supported by small specialist workboats), works and resultant hazards/ risks are comparable to those which are periodically in place for Keadby 1 Power Station O&M activities. Based on the approximate width of typical workboats (<6m in beam), workboat movements will not preclude navigation along the River Trent for the majority of vessels including all shallower draft vessels (i.e. MAR-B, MAR-C, MAR-D, MAR-E and MAR-F vessels). The potential risk for larger vessels, i.e. MAR-G, may be slightly increased (owing to their beam and less nimble nature). However, south of the potential working area, the navigable channel shifts to the centre of the River Trent, meaning navigable room is improved; (approximately 50m between likely workboat presence and vessels using the centre of the navigable channel). Probability of an incident arising from the presence of a workboat/ barge: **0.1** Risk: **low**.
AIL Movements	The use of Railway Wharf to support delivery of AIL has been proven safe to mariners during the construction of Keadby 2 Power Station with many lessons learned and relationships developed that will be used during construction of the Proposed Development to facilitate the safe delivery of AIL **Vessel Passage** On final approaches to Railway Wharf, the presence of a large vessel (i.e. of up to 82m in length and 12m in beam) may present a hazard to other mariners through collision. This may include other vessels or a fixed object, such as a mooring of wharf. This risk is likely to apply to the majority of vessels (i.e. MAR-B, MAR-C, MAR-D, MAR-E and MAR-F vessels) however, the potential risk for larger vessels (i.e. MAR-G) is potentially slightly higher owing to their beam and less nimble nature. Prior to commencement of AIL deliveries, it is expected that the Navigational Authority – ABP Humber – would attend site

Activity	Assessment
	with the heavy lift contractor, once appointed, in order to review access arrangements, moorings and final approach. This would be similar to preparatory activities undertaken for Keadby 2 Power Station and would help to plan for the smooth final approach and docking process for AIL barges; specifically, this would help to minimise the period of time that the navigable channel is constrained, through vessel manoeuvring etc. It is anticipated that ABP Humber would mandate pilotage and/ or use of supporting tug boats and support craft; this would further minimise risk on passage/ final approach. The appointment of a suitably qualified contractor using appropriately maintained vessel(s) is likely to minimise risk of vessel accidents e.g. through catastrophic loss of power/ control . As above, for vessels of the size and nature involved in AIL deliveries, it is anticipated that tug boats/ support vessels would be present for the duration of passage along the River Trent. Notices to Mariners will be prepared and requested for issue by the appropriate Navigational Authority in order to ensure that mariners are aware of the planned activities. Probability of an incident arising from the passage of vessels:**0.3** Risk: **medium**. **Vessel Presence** The presence of a large vessel may constrain the passage of other vessels using the River Trent and may distract other mariners. This risk is likely to apply to the majority of vessels (i.e. MAR-B, MAR-C, MAR-D, MAR-E and MAR-F) however, the potential risk for larger vessels (i.e. MAR-G) is potentially slightly higher owing to their beam and less nimble nature. Assuming mooring on the port side, once docked, approximately 45m width 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 Trent, it is considered that there would be adequate navigable room for all other vessel types likely to use this part of the River Trent. The preparation and issue of a Notice to Mariners will also help to provide awareness of the vessel presence.

Activity	Assessment
	In terms of distraction, the Notice to Mariners will help to raise awareness of vessel deliveries and thereby reduce risk. Although the potential for unloading during the hours of darkness has been considered, following Stage 2 technical engagement discussions, it is not considered likely a viable option (consistent with Keadby 2 Power Station) given not only the additional health and safety risks that would ensue, but also the presence of a number of residential properties along Trentside which would be affected by significant illumination of Railway Wharf, to the extent necessary for night-time working. Although some temporary lighting on Railway Wharf may still be necessary, this will be focussed as set out in the Lighting Strategy (**Application Document Ref. 5.11**). Probability of an incident arising from the presence of a delivery vessel:**0.2** Risk: **low**. **Docking and Unloading** During the final approach and docking itself, the manoeuvring of a large vessel and support craft within the River Trent may constrain the passage of other mariners. This risk is likely to apply to the majority of vessels (i.e. MAR-B, MAR-C, MAR-D, MAR-E and MAR-F vessels) however, the potential risk for larger vessels (i.e. MAR-G) may be slightly higher owing to their beam and less nimble nature. There is a site-specific higher risk of some vessel types using the Stainforth and Keadby Canal (i.e. MAR-C); specifically, this relates to recreational traffic using the Keadby Lock for access to the Canal. 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 ABP Humber as Navigational Authority. During the use of the NAABSA berth, depending on the condition of the riverbed, the vessel may not achieve a stable unloading position; loss of stability or tilting to one side (listing) during docking may cause a hazard to other mariners. Consistent with the protocol established for Keadby 2 Power Station AIL deliveries, it is proposed that a pre-delivery inspection would be carried out with the appropriate Navigational Authority which may, if necessary, include a small extent of bed levelling in order to ensure a safe and stable

Activity	Assessment
	NAABSA platform for docking. Consistent with Keadby 2 Power Station working methods and as discussed with the ABP Humber, it is anticipated that any preparatory levelling could, if required, be undertaken by the Navigational Authority under their own powers or under the MMO exemptions for small-scale dredging[5]. The docking and unloading of a large vessel may distract other mariners, including through the use of any localised wharf/ vessel illumination. In terms of distraction, the Notice to Mariners will help to raise awareness of vessel deliveries to reduce this risk. 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 Trent 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. During the course of unloading, the potential risk of users of the Stainforth and Keadby Canal colliding with vessels docked at Railway Wharf requires consideration. Consistent with deliveries for Keadby 2 Power Station, it is envisaged that it may be necessary to close Keadby Lock for short periods during certain larger AIL deliveries as it is not considered possible to operate the lock safely, for all mariners, whilst AIL are being delivered and unloaded. The indirect consequence[6] of this may be some planned and notified disruption to mariners using the Stainforth and Keadby Canal.

[5] Section 75 of the Marine and Coastal Access Act 2009 (HMSO, 2009) sets out an exemption for dredging or the deposit of dredged material carried out by or on behalf of a harbour authority, subject to a number of conditions. Article 18A of the 2013 Exempted Activities Order (HMSO, 2013) also sets out provision for small-scale, 'low volume' navigational dredging of 500m^3 (in a single campaign) and 1500m^3 (over a 12 month period) without requirement for a Marine Licence.

[6] For the purposes of NRA, this report considers the risks – both direct and indirect – to mariners. **Chapter 12**: Water Resources and Flood Risk (ES Volume I – **Application Document Ref. 6.2**) considers impacts on other users of the canal.

Activity	Assessment
	Notices to Mariners ('Notices and Stoppages[7]') will be requested through CRT to provide mariners with forewarning of closures. Building upon lessons-learned from Keadby 2 Power Station AIL deliveries, notification of the schedule of AIL movements will be hosted by the Applicant in collaboration with the heavy lift contractor, once appointed; this will help to provide all mariners with information on any planned or required closures. Probability of an incident arising from the docking and unloading process:**0.1** Risk: **low**.

6.6 Risk Control Options

6.6.1 Table 9 below summarises the measures identified to mitigate against the identified risks.

Table 9: Risk Controls

Activity	Risk Control/ Mitigation
Canal Water Abstraction Option	**Pre-application** • Engagement with the Canal and River Trust will be undertaken to help inform the planned programme for works at the potential Canal Water Abstraction Point, should this be required; 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. **Pre-Construction and Construction** • Notices to Mariners/ local Canal Notices will be issued in order to provide mariners with information on the planned activities; and • It is anticipated that appropriate hazard warning, screening, lighting and signage would be installed, as required (given the similar scale of works, it is anticipated that this would be comparable to that used on the recently constructed intake for Keadby 2 Power Station).
Potential River	**Pre-application**

[7] The Canal and River Trust is responsible for issuing and managing 'Notices and Stoppages' along the Stainforth and Keadby Canal; this is the equivalent of a Notice to Mariners.

Activity	Risk Control/ Mitigation
Water Abstraction Point	• Should the River Water Abstraction Option be required, engagement with the relevant authorities will be undertaken to help inform any planned programme for works, make use of local working knowledge and minimise risks to other mariners within the River Trent; • ABP Humber, as the appropriate Navigation Authority, has been consulted on the draft DML (**Application Document Ref. 2.1**), alongside the MMO. This has provided an opportunity for ABP Humber, as statutory harbour authority, to review proposed requirements within the DML; • If marine works are required within the harbour authority area, an application will be made to ABP Humber harbour master, in order to obtain 'port approval' for works; • 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; and . • Engagement with Trinity House and MCA will be undertaken to inform the lighting and/ or marking requirements for the works. **Pre-Construction** • A final Construction Environmental Management Plan (CEMP) is to be secured through the DML (**Application Document Ref. 2.1**); this would provide relevant stakeholders with the opportunity to review the measures proposed for the effective management of construction risks including navigation. ADML requirement to provide a method statement for works would also provide an opportunity for relevant stakeholders to review the NRA and risk control measures and agree that they are appropriate and proportionate for the final construction methodology; and • In accordance with the requirements of the DML, all vessel masters would be provided the DML to provide information on key conditions of relevance to navigational risk. **Construction** • A Notice to Mariners condition would be adopted within the DML and issued via ABP Humber as the appropriate Navigational Authority; this would ensure that mariners are made aware of works such that they can plan their passage past the works based on a local, up-to-date account of hazards.

Activity	Risk Control/ Mitigation
Water Discharge Corridor Outfall	**Pre-application, Pre-Construction and Construction** • It is considered that any low risks are likely to be sufficiently controlled via a Notice to Mariners, issued by ABP Humber.
AIL Movements	**Pre-Application** • Engagement with ABP Humber, PD Ports and, where required due to planned closures of Keadby Lock, CRT would be undertaken to help inform the planned use of Railway Wharf; including use of local working knowledge to inform the timing and delivery of works and thereby minimise risks to other mariners within the River Trent and the Stainforth and Keadby Canal, where this is relevant; • ABP Humber, as the appropriate Navigation Authority, has been consulted on the draft DML (**Application Document Ref. 2.1**), a previously described, providing opportunity to review the proposed conditions and • Navigational safety will be considered within the heavy lift contractor specification. Contractor proposals would be reviewed by appropriately qualified and experienced marine personnel. **Pre-Construction** • Prior to commencement of AIL deliveries, it is anticipated that ABP Humber would attend site with the heavy lift contractor, once appointed, in order to review access arrangements, moorings and agree the final approach; • As previously described, the final CEMP would be secured by the DML and would provide relevant stakeholders with the opportunity to review the measures proposed for the effective management of construction risks, including provision of a method statement; • Notices to Mariners will be prepared and requested for issue by the appropriate Navigational Authority in order to ensure that mariners are aware of the planned activities; • In accordance with the requirements of the DML, all vessel masters would be provided the DML to provide information of conditions of relevance to navigational risk; and • Consistent with Keadby 2 Power Station AIL deliveries, it is anticipated that any preparatory levelling would be undertaken by the Navigational Authority (i.e. to provide a safe and stable NAABSA berthing pocket). **Construction**

Activity	Risk Control/ Mitigation
	• It is anticipated that the appropriate Navigational Authority would mandate pilotage and/ or use of supporting tug boats and support craft. This would further ensure minimisation of risk on docking; • In terms of distraction, the Notice to Mariners will raise awareness of vessel deliveries to help reduce this risk. Where task lighting is required, light spill will be minimised as far as reasonably practicable in accordance with the Lighting Strategy (**Application Document Ref. 5.11**); • It is anticipated that some AIL deliveries may require the temporary closure of Keadby Lock. This will minimise risks to mariners using the Stainforth and Keadby Canal ; • Notices to Mariners ('Notices and Stoppages') will be requested through CRT to provide forewarning to mariners of closures; • Building upon lessons-learned from Keadby 2 Power Station, a shipping movement schedule will be maintained by the Applicant, in collaboration with the heavy lift contractor, once appointed providing information on the timing and nature of loads arriving; and • A Notice to Mariners condition would be adopted within the DML and issued via ABP Humber as the appropriate Navigational Authority; 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.

6.7 Risk Management Summary

6.7.1 A summary of the estimated baseline risk and level of risk after the implementation of mitigation discussed above is included in Table 10, below.

Table 10 Summary of estimated baseline and post-mitigation risk

		Baseline Risk		Post-Mitigation Risk	
Area	**Activity proposed**	**Probability**	**Risk**	**Probability**	**Risk**
Canal Water Abstraction Option	Workboats	0.1	Low	0.1	Low
	Cofferdam	0.2	Low	0.1	Low
River Water Abstraction Option	Workboats	0.3	Medium	0.2	Low
	Cofferdam	0.3	Medium	0.2	Low

		Baseline Risk		Post-Mitigation Risk	
Area	**Activity proposed**	**Probability**	**Risk**	**Probability**	**Risk**
Water Discharge Corridor Outfall	Workboats	0.1	Low	0.1	Low
Waterborne Transport Offloading Area (Railway Wharf)	AIL Movements (Passage)	0.3	Medium	0.2	Low
	AIL Movements (Presence)	0.2	Low	0.1	Low
	AIL Movements (Docking)	0.1	Low	0.1	Low

6.8 Cost / Benefit Analysis

6.8.1 All of the risk control options identified above are proposed to be carried forward and have been discussed with MMO, including via their review of the draft DML; no further consideration is therefore given to the cost/benefit analysis.

6.9 Recommendations

6.9.1 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. 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.

6.9.2 ABP Humber, as the statutory harbour authority, benefit from substantial operating experience of the River Trent, including the southernmost reaches of the River, close to Keadby. They also benefit from historical involvement in the use of Railway Wharf during its use for Keadby 2 Power Station. It is therefore recommended that ABP Humber is 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).

7.0 SUMMARY AND CONCLUSIONS

7.1.1 A qualitative assessment of navigational risk has been undertaken. A detailed baseline understanding of local marine activity has been established informed by desk-based research, engagement with relevant marine stakeholders.

7.1.2 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.

7.1.3 Specific navigational risks at the potential river water abstraction 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. this has led to the recommendation for implementation of a range of mitigation measures. Navigational risks at the outfall have also been considered; however, minor works are anticipated that will not result in any navigational hazards.

7.1.4 The use of Railway Wharf for AIL deliveries and associated navigational risk has been assessed; this has led to the recommendation for implementation of a range of mitigation measures.

7.1.5 With the application of suitable mitigation, it is considered that all risks can be reduced to a level As Low as Reasonably Practicable (ALARP) and can be suitably managed by risk controls to reduce them to a fully acceptable level.

7.1.6 The primary risk reduction measures are:

- engagement and collaboration with ABP Humber and Canal and River Trust 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 method statement returns, to ensure that 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 are fully aware of works.

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FIGURES

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Revision: 02

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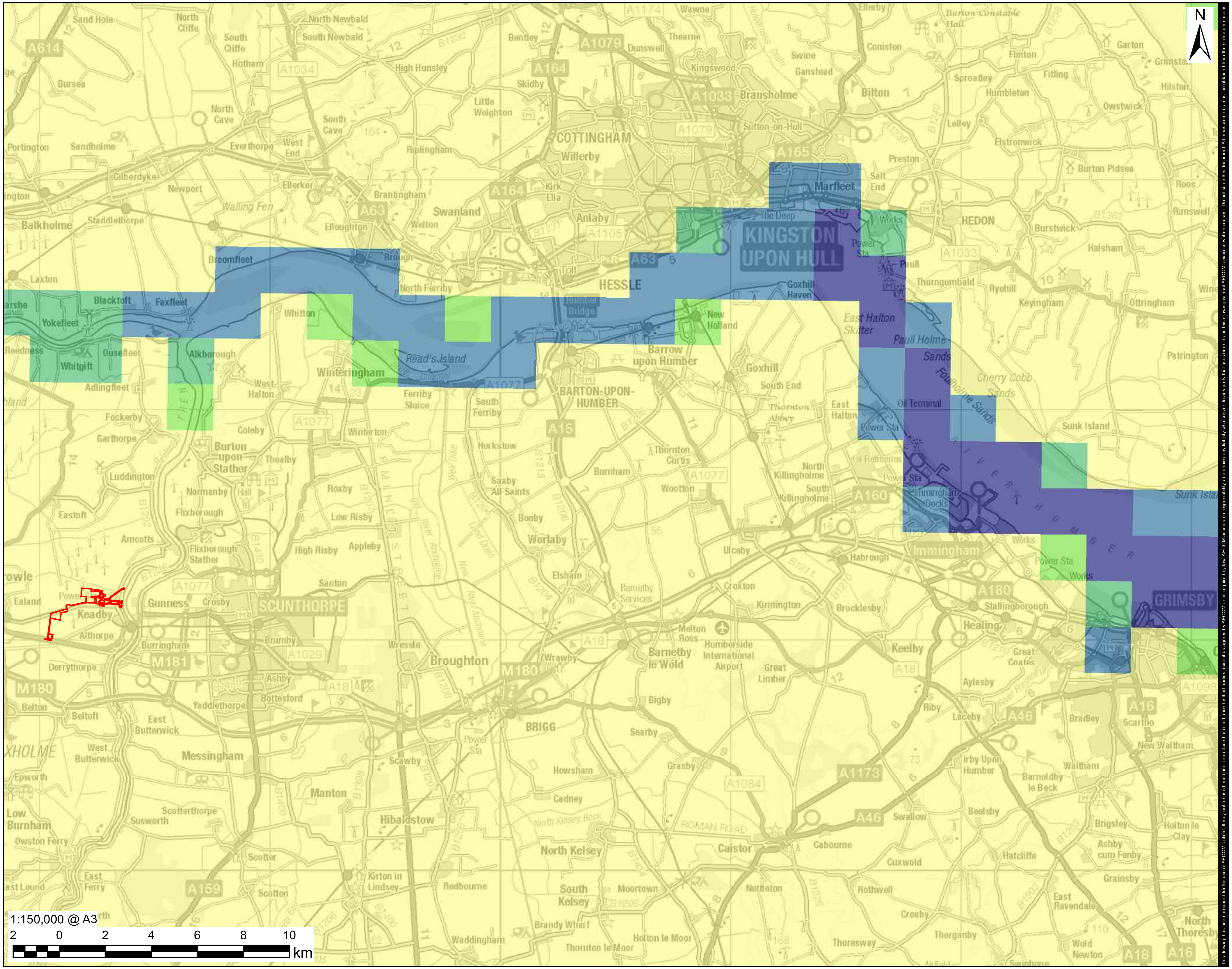

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AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

The Order Limits

Vessel Density Grid 2015 (MMO)

Total Vessels - Annual Average

- 0 -200
- 200 - 500
- 500 - 1000
- 1000 - 10000
- >10000

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

Vessel Density Grid 2015
Sheet 1 of 2

SHEET NUMBER

Figure 12C.1

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Revision: 02

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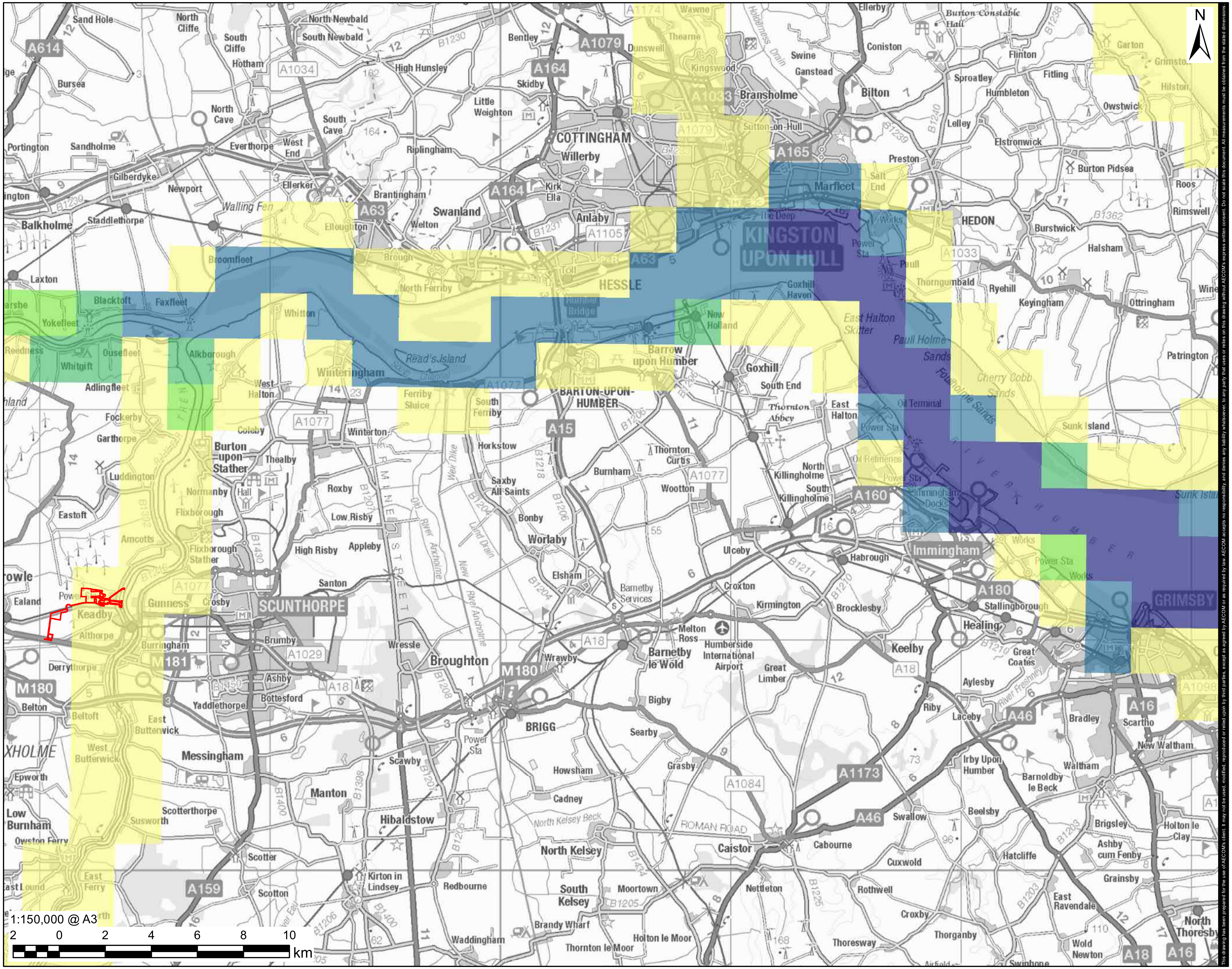

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- >10000

NOTES

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ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

Vessel Density Grid 2017
Sheet 2 of 2

SHEET NUMBER

Figure 12C.1

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_2_AISDerTrackLines2015_20220328_R02.mxd

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022

AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Anonymised AIS Derived Track Lines 2015

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

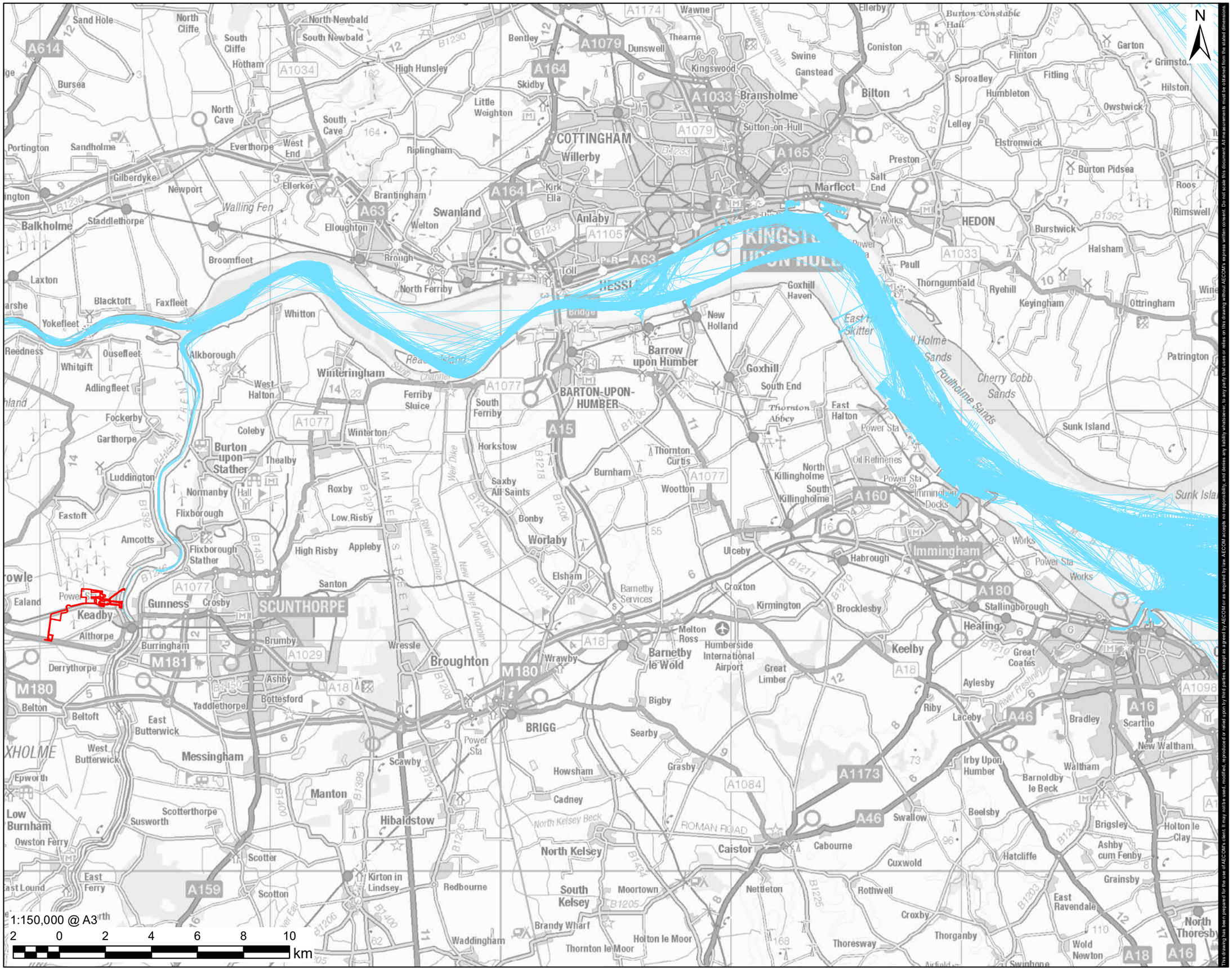
Anonymised AIS Derived Track Lines 2015
Sheet 1 of 2

SHEET NUMBER

Figure 12C.2

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_2_AISDerTrackLines2017_20220328_R02.mxd

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Anonymised AIS Derived Track Lines 2017

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

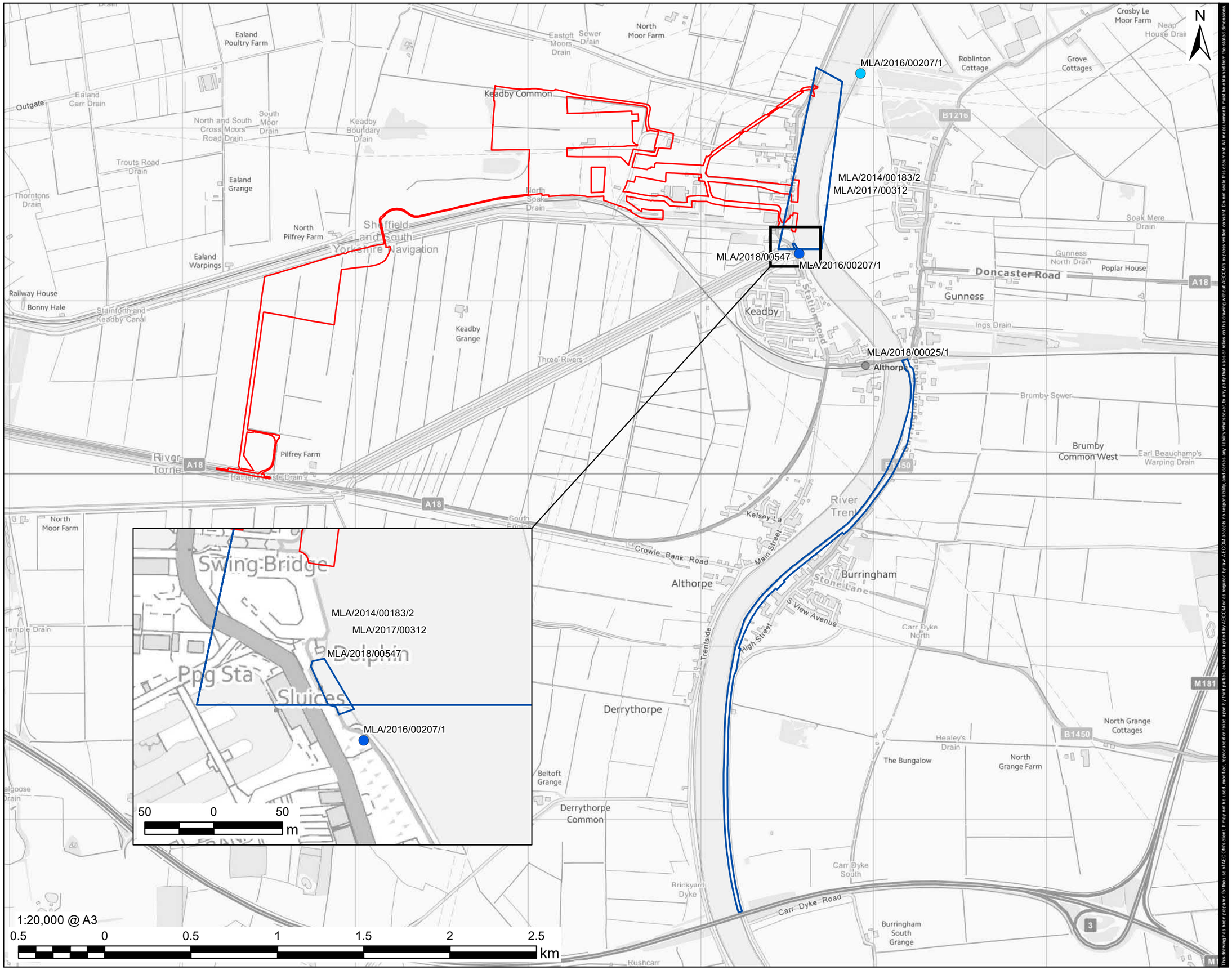
Anonymised AIS Derived Track Lines 2017
Sheet 2 of 2

SHEET NUMBER

Figure 12C.2

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_3_MMOLicensing_20220328_R02.mxd



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Gunness Outfall
- Keadby Outfall
- MMO License Application Boundary (MMO)

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

MMO Licensing Data

SHEET NUMBER

Figure 12C.3

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_4_ICESRectangles2017_20220328_R02.mxd

AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
[redacted]

LEGEND

The Order Limits

Statistical Rectangles (ICES 2017)

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

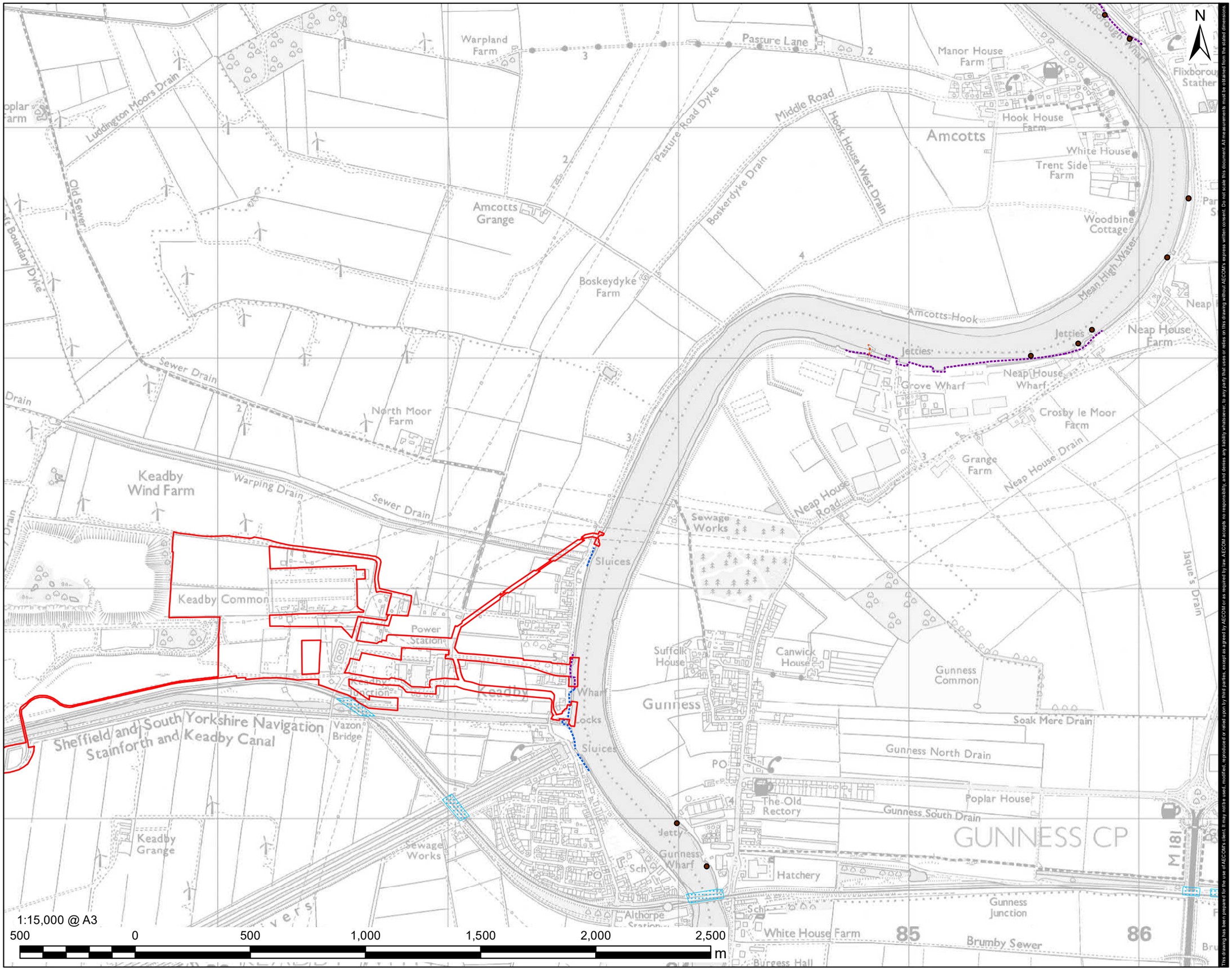
Vessel Density Grid 2017

SHEET NUMBER

Figure 12C.4

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_5_IndustrialData_20220328_R02.mxd



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Pile
- Shoreline Construction, Undefined
- Shoreline Construction, Pier (Jetty)
- Shoreline Construction, Wharf (Quay)
- Shoreline Construction, Bridge

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

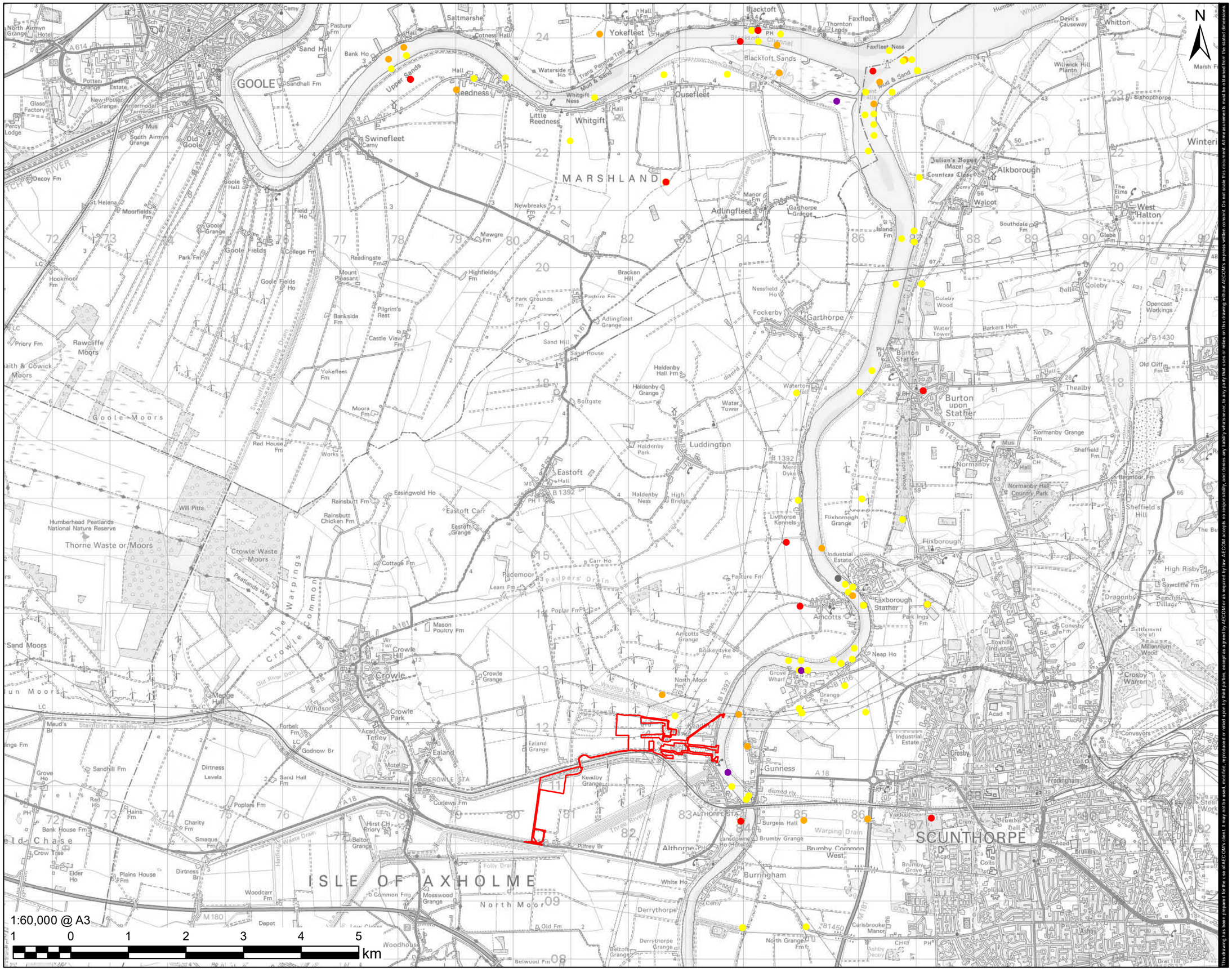
Industrial Features

SHEET NUMBER

Figure 12C.5

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_6_HistoricalMAIB_20220328_R02.mxd



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits

Historical Incident

Occurence Severity

- Less Serious
- Marine Incident
- Serious
- Very Serious
- No Severity Data

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

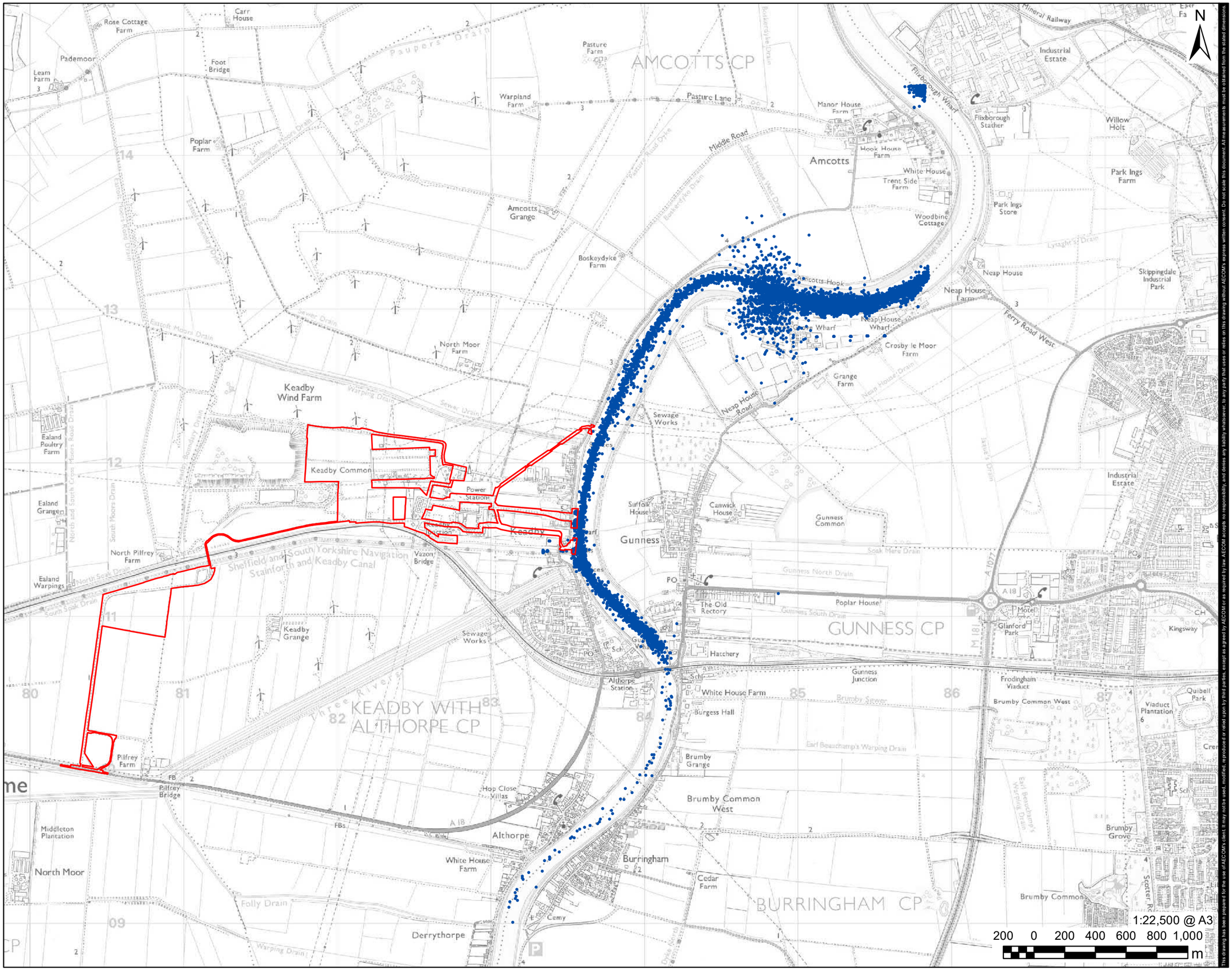
SHEET TITLE

Historical MAIB Data

SHEET NUMBER

Figure 12C.6

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_7_2019_Historical_Vessel_Positions_20220328_R02.mxd Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- 2019 Historic Vessel Position

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

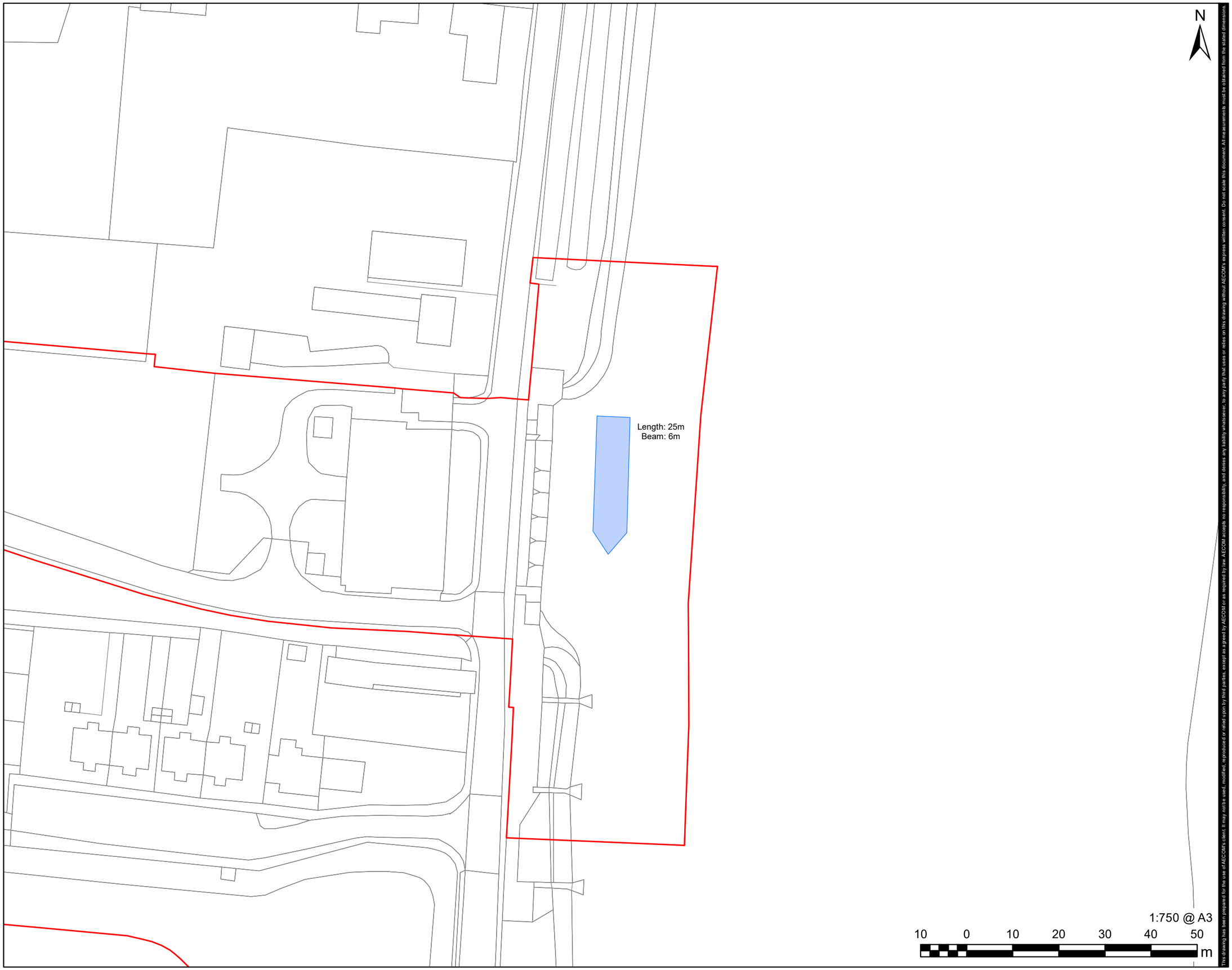
2019 Historical Vessel Positions

SHEET NUMBER

Figure 12C.7

Date: 28/03/2022
Approved: HN
Checked: CA
Drawn: JW
Revision: 02

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_8_IndicWorkboatLocations_20220328_R02.mxd



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Potential Workboat Location

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

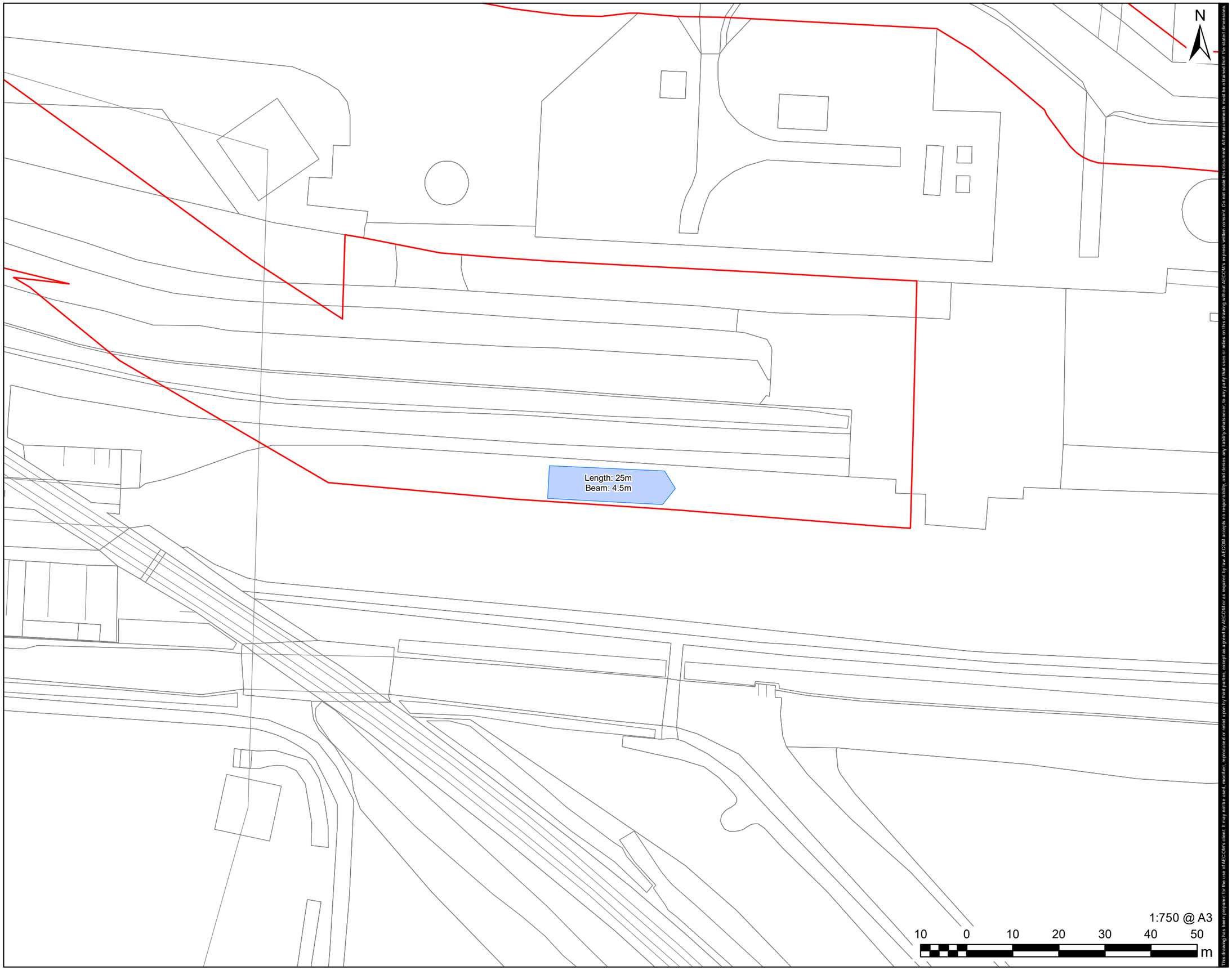
Indicative Workboat Location – River Trent
Sheet 1 of 2

SHEET NUMBER

Figure 12C.8

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_8_IndicWorkboatLocations_20220328_R02.mxd



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Potential Workboat Location

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

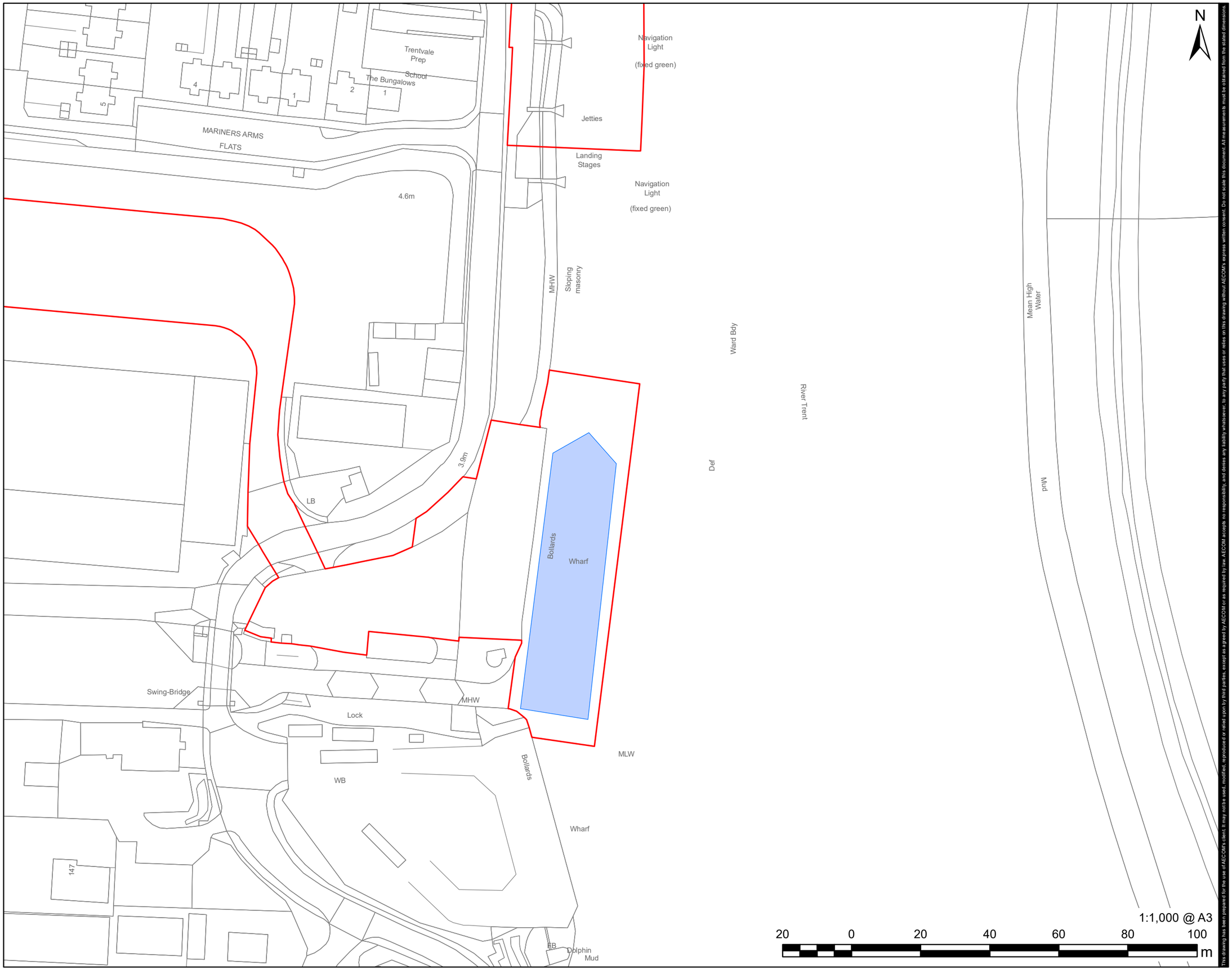
Indicative Workboat Location – Keadby & Stainforth Canal Sheet 2 of 2

SHEET NUMBER

Figure 12C.8

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 29/03/2022

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_9_AILDeliveries_20220328_R021.mxd



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Largest Potential Vessel

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

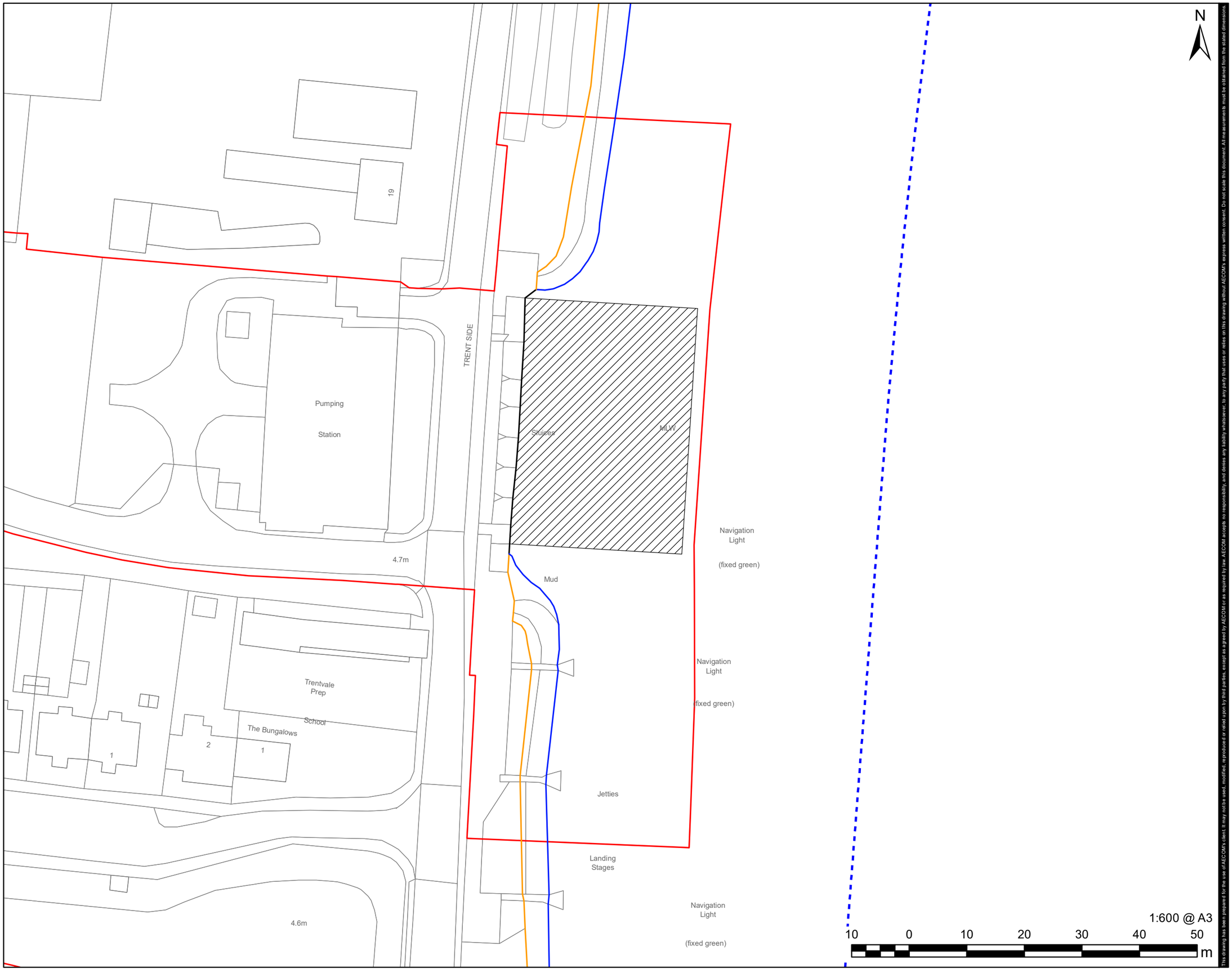
Indicative Vessel Mooring for AIL Management

SHEET NUMBER

Figure 12C.9

Filename: K:\07 CAD & GIS\02_Maps\Navigational Risk Assessment\ES Addendum Version\K_NRA_ES_Add_Fig12C_10_CofferDam_Example_20220328_R02.mxd

Revision: 02 Drawn: JW Checked: CA Approved: HN Date: 28/03/2022



AECOM

PROJECT

The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order

CLIENT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits

Tide Lines

- Mean High Water (Springs)
- Mean Low Water (Springs)
- Mean High Water (Springs) & Mean Low Water (Springs)
- Approximate Navigational Channel (Digitised from 1:25,000 Mapping)
- Cofferdam Model

NOTES

ISSUE PURPOSE

NAVIGATIONAL RISK ASSESSMENT

PROJECT NUMBER

60625943

SHEET TITLE

Cofferdam Model

SHEET NUMBER

Figure 12C.10

Meeting Minutes

Meeting name
SSE Keadby 3 – NRA Workshop Minutes (ABP Humber and Canal and Rivers Trust)

Subject
ABP Humber & CRT - Stakeholder Update Meeting

Meeting Location
MS Teams

Attendees (AECOM/SSE)
(EW), AECOM
SE), AECOM
(IH), SSE

Attendees (ABP Humber)
GC
MB
JM
BB

Attendees (CRT)
SM
KF
PG
LI

Meeting date
25th February 2021

Time
15:30 – 17:00

Distrubiton List
Attendees
KY, CRT

AECOM project number

Additional information
Appendix A - Indicative DCO Red Line Boundary
Appendix B – Meeting Slide Pack
Appendix C - Extract from ABP Humber data response

ABP Humber & CRT – NRA Workshop Minutes (25th February 2021)

Action No.	Action	Owner	Target close-out date
01	AECOM/SSE Project Team to involve Kevin Young (CRT) in subsequent discussions	AECOM – EW/SE	DCO Submission – Q2 2021
02	ABP Humber to provide available vessel numbers / data and also their own local NRAs to help inform assessment of Navigational Risk	ABP Humber – AF	05/03/2021
03	ABP Humber to provide details of previous process for berth use at Railway Wharf for K2 to inform NRA [Provided now; see base of this pack]	ABP Humber - AF	05/03/2021
04	AECOM/SSE Project Team to consider avoidance of key 'sensitive' dates for CRT	AECOM – EW/SE	DCO Submission – Q2 2021
05	AECOM/SSE Project Team to review worst-case sizing assumptions for the River Trent cofferdam given potential concerns on navigation expressed by ABP Humber	AECOM – EW/SE	DCO Submission – Q2 2021

Agenda Item	Minutes	Key Actions
Introductions / Meeting Purpose	Introductions were completed – please see attendance above. EW clarified the meeting purpose.	
Summary of the Keadby 3 Project	An overview of project and site was provided with strategic context in relation to the Zero Carbon Humber (ZCH) and Northern Endurance Partnership (NEP) and the relationship with Proposed Development. Points to be discussed regarding the feedback on the PEI Report were summarised: • CRT – points on navigational safety in relation to the canal and closure of canal for K2 abnormal loads and asked for information on size and loading times, scale of loads etc.;	

Agenda Item	Minutes	Key Actions
	• MCA – impact to navigation and recommended engagement; • Trinity House – flagged ABP Humber (second workshop this afternoon with CRT). (See Appendix B, Slide 11 to Slide 16 for more information)	
Overview of potential works	EW provided an overview of potential works **Water Discharge Corridor** – EW provided overview noting that the indicative order limits mirror the existing concrete reinforced outfall as we don't believe that there is any need to do any major upgrades to this structure (works likely to involve RIB/small workboat-based maintenance with hand tools and finishing). **Canal Water Intake** – EW provided overview of scale of works and showed K2 intake now constructed; works predicted to be comparable to this in terms of scale and demarcation (and minimal ingress into the Canal, which we understand has not been problematic for K2). **River Trent Intake** – although not the preferred option, EW explained that there would be a requirement for upgrades of the intake infrastructure to ensure compliance with Eel Regs. We anticipate that a cofferdam would be required, and works would be more significant than at other locations in the Trent. We have used a worst-case approximation of up to 25m for a cofferdam into the Trent. Discussion Point 1 - AF (ABP) commented that this work is of interest as this is the deepest part of the navigable channel. **Waterborne Transport Offloading Area** – EW explained that no in-river works during construction is proposed given that we anticipate adequacy of the existing improvement works undertaken for Keadby 2 at Railway Wharf. Powers sought will be for temporary retention, improvement of concrete pad (if larger mobile cranes required) and use of the existing facility. Discussion Point 2 - Question raised on whether the land at Railway Wharf will be taken by the Applicant? EW noted that the powers will be sought for the maintenance, strengthening and improvement of the existing jetty, and placement of mobile cranes to enable loads to be delivered, but no compulsory acquisition intended by the Applicant. Discussion Point 3 - AF (ABP) queries who would be designated as the terminal operator at Railway Wharf during the works, noting that responsibility needs to be clearly set out. SM clarified that he would like Kevin Young to be included in any further meetings from this point onward please. EW thanks for noting this, we will record that. #Action 1	1. AECOM/SSE Project Team to involve Kevin Young (CRT) in subsequent discussions

Agenda Item	Minutes	Key Actions
Access and use of Railway Wharf	Discussion Point 4 - SMc (CRT) questioned when works will take place and predicted usage (numbers and types of loads). EW outlined that we are presenting an abnormal indivisible loads (AIL) strategy within our Framework Construction Traffic Management Plan (CTMP) which recognises the policy of 'more by sea' but acknowledges that a variety of AIL routes can be utilised. SE noted that construction could potentially start as early as Quarter 4 2022 and that commercial timescales will tie into emerging ZCH pipeline – determination of the DCO for which is anticipated in 2023/ 2024 after which, construction of the ZCH pipeline could commence. SM queried numbers of loads. EW explained that it is difficult to predict an exact number at this early concept stage of design but that this is under review to provide a reasonable worst-case estimate assumption. EW explained that the K2 shipment schedule and heavy lift process had been reviewed; the vessel dimensions are predicted to be similar.	
Approach to NRA	Marine Baseline Data – EW provided overview of data procured. Higher density of vessels exist within Port of Hull/ABP Humber Area. Tankering and passenger traffic/ ro-ro in this area but this virtually all drops-off at the mouth of the Trent. EW summarised the baseline data reviewed. Includes anonymised tracks from 2015 and 2017 and data from Marine Public Register / other commercial data procured and used to assess risks from infrastructure/to mariners. Looked at Marine Accident Database; carried out key word searches and area searches and requested metadata behind this from DfT; this will be considered if we get the metadata in time but we may not receive it before finalising the NRA. Data also reviewed from Keadby 1 and Keadby 2 as it's a very similar operation and therefore lessons learned important to bring forward into project. No formal NRA for K2. No marine licence application was made for K2. Have engaged with HLE contractor and spoken to K2. Shipment plan updated weekly on SSE website so that mariners/stat bodies could keep track of predicted shipment schedule. Worth noting that this can change due to weather and the complexities of a major construction programme. Night-time unloading. Has been considered, and we welcome CRT feedback, but this is unlikely due to the majority of HLE contractors having a general rule against night time lifts. ABP bylaws and general H&S policies – don't think that this will be encouraged. Likely that engagement and advance warning possibly with a helpline/hotline would be the preferred option. Approach to NRA consultation – EW provided an overview of ongoing/planned engagement.	2. ABP Humber to provide available vessel numbers / data and also their own local NRAs to help inform assessment of Navigational Risk 3. ABP Humber to provide details of previous process for berth use for K2 to inform NRA 4. AECOM/SSE Project Team to consider avoidance of key 'sensitive' dates for CRT

Agenda Item	Minutes	Key Actions

ABP:

AF commented that ABP has numbers rather than AIS or tracks and also their own NRA for this part of the river that can be provided. Action #2.

Local VTS – same as the one in Humber.

AF commented that there will be a number of pre-requisites to satisfy them as harbour authority that AIL deliveries at Railway Wharf are feasible that should be reflected in the NRA or picked up as part of further discussions with ABP:

- Review of the berth pocket to determine potential for vessels grounding and whether some bed levelling required (as was the case at K2)
- Need for a pre-first delivery vessel inspection (dummy run minus cargo)
- Provision of a mooring plan for each vessel
- Communication with mooring company to be used
- Assessment of lighting issues (at K2, there were initial issues and then new lighting towers were erected).
- Purchased new shore moorings – may need to take cautious approach and treat as new berth.

MB confirmed this is a NABSA [not always afloat but safely aground] berth so the issue considered for K2 was the angle of the riverbed toward the quay wall – i.e. didn't want the barge to ground at an angle of list. EW asked if ABP Humber were able to WID down to required levels / was this covered under their own powers etc. within the Harbour Area? AF recalls the plough dredge was used to operate under the MMO's exemption rule of up to 1500m3 without needing marine consent from MMO for K2. EW confirmed it would be helpful to have further information on this if ABP has detail. Action #3

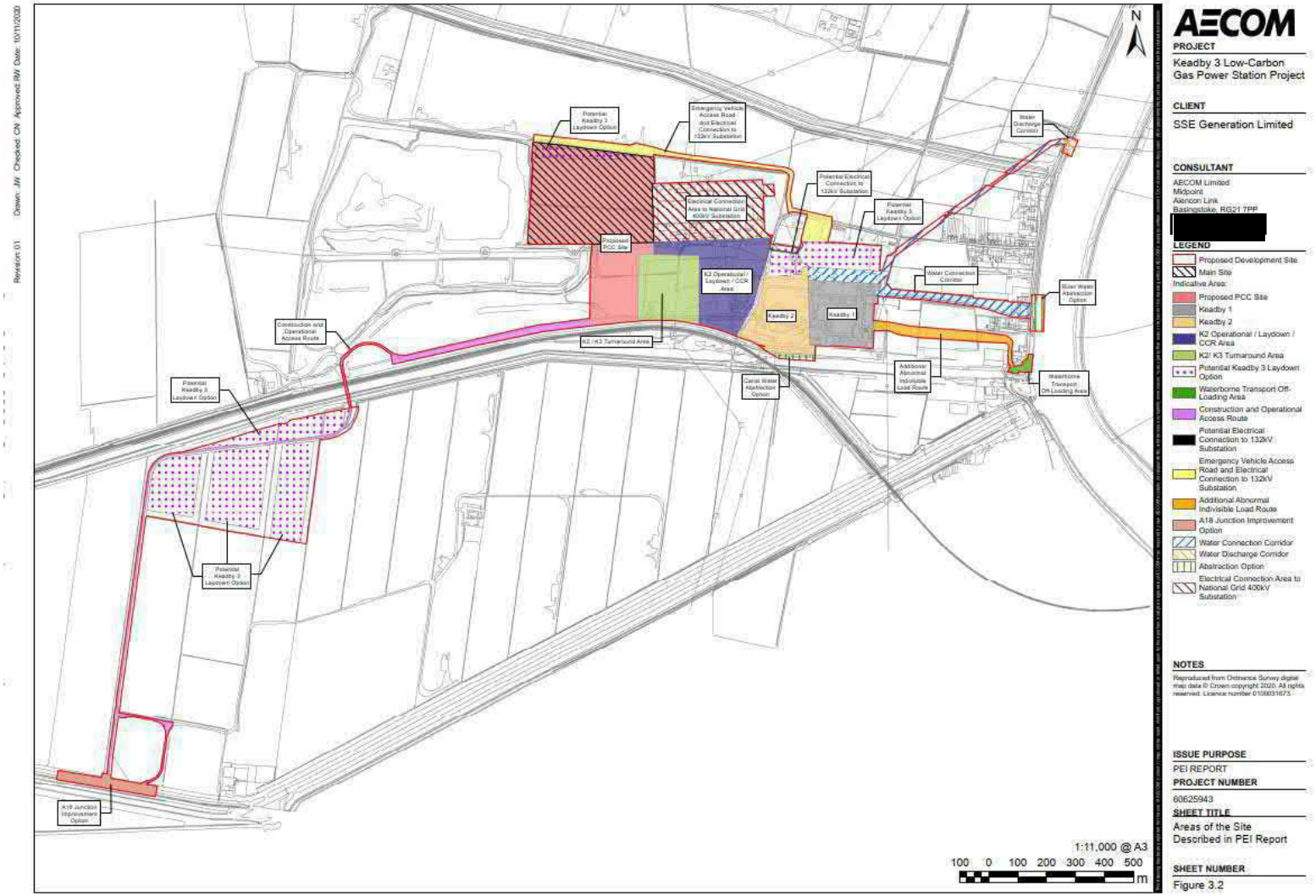
AF confirmed that their preference would be to retain as much existing knowledge from K2 as possible for the loads that have to come to Railway Wharf. AF noted that once over the initial challenges, the operations ran reasonably smoothly from their perspective. EW thanked AF for this and emphasised that we are engaging with stakeholders as early as possible to ensure feedback considered for K3. AF noted that the communication between websites for when vessels are due was paramount. (see feedback from CRT).

AF noted that the starting point for any consent will be a bathymetric survey and that sufficient time must be given in the programme to undertake any necessary dredging work.

AF queried where the vessels will be coming from? EW commented that it is too early yet to be definitive but likely that some will be coming via the Port of Immingham based on K2. AF commenting that if trans-shipment is proposed via Immingham, this gives them additional management responsibilities/work.

Agenda Item	Minutes	Key Actions
	CRT SMc asked what consideration has been given to other wharves and whether it has to be Railway Wharf that is used given the problems experienced on K2. SMc noted that the low vessel numbers because of Covid 'eased' the problems but expressed concerns that this will not be the case (in all likelihood) for K3. EW explained that in line with policy direction and the low carbon argument for use of a 'more by sea' policy, sea freight / river delivery of AILs is included in the EIA. We also note CRTs feedback encouraging this during Stage II consultation. SMc requested that if Keadby Wharf is to be used whether arrivals can be planned to avoid key dates e.g. bank holidays CRT and noted that they would prefer a 'live tracker'. . Action #4 SMc queried how long the programme would go on for? EW noted that deliveries were circa over 6 months and that a similar or slightly longer period may be anticipated, but as we are at an early stage of design, this has not yet been firmed up.	
Forward Look, Next Steps and Timescales	EW explained next steps and programme to submit application Q2 2021 with pre-examination and examination thereafter. Statements of Common Ground – EW asked if ABP as Harbour Authority would be happy to prepare a joint SoCG noting that MCA and Trinity House are likely to be happy to defer to ABP. AF noted that this would be new ground for them as he wasn't aware of having developed these before but willing to do so.	
Open Discussion, Questions and Any Other Business	SE noted that SoCG can provide a mechanism for discussion of detailed wording of requirement and parties to be engaged with and give further assurances. SMc -noted that there are no navigation lights at the Lock. Needs to be taken into account. CRT – Wanted to provide good feedback on work undertaken on intake by K2 contractors recently.	

Appendix A – Indicative DCO Red Line Boundary (Note – from 2020/21 PEIR)



Appendix B – Meeting Slide Pack

KEADBY 3 LOW CARBON
GAS POWER STATION

Navigational Risk Workshop 2

ABP Humber | Canal and Rivers Trust

25 February 2021

sse Thermal | For a better world of energy

KEADBY 3 LOW CARBON GAS POWER STATION

Stage Two Consultation – Technical Engagement

Overview of today's presentation

1. Introductions and objectives of meeting
2. Strategic context and overview of what is proposed at Keadby
3. Overview of potential works
   - R. Trent
   - Keadby & Stainforth Canal
4. Access and use of Railway Wharf
5. Approach to Navigational Risk Assessment
6. Next Steps and Timescales
7. Open Discussion, Questions and AOB

sse Thermal

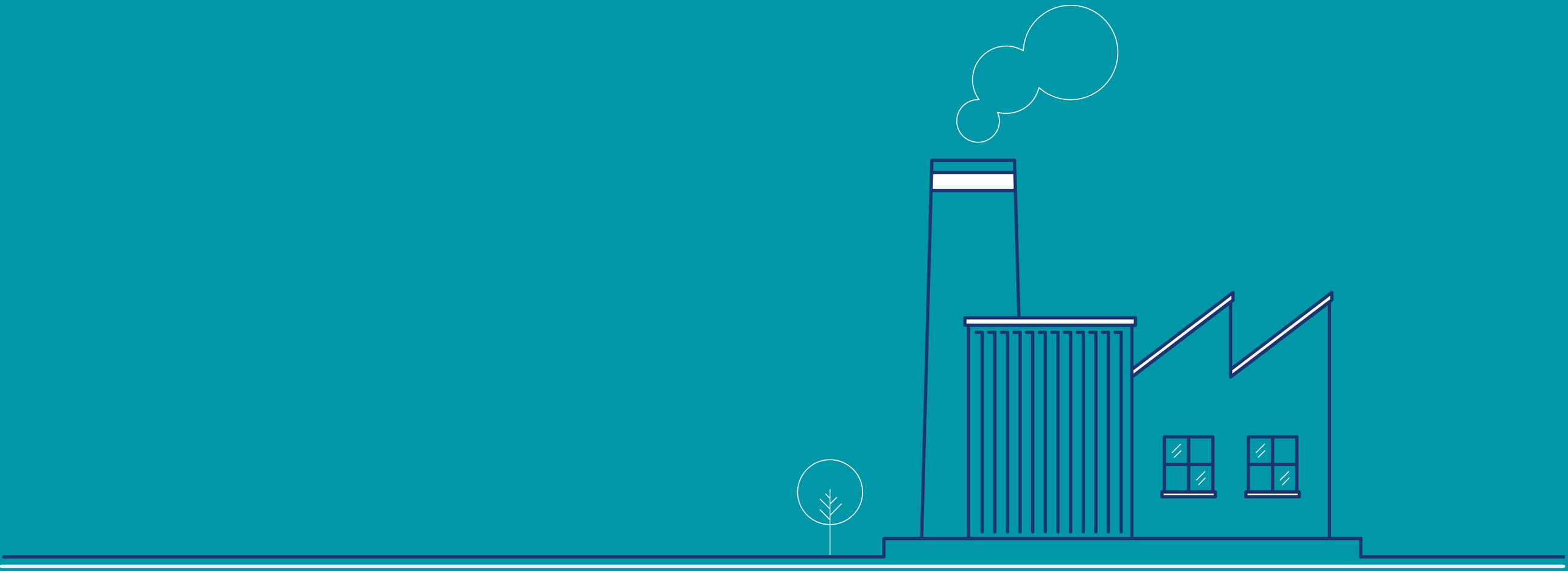
Introductions & Objectives of Meeting

Other attendees -

Meeting Objective:

- *Present our approach to Navigational Risk Assessment, obtain feedback on data sources and review opportunities for gathering additional information, data and historical experience from consultees*

SUMMARY OF THE KEADBY 3 PROJECT
- STRATEGIC CONTEXT -

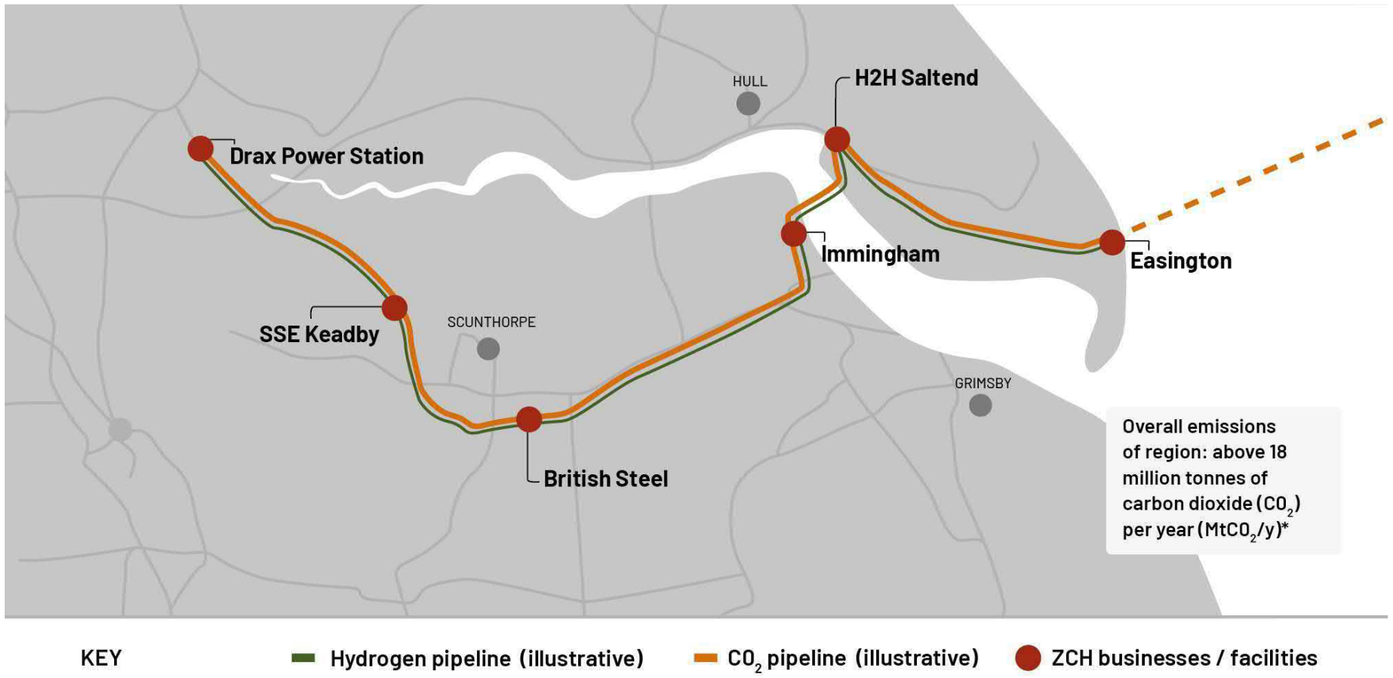


sse Thermal

STRATEGIC CONTEXT – ZERO CARBON HUMBER PARTNERSHIP

The UK has legislated to cut national carbon dioxide emissions to **Net Zero** by **2050**

SSE Thermal is partnering with leading organisations across the Humber Region to accelerate the development of carbon capture and underground storage (CCUS) - this includes Keadby 3, which is intended to link in to the Zero Carbon Humber (ZCH) Partnership and Northern Endurance Partnership (NEP) for offshore geological storage of CO_2, representing an important contribution to towards **Net Zero**



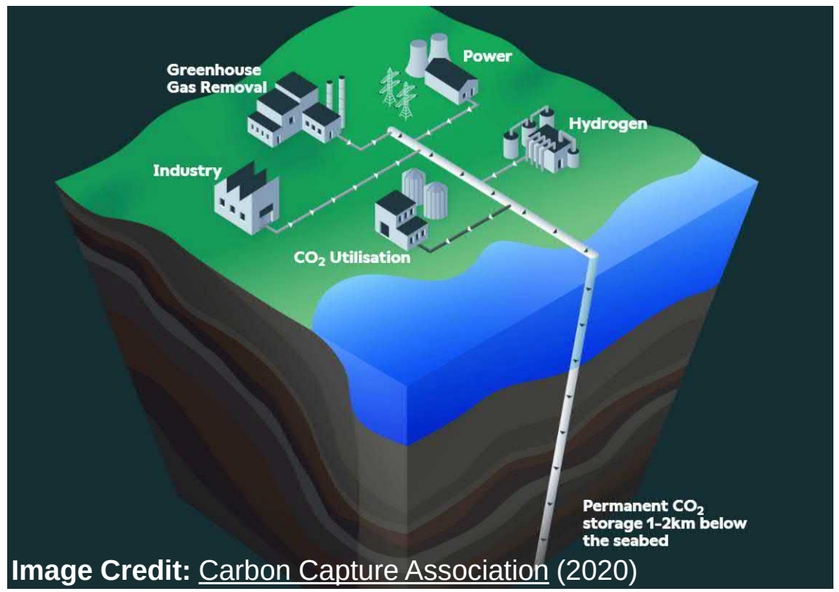
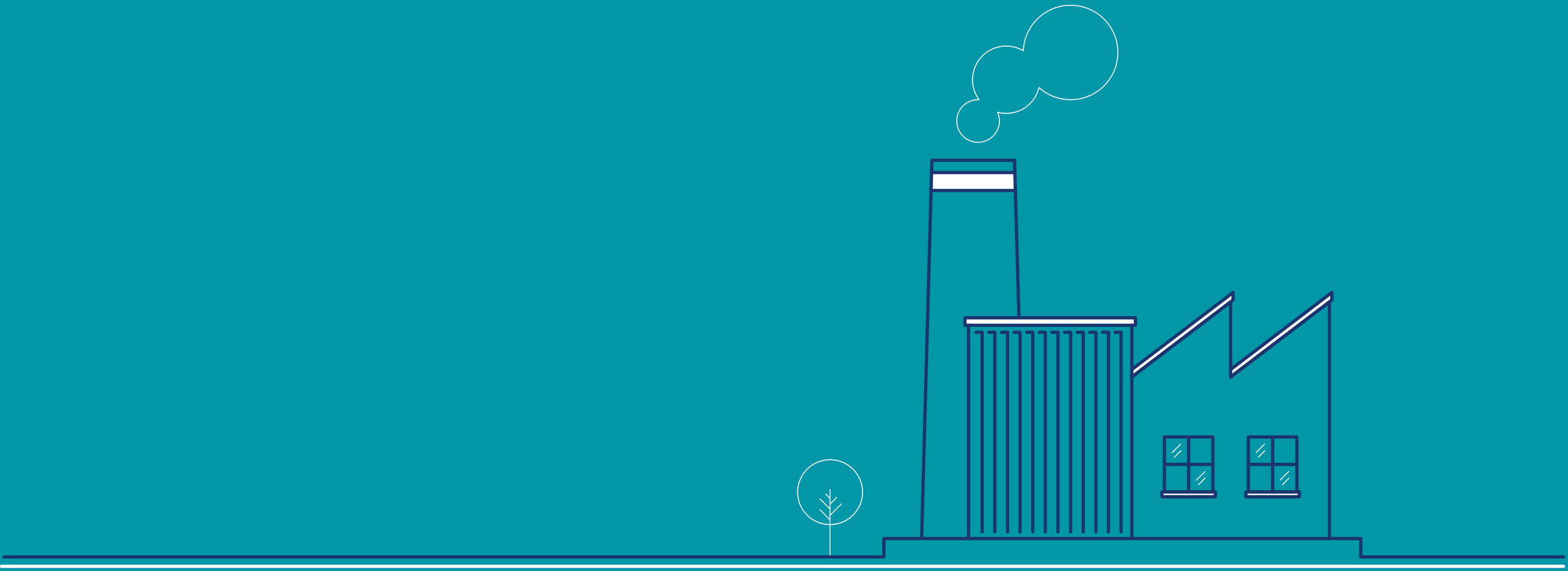


Image Credit: Carbon Capture Association (2020)


Net Zero Teesside
&
ZEROCARBON HUMBER
Northern Endurance Partnership
TEESSIDE
HUMBER
NORTH SEA
POTENTIAL FUTURE EXPANSION
POTENTIAL FUTURE EXPANSION
ENDURANCE
145km
85km
TEESSIDE
MIDDLESBROUGH
SCARBOROUGH
HUMBER
HULL
GRIMSBY
YORK
SCUNTHORPE

SUMMARY OF THE KEADBY 3 PROJECT
- TECHNICAL OVERVIEW -



sse Thermal

OVERVIEW OF WHAT IS PROPOSED

KEADBY 3 LOW CARBON GAS POWER STATION PROJECT

The Keadby 3 Low Carbon Gas Power Station Project is a high efficiency low carbon combined cycle gas turbine (CCGT) power station with a capacity of up to 910MW electrical output, including a post combustion carbon capture plant (CCP)

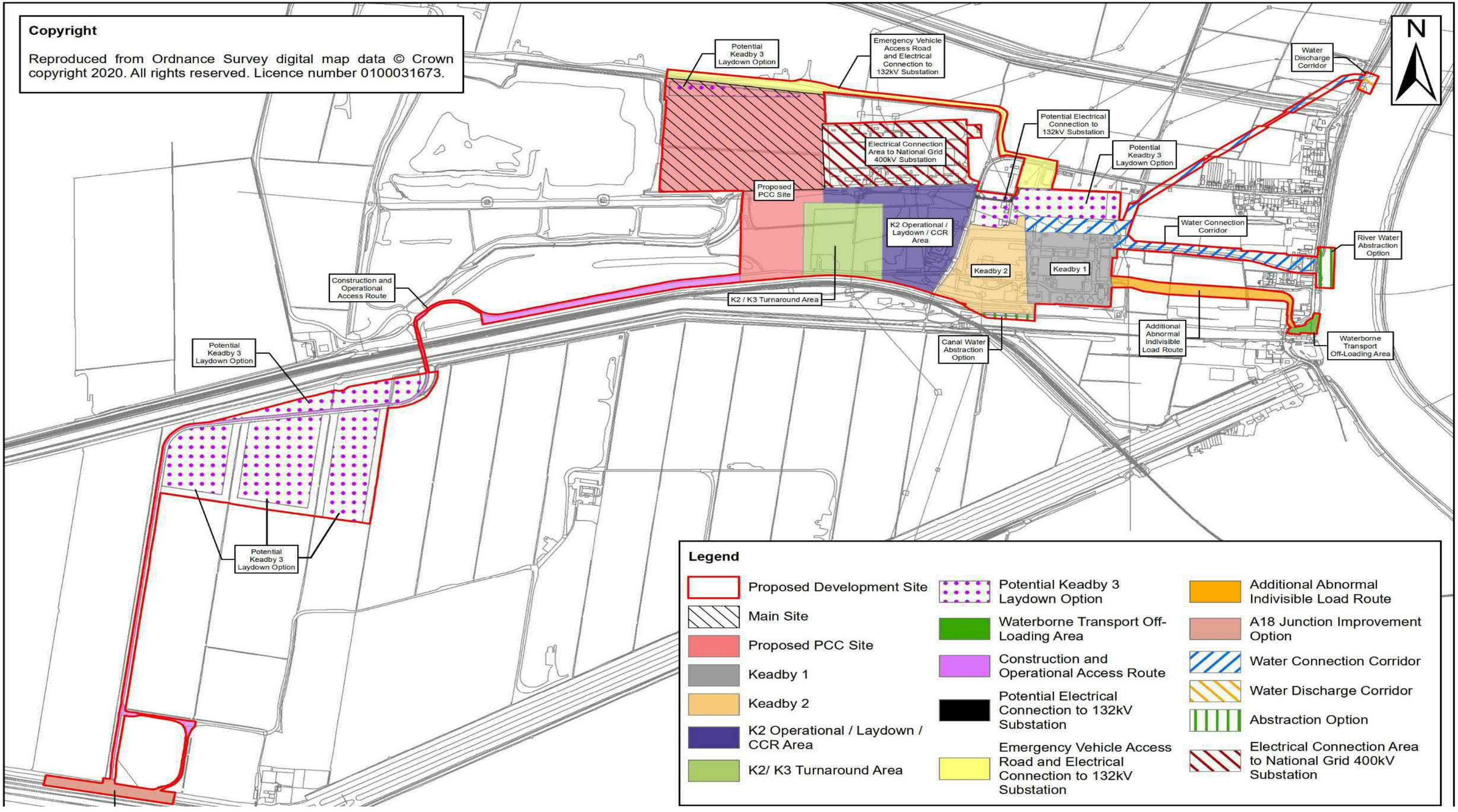
Keadby 3 would

- be fuelled by natural gas
- be able to export low carbon electricity to the National Grid
- be sited to make use of existing connections for natural gas, cooling water and electricity on land adjacent to Keadby 1 and 2
- include other associated development required to construct, operate and maintain the Proposed Development

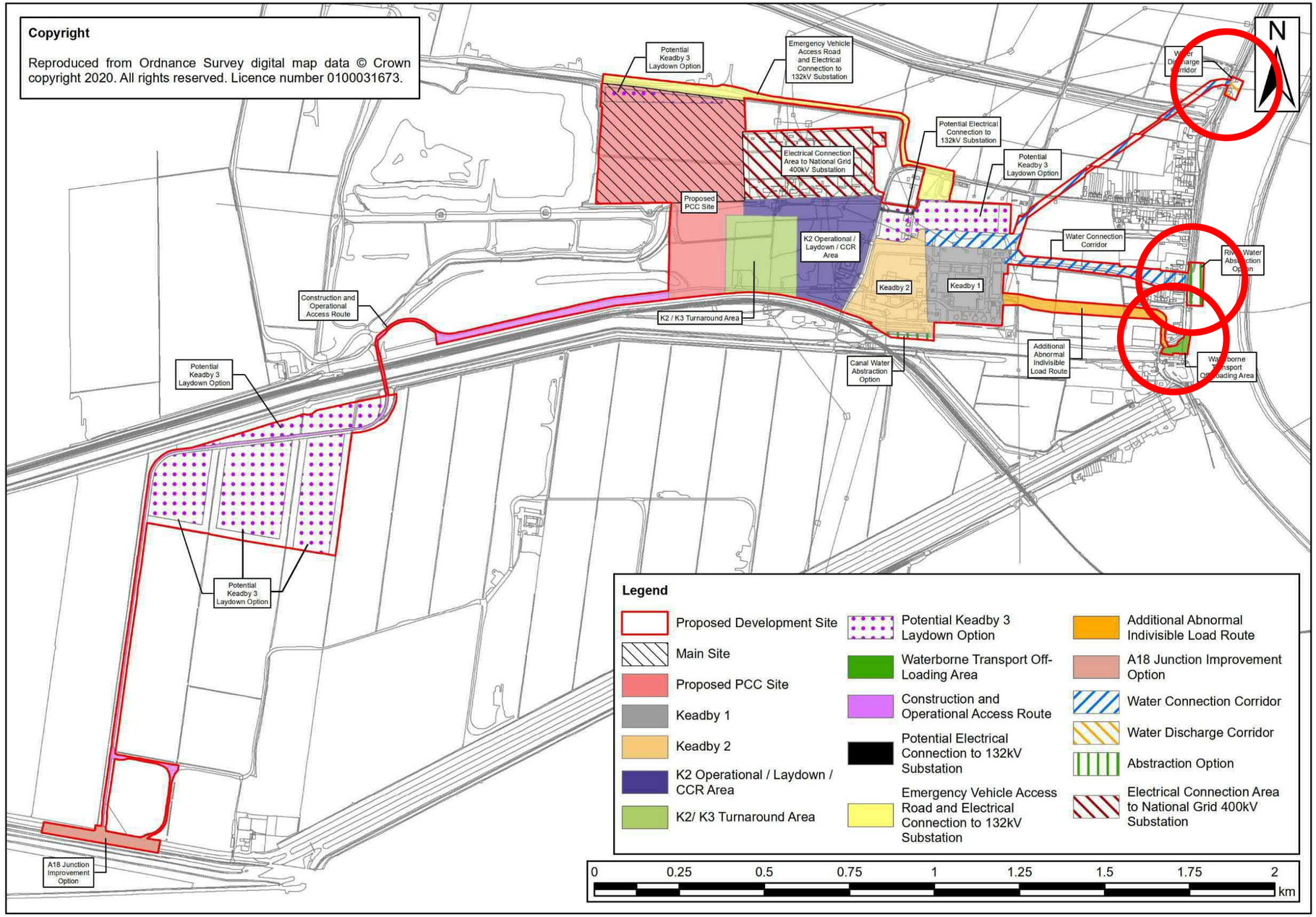
The Applicant responsible for constructing, operating, maintaining and decommissioning CCP

ZCH responsible for construction, operation and decommissioning of the CO_2 gathering network from onshore industrial facilities including the Proposed Development and is preparing a separate DCO for the export pipeline.

sse Thermal



OVERVIEW


Copyright
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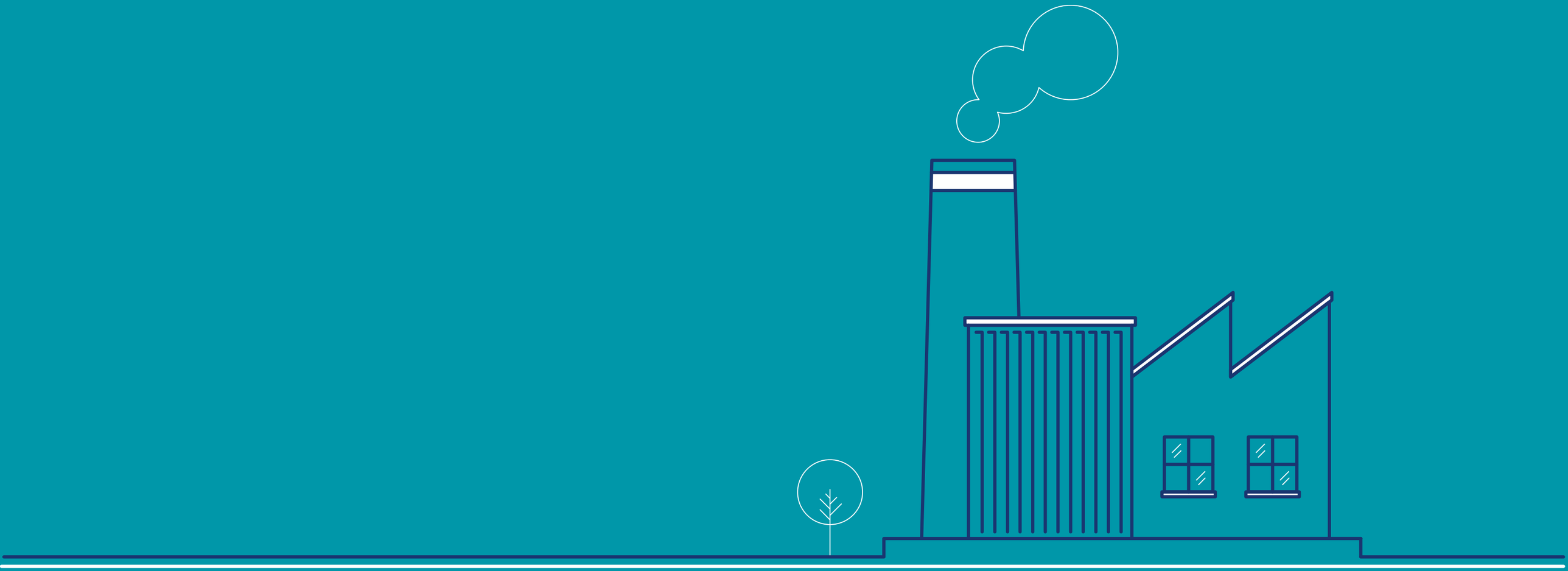
N
Potential Keadby 3 Laydown Option
Emergency Vehicle Access Road and Electrical Connection to 132kV Substation
Potential Electrical Connection to 132kV Substation
Electrical Connection Area to National Grid 400kV Substation
Potential Keadby 3 Laydown Option
Proposed PCC Site
K2 Operational / Laydown / CCR Area
Water Connection Corridor
Keadby 2
Keadby 1
Construction and Operational Access Route
K2 / K3 Turnaround Area
Additional Abnormal Indivisible Load Route
Canal Water Abstraction Option
Potential Keadby 3 Laydown Option
Potential Keadby 3 Laydown Option
A18 Junction Improvement Option
Legend
Proposed Development Site
Main Site
Proposed PCC Site
Keadby 1
Keadby 2
K2 Operational / Laydown / CCR Area
K2/ K3 Turnaround Area
Potential Keadby 3 Laydown Option
Waterborne Transport Off-Loading Area
Construction and Operational Access Route
Potential Electrical Connection to 132kV Substation
Emergency Vehicle Access Road and Electrical Connection to 132kV Substation
Additional Abnormal Indivisible Load Route
A18 Junction Improvement Option
Water Connection Corridor
Water Discharge Corridor
Abstraction Option
Electrical Connection Area to National Grid 400kV Substation
0 0.25 0.5 0.75 1 1.25 1.5 1.75 2 km

STAGE II CONSULTATION



STAGE II CONSULTATION

Comments	Canal	Trent
Canal & Rivers Trust *The Trust's input would be crucial to ensure that the impact on navigational safety can be fully assessed. We advise that full details of the design of any abstraction equipment and the method of construction (including details of any cofferdams) would need to be submitted to and approved by the Trust prior to the commencement of the works on this part of the development.*	**X**	

STAGE II CONSULTATION

Comments	Canal	Trent
Canal & Rivers Trust *We request further information from the applicant to ensure that this part of the proposal does not result in a hazard for navigational safety at the entrance to the canal at Keadby or the need for unscheduled closure of the canal. As we understand that materials will be transported long distance, it may be difficult to organise set closure times for the canal, and we believe that measures to allow for night time off-loading could be considered to give the applicant more flexibility to allow for offloading during night hours when the canal is not in heavy use.*	**X**	**X**

STAGE II CONSULTATION

Comments	Canal	Trent
Canal & Rivers Trust *We request that details should be provided by the applicant as to the anticipated size and loading times of vessels in this location to ensure that this part of the proposal does not result in a hazard for navigational safety at the entrance to the canal at Keadby, or result in unplanned closures of the waterway. Should this not be possible, then we would advise that improvements are made to the lighting the proposed loading point so that crane works can be carried out during the night, which will have a reduced impact on boat movements in and out of Keadby Lock.*	**X**	

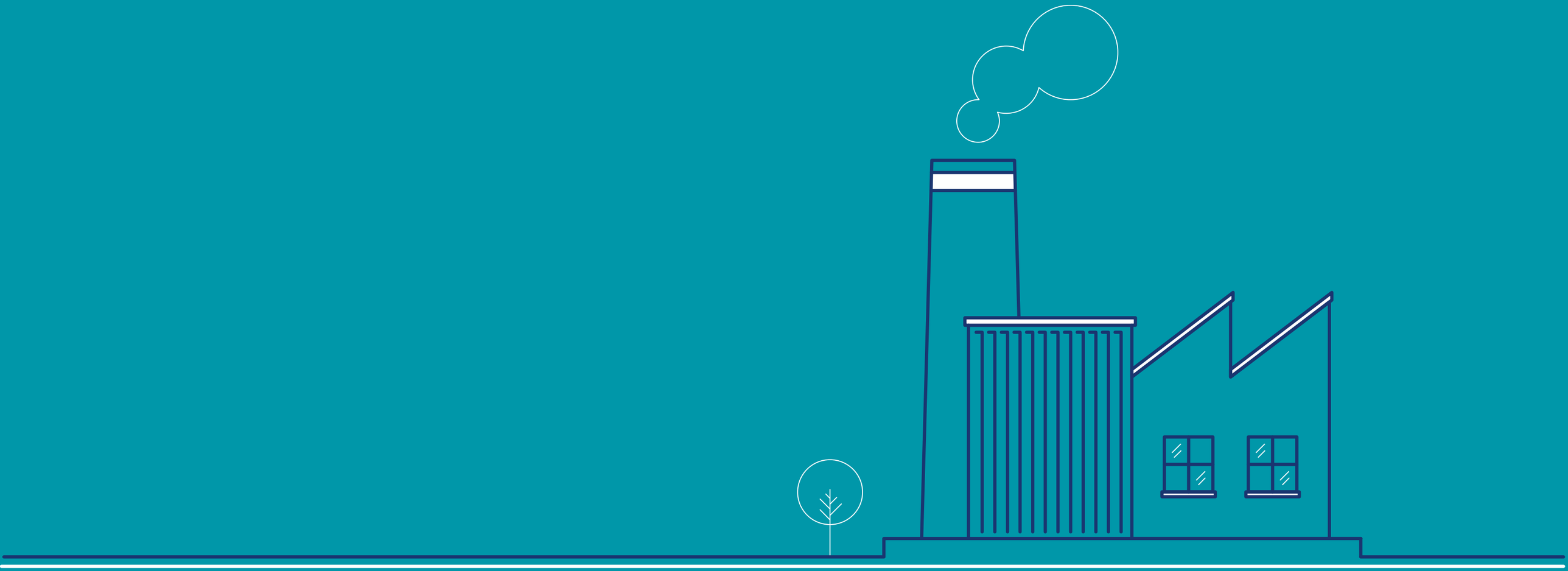
STAGE II CONSULTATION

Comments	Canal	Trent
Maritime and Coastguard Agency *For those works within the marine environment, we would expect to see a full consideration of their potential impact on the safe navigation of vessels transiting the area, and the safety of other marine users. The MCA would like to see further information and detail provided to determine the significance of these predictions. Where possible, the developer should also seek to consult other local marine stakeholders, including both commercial shipping and recreational vessel groups.*	**?**	**X**

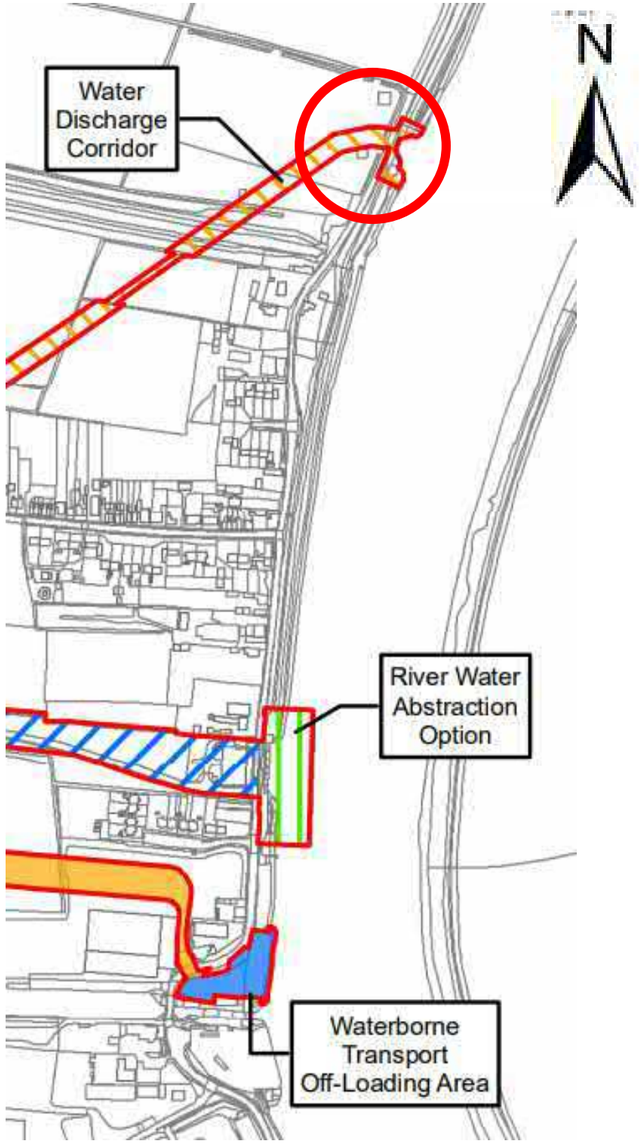
STAGE II CONSULTATION

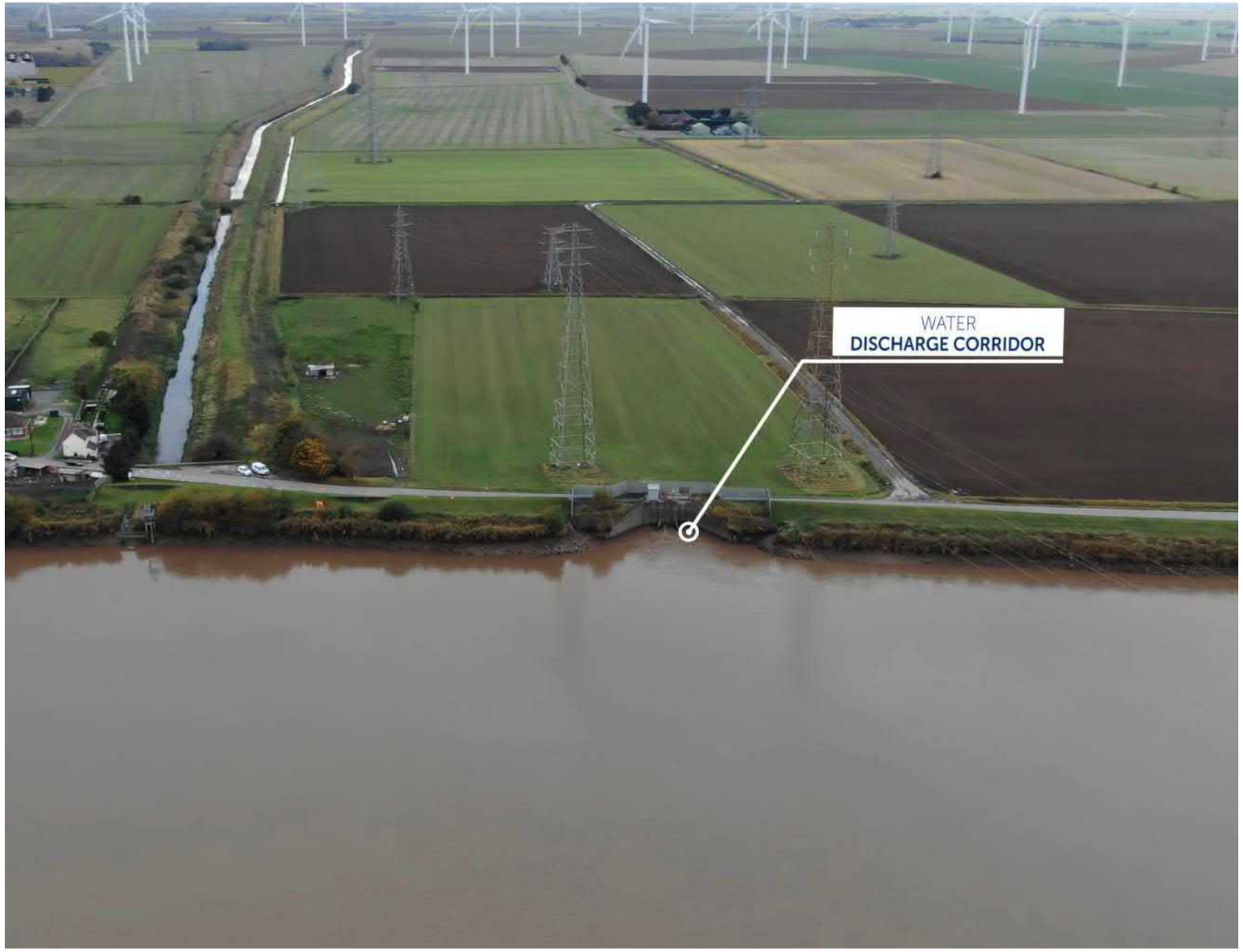
Comments	Canal	Trent
Trinity House *Trinity House is primarily concerned with the works that are to take place below the high water mark. Therefore, as these works lie within the jurisdiction of ABP Humber, we advise that all marine safety risk mitigation measures should be agreed with ABP Humber in the first instance.*		**X**

OVERVIEW OF POTENTIAL WORKS



WATER DISCHARGE CORRIDOR





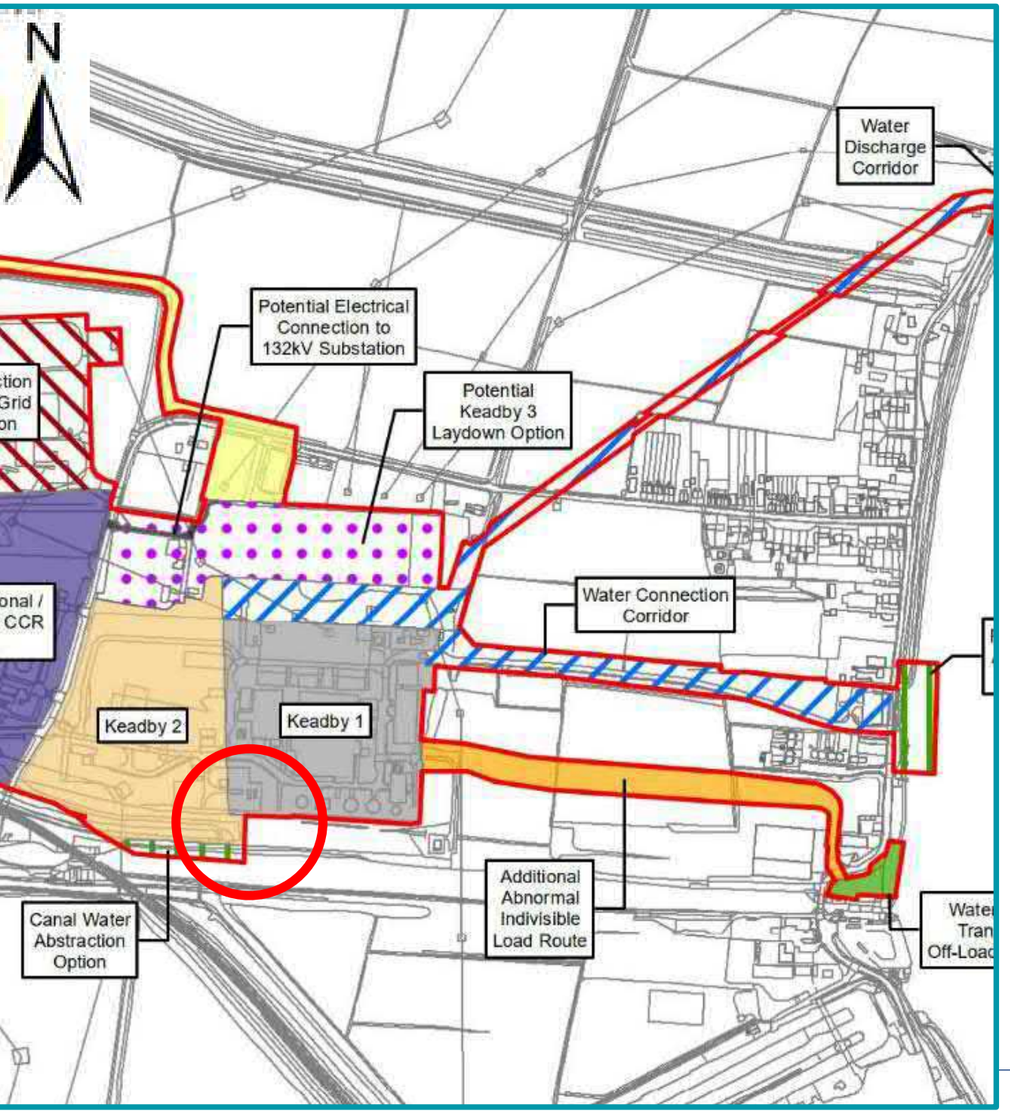
sse Thermal

WATER DISCHARGE CORRIDOR

Construction

- Important to note this is an **existing outfall/** discharge corridor
  - used by Keadby 1
  - proposed to be used by Keadby 2
- Discharge corridor and outfall proposed with limited upgrade works, only if necessary
- No in-river working/ cofferdams proposed

CANAL WATER ABSTRACTION OPTION



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CANAL WATER ABSTRACTION OPTION

Construction

- Comparable to K2 intake construction (see images left and below)
- Preliminary extent of cofferdam in the Canal estimated at ~15m

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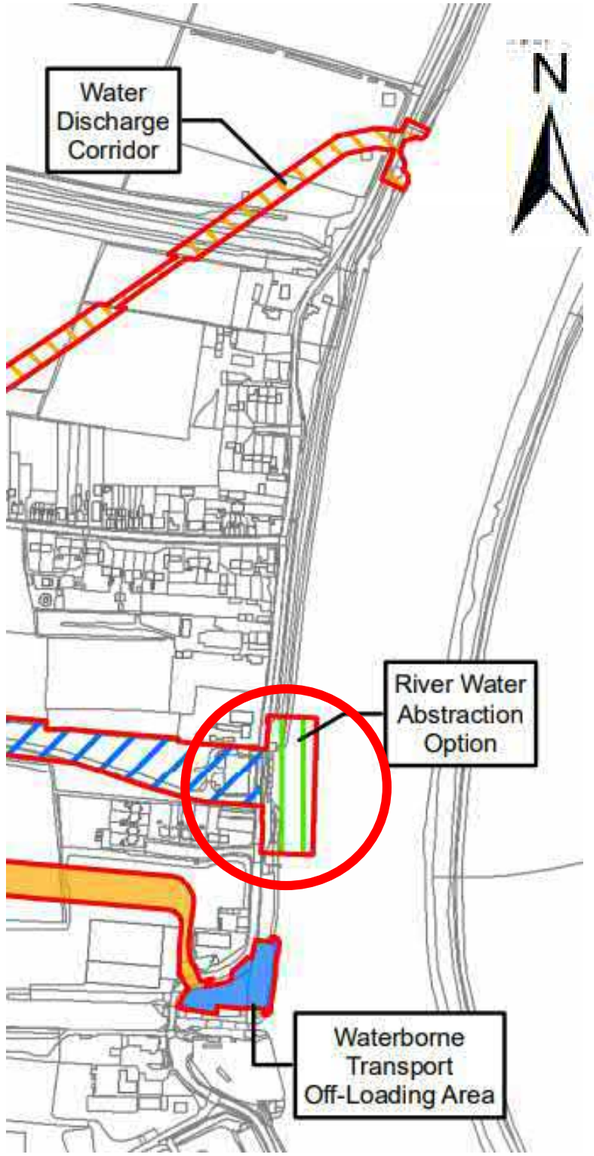
RIVER WATER ABSTRACTION OPTION



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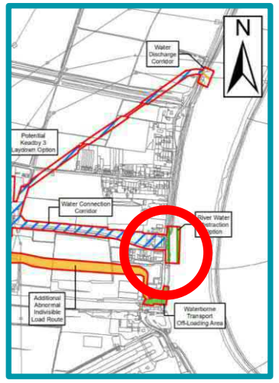
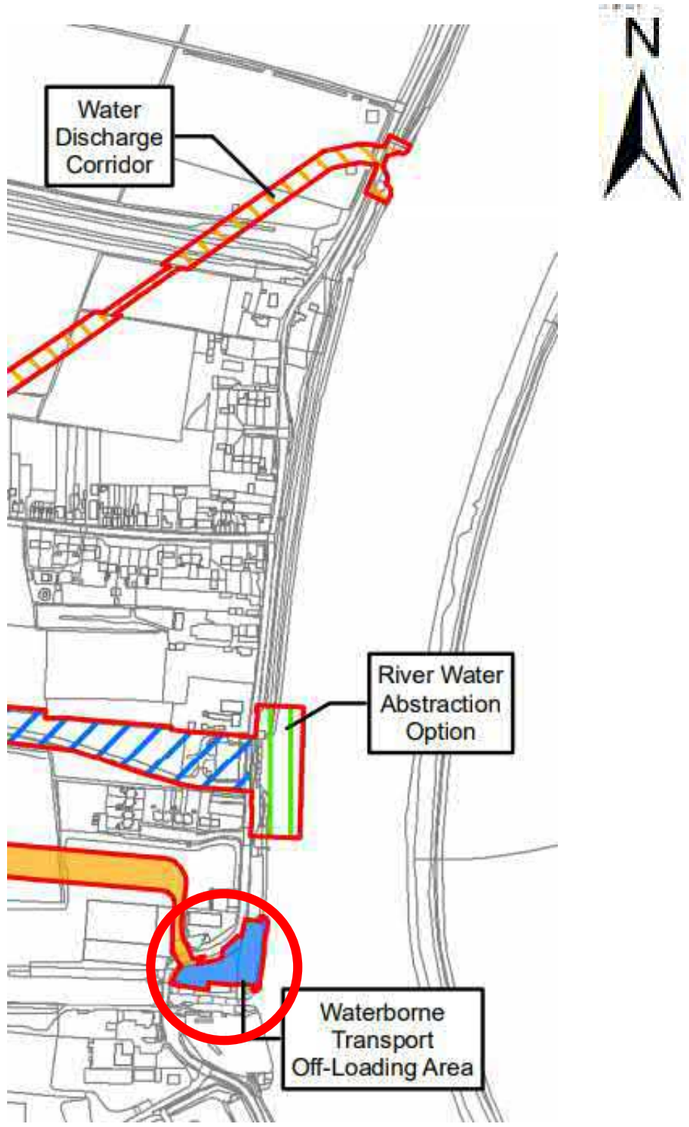
RIVER WATER ABSTRACTION OPTION (NOTE THAT THIS IS NOT OUR PREFERRED OPTION)



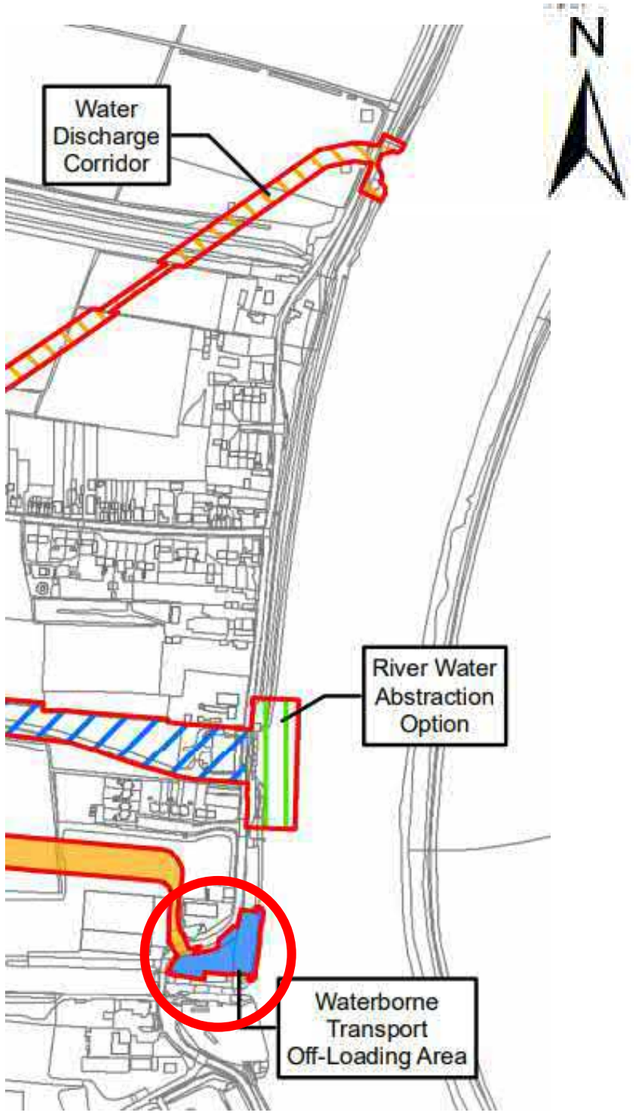
- If we cannot abstract from the canal, we will utilise the existing (consented) abstractions from the River Trent for Keadby 1
- Existing pipework/ infrastructure in river likely to be upgraded/ replaced given age/ condition and to enable compliance with Eels (England and Wales) Regulations 2009
- Preliminary extent of cofferdam in the River Trent estimated at ~25m (very minor ingress into the river)

WATERBORNE TRANSPORT OFF-LOADING AREA



sse Thermal

WATERBORNE TRANSPORT OFF-LOADING AREA



Existing Waterborne Transport Offloading Area

- Use will be consistent with use for Keadby 2 construction enabling abnormal loads to use waterborne transport – no MMO MLA activity thus far)
- No “in-river” works proposed during construction stage
- Powers sought will be for temporary retention, improvement of concrete pad (if larger mobile cranes required) and use of the existing Railway Wharf facilities (‘Waterborne Transport Offloading Area’
- Indicative order limits have been extended since PEI Report to account for feedback raised by CRT (i.e. an additional ~5m oversail to allow for swinging a larger crane over delivery vessel)
- Load bearing capacity of wharf and crane pads recently upgraded to facilitate delivery of abnormal loads for Keadby 2 construction – not proposing anything similar for Keadby 3 as these engineering works are adequate

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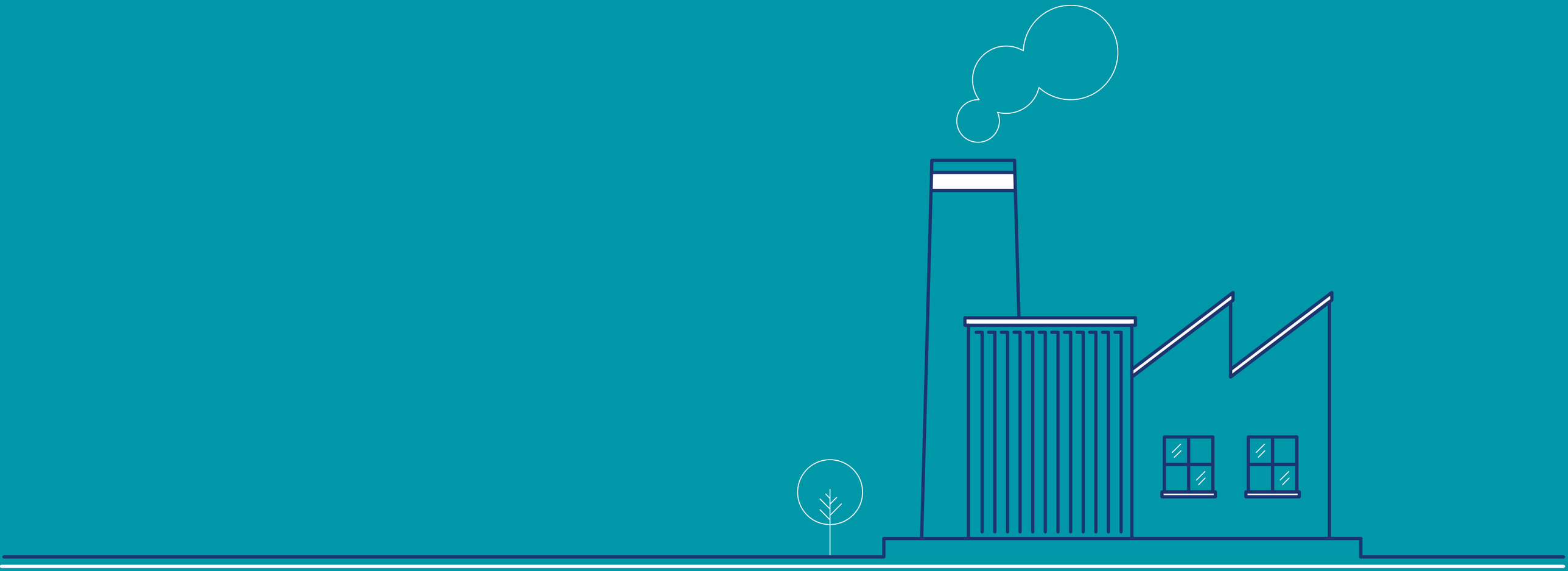
ACCESS AND USE OF RAILWAY WHARF



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WATERBORNE TRANSPORT OFF-LOADING AREA

SSE Thermal

WATERBORNE TRANSPORT OFF-LOADING AREA

Predicted Usage

- The Framework Construction Traffic Management Plan will include an Abnormal Indivisible Loads (AIL) strategy that recognises strategic policy (and as encouraged by CRT S42 responses), ‘more by sea’ to be pursued
- Small components and modules will be transported using the existing road network but some of the more significant modules would be transported by ship along the River Trent to an Railway Wharf

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WATERBORNE TRANSPORT OFF-LOADING AREA

Predicted Usage

- AIL strategy will acknowledge that where the Wharf or access route to site from the quayside is unsuitable for some of the larger modularised units, other AIL routes would be implemented (e.g. unit landed at Goole and transported to site using existing road network)
- Usage during construction of K2 under review
- Keadby 3 shipment estimated based on K2 with the addition of Carbon Capture Plant (CCP)
- Vessel type consistent with K2 construction / local transhipment activities (i.e. at Keadby and adjacent facilities at Grove Point)

WATERBORNE TRANSPORT OFF-LOADING AREA

Predicted Usage

- Vessel dimensions likely to be comparable to Keadby 2
- Review of historical transhipment programme/specifications suggest largest vessels likely to be:
  - 66m length / 10m beam
  - 80m length / 12m beam
  - 82m length / 11m beam
  - 82 length / 11.5m beam

MAMMOET Hansa Meyer Global

Keadby 2 CCGT Project

Railway Wharf Shipment Schedule

Last Updated: 18/09/2020

Shipment Number	Vessel Name	Heavy Lifts	Other Packages	Scheduled ETA	Scheduled ETD
1	[illegible]	[illegible]	[illegible]	06/02/2020 - 04:45	07/02/2020 - 18:30
2	MV AMY (V1)	Pre Fab Modules		13/02/2020 - 10:45	13/02/2020 - 22:45
3	MV AMY (V2)	Pre Fab Modules		19/02/2020 - 04:25	19/02/2020 - 16:30
4	MV AMY (V3)	Pre Fab Modules		24/02/2020 - 08:30	24/02/2020 - 20:30
5	MV AMY (V4)	Condenser		26/02/2020 - 08:30	26/02/2020 - 21:30
6	MV AMY (V5)	Pre Fab Modules		28/02/2020 - 10:30	28/02/2020 - 22:30
7	H&S Bravery	Steam Turbine Set		19/03/2020	19/03/2020
8	MV AMY	Pre Fab Modules		20/03/2020	20/03/2020
9	HRSG 1 - TBC	2 x HRSG		26/03/2020	26/03/2020
10	HRSG 2 - TBC	2 x HRSG		27/03/2020	27/03/2020
11	HRSG 3 - TBC	2 x HRSG		28/03/2020	28/03/2020
12	HRSG 4 - TBC	2 x HRSG		30/03/2020	30/03/2020
13	HRSG 5 - TBC	2 x HRSG		01/04/2020	01/04/2020
14	HRSG 6 - TBC	2 x HRSG		02/04/2020	02/04/2020
15	HRSG 7 - TBC	2 x HRSG & 2 x ABC		04/04/2020	04/04/2020
16	HRSG 8 - TBC	2 x HRSG & 1 ABC		06/04/2020	06/04/2020
17	HRSG 9 - TBC	2 x HRSG		08/04/2020	08/04/2020
18	HRSG 10 - TBC	2 x HRSG		09/04/2020	09/04/2020
19	H&S Bravery	STGEN		27/05/2020	28/05/2020
20	RMS Cuxhaven (nom)	Pre Fab Modules		10/06/2020	10/06/2020
21	H&S Wisdom (nom)	2 x HRSG		11/06/2020	11/06/2020
22	H&S Bravery (nom)	2 x HRSG		12/06/2020	12/06/2020
23	TBC	Pipework		19.06.2020	19.06.2020

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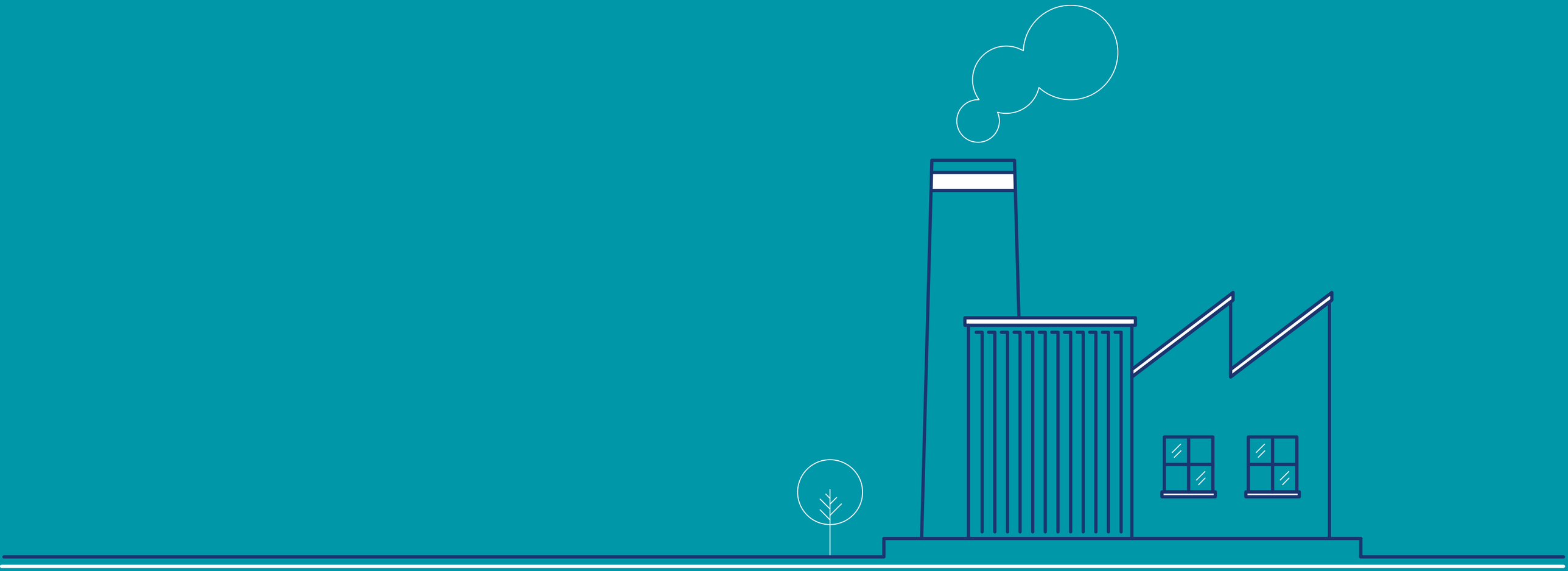
APPROACH TO NAVIGATIONAL RISK ASSESSMENT (NRA)



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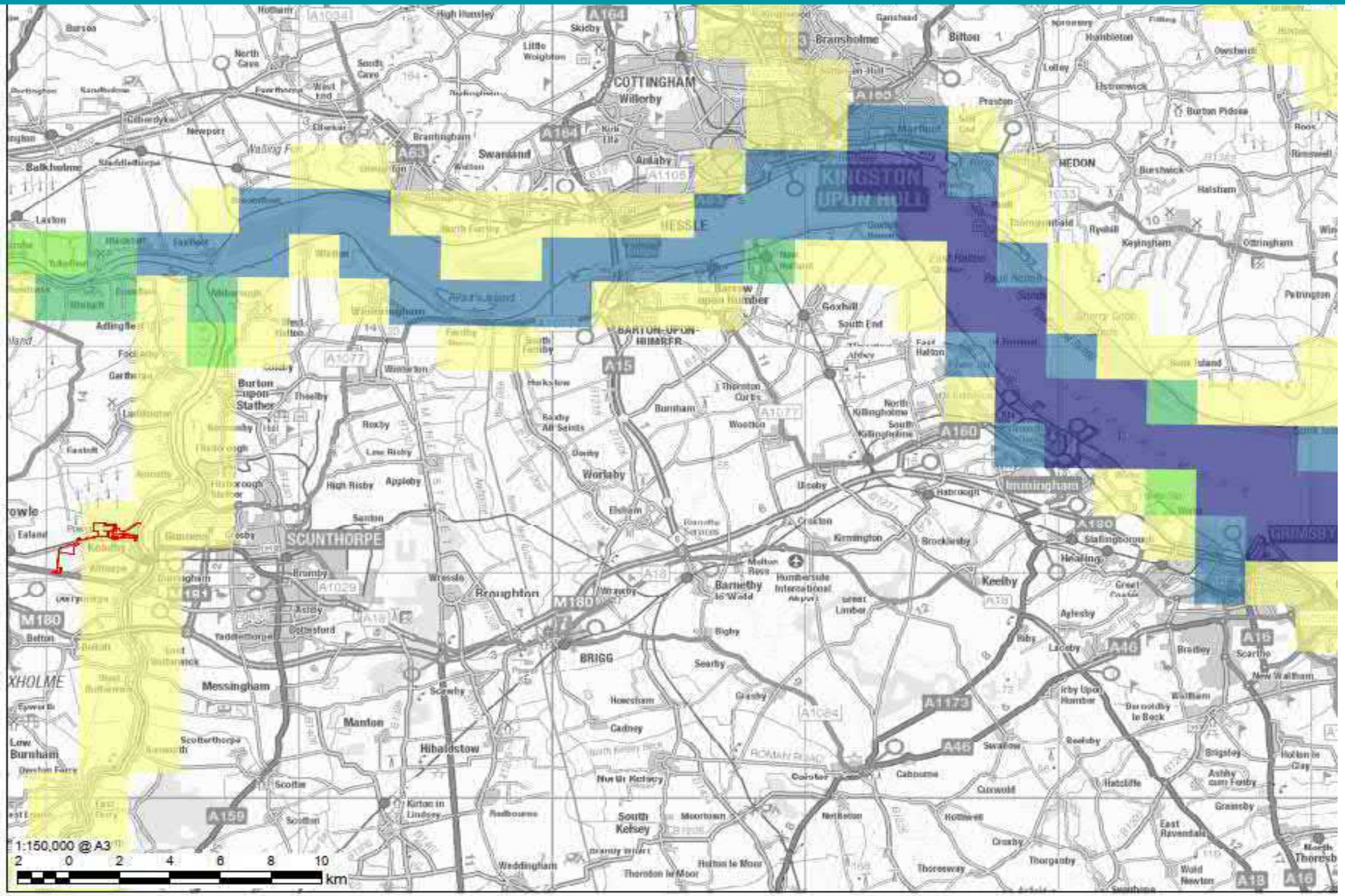
APPROACH TO NRA: MARINE BASELINE / DATA

Sources of Data

- AIS Grids and Track data has been reviewed (initially from 2015 and 2017; 2018 and 2019 data has been requested)
- Limitations of this data acknowledged
  - E.g. AIS not mandatory for all vessels (i.e. <10s / recreational traffic etc unlikely to be recorded)
- Still remains useful to provide an initial broad overview – see next slides

2017 VESSEL DENSITY GRIDS



AECOM

PROJECT

Keadby 3 Low Carbon Gas Fired Generating Station

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
3 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

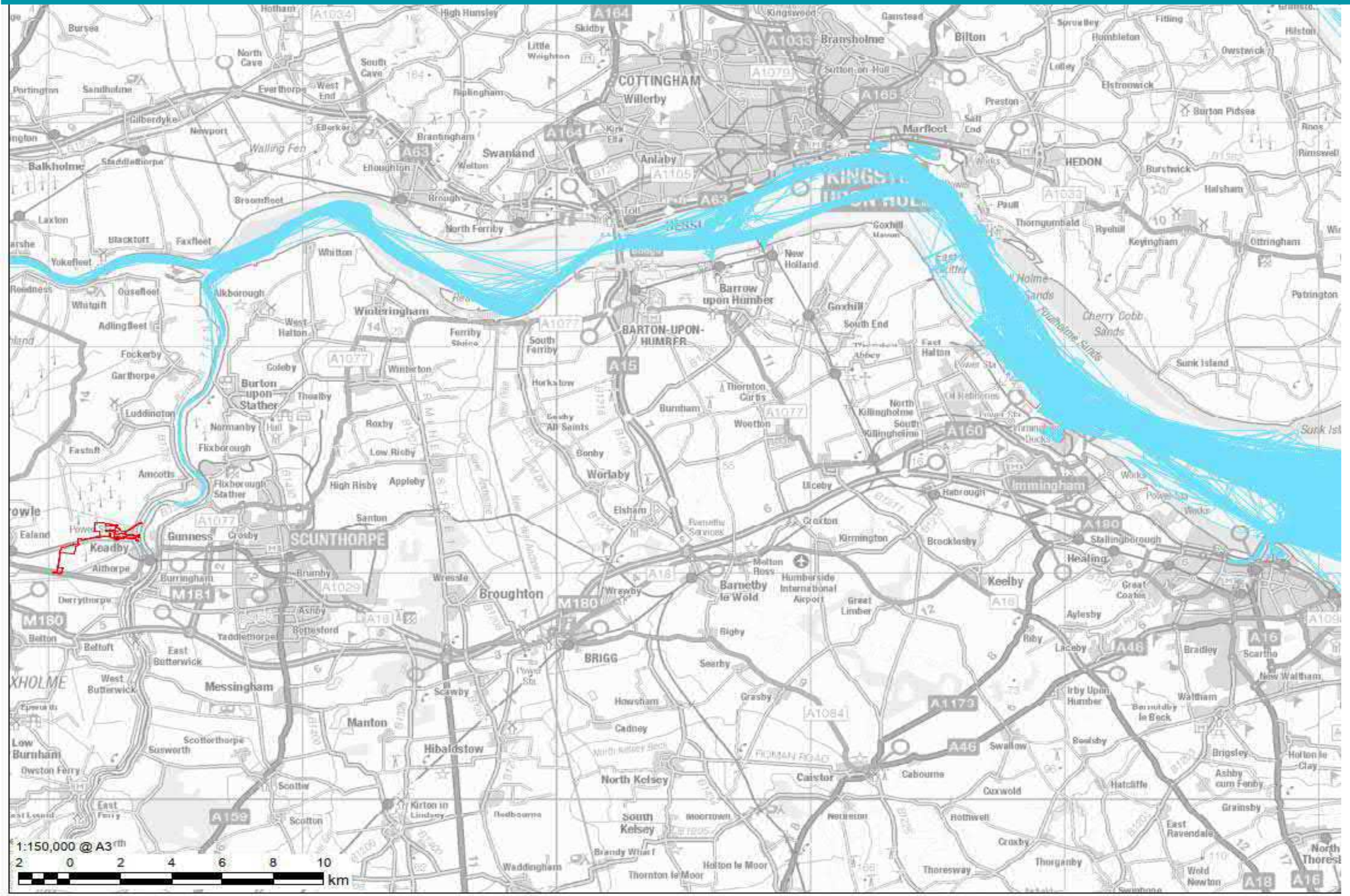
- The Order Limits

Vessel Density Grid 2017 (MMO)

Total Vessels - Annual Average

- 0 -200
- 200 - 500
- 500 - 1000
- 1000 - 10000
- >10000

2017 ANONYMISED AIS TRACK LINES



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Keadby 3 Low Carbon Gas Fired Generating Station

APPLICANT

Keadby Generation Limited

CONSULTANT

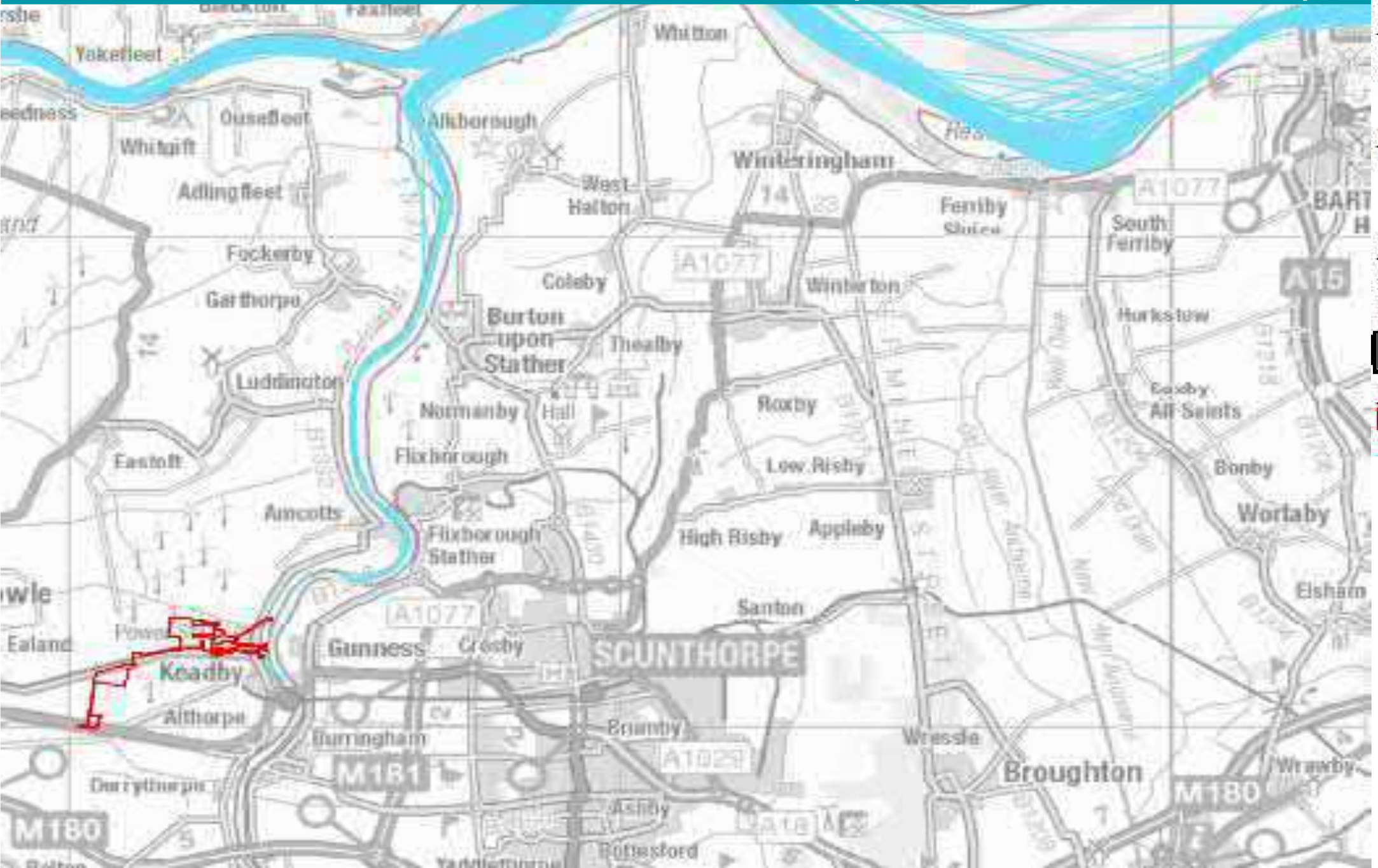
AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

The Order Limits

Anonymised AIS Derived Track Lines 2017

2017 ANONYMISED AIS TRACK LINES (FOCUS ON KEADBY)



PROJECT

Keadby 3 Low Carbon Gas Fired Generating Station

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

The Order Limits

Anonymised AIS Derived Track Lines 2017

APPROACH TO NRA: MARINE BASELINE / DATA

Sources of Data

- Marine Public Register (indicating existing consented works / infrastructure)
- Industrial data (i.e. existing moorings, pipelines, wharves etc
- Data gathered February 2021 to reflect latest consented / recorded activities and infrastructure
- This is used to consider any risks to existing infrastructure and/or other mariners within the NRA

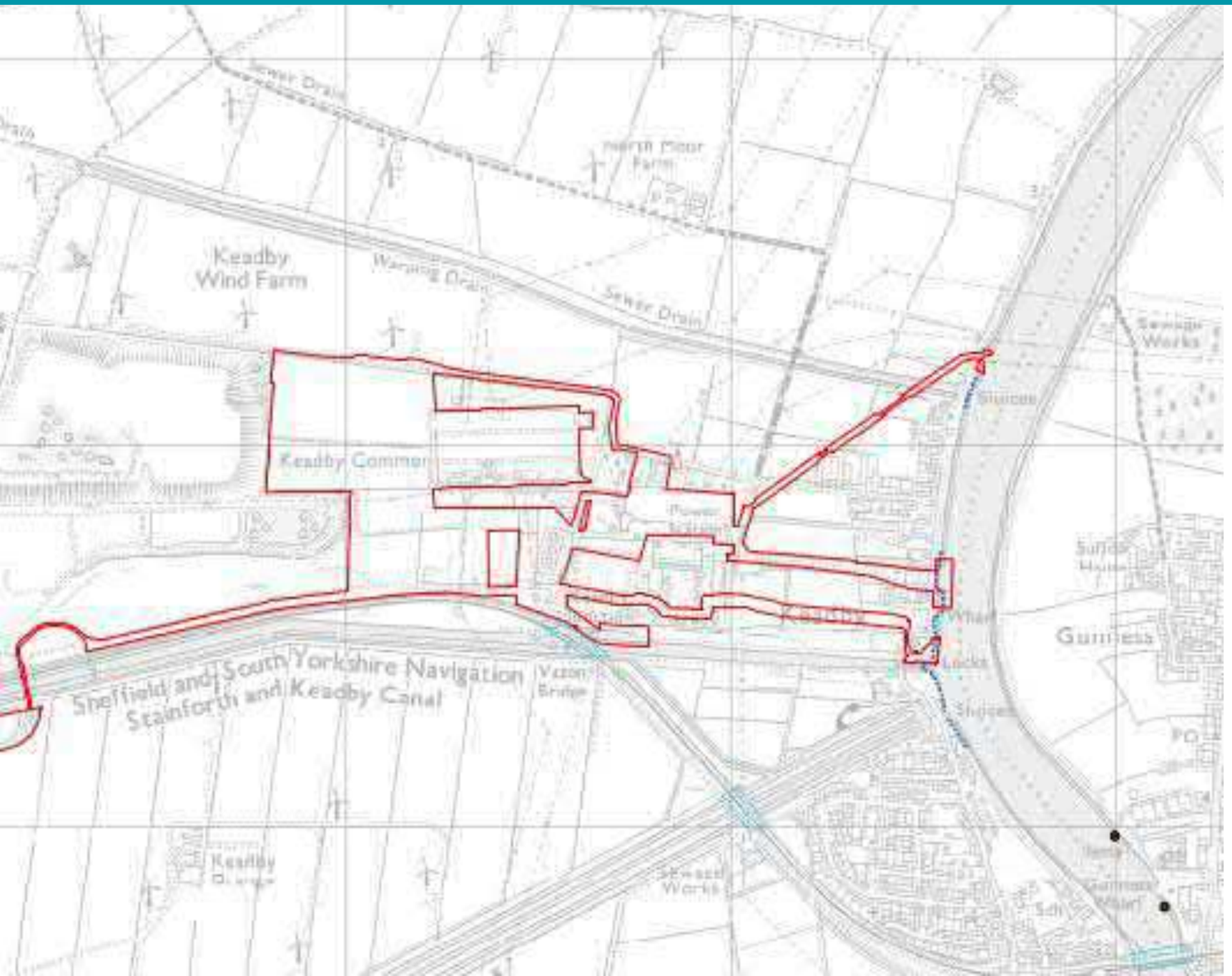
Historical Accidents

- Marine Accident Investigation Branch (MAIB) data
- Any local incident reports, where available

Key Considerations

- Operational Cooling Water System (CWS) associated with K1
- K1 O&M (including periodic dredging)

APPROACH TO NRA: MARINE BASELINE / DATA



AECOM

PROJECT

Keadby 3 Low Carbon Gas Fired Generating Station

APPLICANT

Keadby Generation Limited

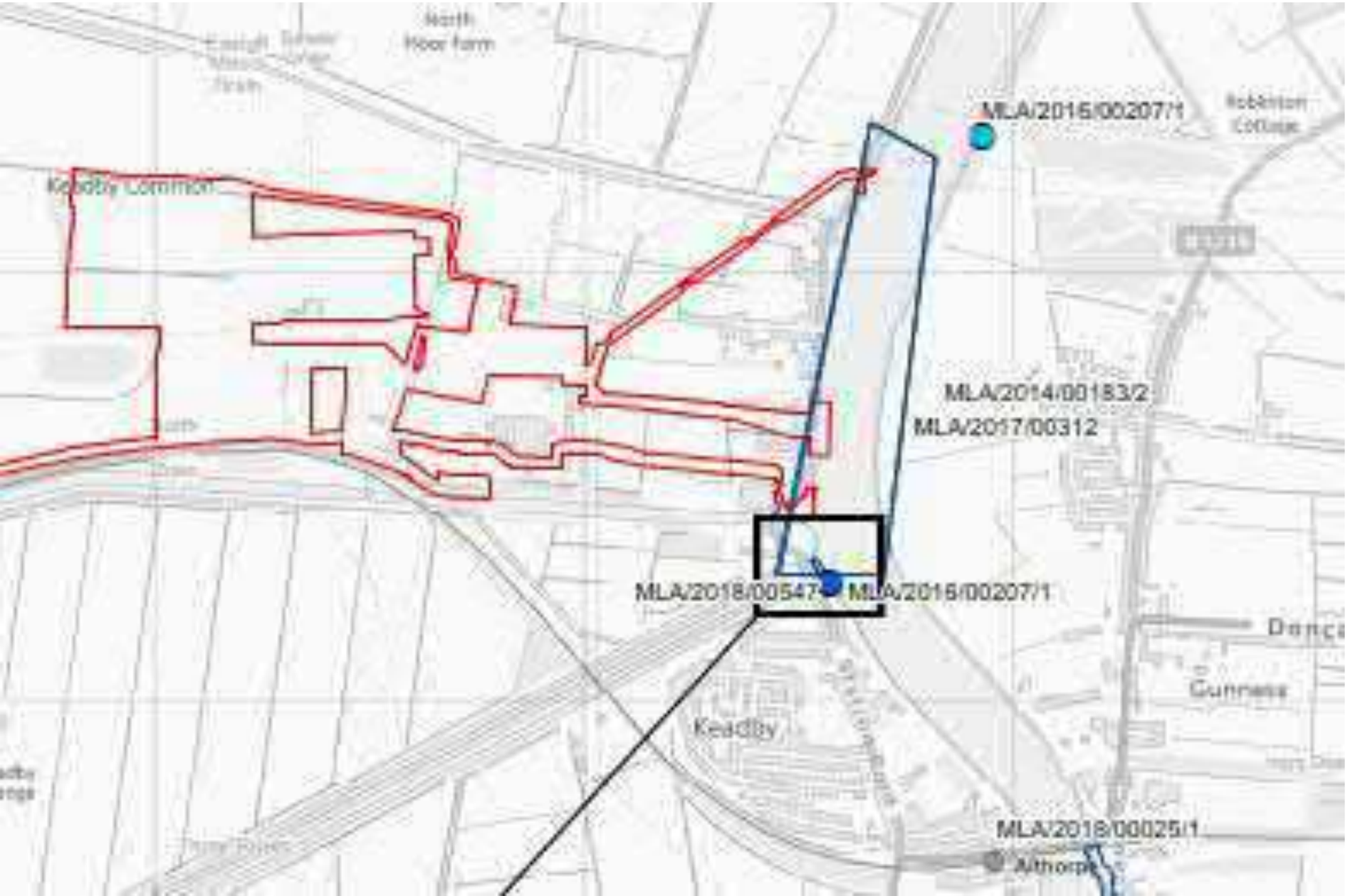
CONSULTANT

AECOM Limited
2 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

- The Order Limits
- Pile
- Shoreline Construction, Undefined
- Shoreline Construction, Pier (Jetty)
- Shoreline Construction, Wharf (Quay)
- Shoreline Construction, Bridge

APPROACH TO NRA: MARINE BASELINE / DATA



AECOM

PROJECT

Keadby 3 Low Carbon Gas Fired Generating Station

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
2 City Walk
Leeds
[redacted]

LEGEND

- The Order Limits
- Gunness Outfall
- Keadby Outfall
- MMO License Application Boundary (MMO)

APPROACH TO NRA: MARINE BASELINE / DATA

Sources of Data

- Historical MMO Dredging Licence / engagement with Keadby 1 O&M Team
- High volumes of river muds / silt and wider fouling risks require periodic management
- This is an ongoing period (consented) activity at Keadby 1 – operations discussed in following slide…

APPROACH TO NRA: MARINE BASELINE / DATA

Keadby 1 (Consented) O&M Considerations for NRA

Dredging (Option I)

- Cutter Suction Dredger

Dredging (Option II)

- Bucket Dredger

Diving Operations

- River-based dive operation (less constrained access/easier)
- Supported with small safety boat

Clearance and Maintenance

- Hand-removal of any residual silts
- Insertion of stop gates (i.e. to isolate the CWS)

APPROACH TO NRA: HISTORICAL EXPERIENCE

Keadby 2

- Use of Railway Wharf/Canal encouraged by consultees during consultation (s.36 Variation)
- Canal infeasible due to typical vessel size required for modules
- No formal NRA undertaken for K2 (Railway Wharf planning application - PA/2019/1554 – focused on terrestrial risks and management of piling works for reinforcement of the Wharf)
- NRA will be carried out for K3 – SSE wish to work with stakeholders from the outset to understand and address any issues from the outset
- Historical experience vital to assist with this…

APPROACH TO NRA: HISTORICAL EXPERIENCE

Experience from Keadby 2

- Engagement undertaken with heavy lift contractor for K2 to help inform planning / NRA for K3
- Key ‘lessons learned’:
  1. Updates on vessel shipment plan were welcome
  2. Use of the SSE Website to host a “live” shipment plan positive
  3. A better granularity of shipment plan likely to be of assistance to mariners
  4. Night-time unloading unlikely to be compliant with heavy lift contractor requirements / Harbour Authority controls
  5. Lighting for night-time working unlikely to sufficiently mitigate against Heath and Safety risks (noting potential impact to local residents also)
  6. Engagement and advance warning

APPROACH TO NRA: CONSULTATION

Bodies Identified and Ongoing Considerations

User	Notes
Canal and Rivers Trust	• Ongoing engagement • Permit for work (Canal) / ~Notice to Mariners (Canal)
ABP Humber	• Ongoing engagement • River Permit (Trent) / Notice to Mariners (Trent) • Compliance with Conservancy Act / bylaws
PD Ports (Keadby)	• Ongoing engagement regarding usage of Railway Wharf
Royal Yachting Association	• Confirmatory engagement may be undertaken
Department for Transport / Marine Accident Investigation Branch (MAIB)	• Historical MAIB data under review • Metadata has been requested to tie this to specific locations on Trent
Maritime and Coastguard Agency	• Ongoing engagement
Trinity House	• Ongoing engagement
Marine Management Organisation	• Confirmatory engagement may be undertaken
Other / Recreational Mariners	• Sea Cadets / British Canoeing / British Rowing – ongoing engagement

APPROACH TO NRA: DATA REQUESTS / HISTORICAL EXPERIENCE

Additional Data

- Keen to discuss data availability from ABP Humber, PD Ports and CRT?
- Local VTS?
- Historical experience of the K2 shipment / unloading?
- Other comparable experience?

NEXT STEPS

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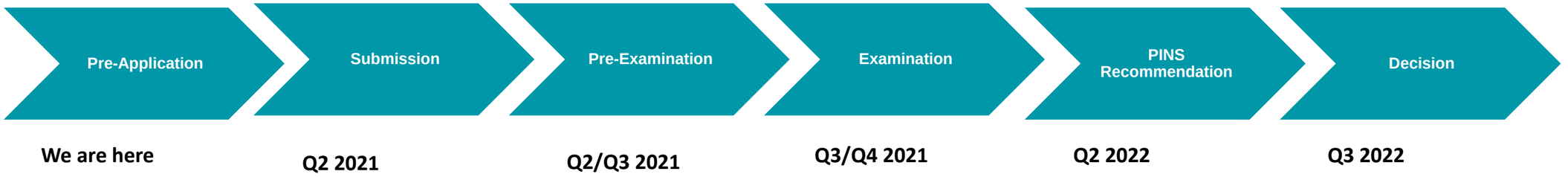
DCO APPLICATION PROCESS



- Stage II Consultation recently completed
- Technical engagement ongoing alongside production of Environmental Statement
- We will prepare a Consultation Report, to be submitted with the DCO application, which shows how we have considered comments received during Stage 1 (Spring 2020) and Stage 2 (Winter 2020) consultation
- We are proposing to submit the DCO application to the Planning Inspectorate (PINS) in Q2 2021
- Following submission, the application will be considered over the course of approximately a year, including a pre-examination period where we will develop Statements of Common Ground and seek to agree these with key stakeholders for submission into examination, and a 6-month examination

OPEN DISCUSSION / AOB

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THANK YOU

For further information, please contact:

consultation@keadby3.co.uk

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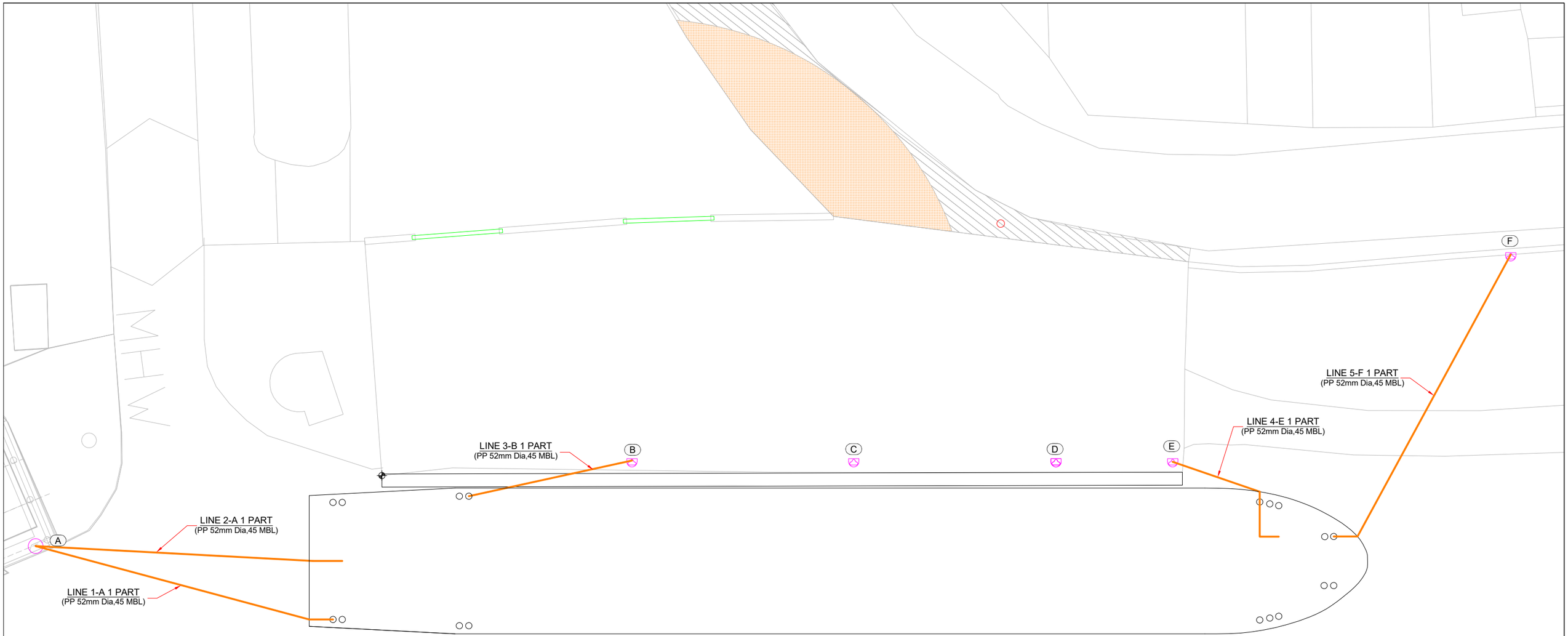
Appendix C – Extract from ABP Humber Data Response



DRAWING NOTES:

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

- ALL WEIGHTS ARE IN t (METRIC TONNES) UNLESS OTHERWISE STATED.

- ALL DETAILS ARE PROVISIONAL AND ARE SUBJECT TO CONFIRMATION.

TECHNICAL NOTES:

1. CLIENT TO SUPPLY AND INSTALL FENDERS BETWEEN BARGE AND QUAY EDGE.
2. CLIENT TO ENSURE THAT QUAY EDGE IS CLEAR TO PERMIT EASY ACCESS FOR ALL ANCHOR POINTS AND TO ALLOW FOR MOORING WIRES TO BE RUN OUT FROM WINCHES DURING BARGE INSTALLATION.
3. ALL MOORING ROPES TO BE PRE-TENSIONED TO 1.5 T

Rev.	Date	Drawn	Check	Description
C	20/01/20	DLM	MCH	FOR REVIEW
B	01/11/19	DLM	MCH	FOR REVIEW
A	18/10/19	DLM	MCH	PRELIMINARY

QF19 (Issue

ALE
Abnormal Load Engineering Ltd.
Sotherby Road, Middlesbrough, TS3 8BS, U.K
[redacted]

Client: HANSA MEYER

Project Title: GT SGT5-9000HL OFFLOADING AT RAILWAY WHARF

Drawing Title: PROVISIONAL MOORING ARRANGEMENT FOR RAILWAY WHARF

Date	Drawn	Checked	Scale (A1)	Sheet
20/01/20	DLM	MCH	SEE VIEWS	2 of 2

Project No.	Drawing No.	Rev.
ALE-AA6039-03	AA6039-03-DWG-003	B

File Location: C:\Users\D.LeMasurier\Documents\ALE working Space\Keadby REV D\DRW-1412-01-100-D - Mooring plan.dwg

ABP | HUMBER ESTUARY SERVICES

GENERAL NOTICE TO PILOTS

NO. 05/2016

Gentlemen,

TRENT AEGIR PREDICTIONS

Please be advised that a review of the procedures surrounding Trent Aegir's has been conducted.

Following this review, the Pilot of a vessel expected to be berthed on the River Trent, during any period of predicted tides of greater than 8.8m HW Albert (book height), should give the master the "Guidance Notes For Masters Of Vessels Berthed On The River Trent".

Pilots are further advised that they should ensure masters of vessels berthing in the Trent are made aware of this expected occurrence and to ensure vessels are adequately moored and tended, in accordance with Byelaw 25 of The Humber Navigation Byelaws 1990.

Andrew P Swift
PILOTAGE OPERATIONS MANAGER & DEPUTY HARBOUR MASTER HUMBER
30 August 2016

ASSOCIATED BRITISH PORTS

GUIDANCE NOTES FOR MASTERS OF VESSELS BERTHED ON THE RIVER TRENT

To be issued on arrival by the berth operator or agent

Please be aware that very strong tides are experienced, especially on spring tides.

It should be noted that the ebb runs for approximately 9 hours and the flood for only 3 hours (at Keadby the time from low water to high water can take place in as little as 2½ hours)!

On some berths the vessel may be aground around LW. The master should ensure he knows the depth on the berth at Datum, as the rapidly rising water may float the vessel causing sudden and severe strain on the moorings, particularly the headlines and after back spring.

At times of spring tides, the arrival of the flood can result in an initial very rapid rise in the water level. For example, at Flixborough on a predicted 6m tide range; the water level can rise by 1 metre in the first 10 minutes of the flood tide. At times a tidal bore can occur leading to sudden and severe strain on a ship's mooring lines.

This tidal bore is known locally as the Trent Aegir.

The following advice is to assist in ensuring that your vessel remains safely moored alongside during her stay on the Trent.

- Mixed moorings should be avoided if possible ie wires and nylon as they have different stretchability leading to uneven weight distribution.
- All moorings not on winches should be turned up on mooring bits in the approved manner. Lines should not be left on the drum end.
- Moorings on winches, should have the brake fully on.
- Self rendering winches should not be used in the self rendering mode. They should be out of gear with the brake fully on or as per users manual.
- After moorings have been made fast there is no need to make any adjustments. Tampering with mooring lines, particularly at times when the tide is flooding or ebbing, is dangerous.
- During large tides it is advisable to have the main engine ready for immediate use, and, if necessary, run to take the load off the moorings for the period 3 hours before HW Keadby until HW Keadby.
- Anchors should be cleared and ready for immediate dropping.
- Sufficient crew members should be available on board at all times in order to deal with any emergencies that may arise.

Shifts from one berth to another should take place close to Local HW and will require the services of an authorised pilot.

Issued: January 2014

PIL.212-03-14
PIL.191-01-14

Meeting Minutes

Meeting name
SSE Keadby 3 – NRA Workshop Agenda (Trinity House and Maritime & Coastguard Agency)

Meeting date
25th February 2021

AECOM project number

Subject
Trinity House and MCA - Stakeholder Update Meeting (Inc. Approach to Navigational Risk Assessment)

Time
10:00 – 11:30

Additional information
Appendix A Indicative DCO Red Line Boundary
Appendix B – Meeting Slide Pack

Attendees
(EW), AECOM
(SE), AECOM
(JF), SSE
(SV),Trinity House
(TB), MCA

Meeting Location
MS Teams

Trinity House & MCA – NRA Workshop Minutes (25th February 2021)

Action No.	Action	Owner	Target close-out date
01	AECOM/SSE to undertake engagement with ABP Humber and confirm role as Navigational Authority	EW	25/02/2021
02	AECOM/SSE to ensure role of Navigational Authority is made very clear in NRA	EW	Q2 2021 (DCO Submission)
03	AECOM/SSE to undertake engagement with ABP Humber to try and obtain PAVIS/VTS data, where available	EW	11/03/2021
04	AECOM/SSE to approach RYA (centrally) but also individual Marinas, if possible, to obtain additional data	EW	11/03/2021
05	AECOM/SSE to confirm lighting and marking requirements in relation to the cofferdam (if required) with ABP Humber	EW	11/03/2021

Agenda Item	Notes	Key Actions
Introductions and Meeting Purpose		
Summary of the Keadby 3 Project	An overview of project and site was provided with strategic context in relation to the Zero Carbon Humber (ZCH) and Northern Endurance Partnership(NEP) and relationship with Proposed Development. An overview of the Proposed Development was provided, focussing on the marine aspects (Waterborne Transport Offloading Area, Water Discharge Corridor including Canal Water Abstraction option and River Water Abstraction option) and other linkages with Keadby 1 and Keadby 2 Power Station. Points to be discussed regarding the feedback on the PEI Report were summarised:	

Agenda Item	Notes	Key Actions
	• CRT – points on navigational safety in relation to the canal and closure of canal for K2 abnormal loads and asked for information on size and loading times, scale of loads etc.; • MCA – impact to navigation and recommended engagement; • Trinity House – flagged ABP Humber (second workshop this afternoon with CRT). [For further information, please see Appendix B, Slide 5 – 16]	
Overview of potential works	Overview of Potential Works at Keadby 3 provided Water Discharge Corridor – EW provided overview. RLB mirrors concrete reinforced outfall. Intentional as we don't believe that there is any need to do any major upgrades to this structure. Canal Water Intake – EW provided overview of scale of works and showed K2 intake now constructed. River Trent – although not the preferred option, would be a requirement for upgrades of intake infrastructure, upgrades to ensure compliance with Eel Regs. Cofferdam required and works would be more significant than at other locations. Worst-case approx. 25m into Trent. Leaves large navigable area including deepest part of Trent for Navigation. Waterborne Transport Offloading Area – no in-river works during construction. Explanation of adequacy of existing improvement works completed recently for Keadby 2 at the Wharf. [For further information, please see Appendix B, Slide 17 – 25]	
Access and use of Railway Wharf	Access and use of Railway Wharf – EW outlining abnormal indivisible load (AIL) strategy within Framework Construction Traffic Management Plan (CTMP) to be submitted with DCO Application which recognises 'more by sea' to be pursued. Will acknowledge that a variety of AIL routes can be utilised. [For further information, please see Appendix B, Slide 26 – 30]	
Approach to NRA	Overview provided of approach to NRA. Marine Baseline Data – EW provided overview of data procured. Higher density of vessels exist within Port of Hull/ABP Humber Area. Tankering and passenger traffic/ ro-ro. Anonymised tracks – vast majority of traffic stops just south of Keadby. RMS Trentport facility. Receives types of loads that have AIS fitted. Key stopping point – perhaps small amounts past that but likely small river loads/barges further upstream.	**1.** AECOM/SSE to undertake engagement with ABP Humber and confirm role as Navigational Authority **2.** AECOM/SSE to ensure role of Navigational Authority is made very clear in NRA and application documents

Agenda Item	Notes	Key Actions
	Data from Marine Public Register procured other commercial data and used to assess risks from infrastructure/to mariners. Looked at Marine Accident Database key word searches and area searches and requested metadata behind this from DfT so will be considered. Keadby 1 has an operational cooling water system that is periodically dredged. Few times a year both intake/discharge. EW described types of dredging. Looked at data on AIL deliveries from Keadby 2 as we anticipate that Keadby 3 will be a very similar operation and therefore lessons learned important to bring forward into project. Canal Lock gate v. narrow (approx. 7m) so not feasible for AIL. No formal NRA for K2. No marine licence required for K2. Have engaged with HLE contractor and spoken to K2. Shipment plan updated weekly on SSE website so that mariners/stat bodies could keep track of predicted shipment schedule. Obviously can change due to weather and construction programme tweaks. Stakeholders would welcome increased granularity of notice. We will be looking to carry this forward. Night-time unloading. Given thought but unlikely due to HLE contractors willingness to do this. ABP bylaws and general H&S policies – don't think that this will be encouraged by them, but we will confirm this following engagement. Nuisance to recreational managers is important as a consideration but we would envisage that decision making regarding safety would take precedence. Even if extremely well lit, don't think that this would mitigate H&S risks. Consideration etc. of noise and lighting to local residents is also a factor that would need to be considered if night-time deliveries considered given close proximity of residential properties on Trentside. Likely that engagement and advance warning possibly with a helpline/hotline would be the preferred option. Approach to NRA consultation – EW provided an overview of ongoing/planned engagement. PD Ports – engaging to understand level of activity at this and other local wharfs. Overview of other proposed engagement including Sea Cadets, MMO, MAIB, RYA etc. **Discussion** **TB** Q1 – Location of K3 – who is the Navigation Authority? EW confirmed that ABP Humber is the Harbour Authority up to Keadby Lock where their jurisdiction stops but CRT are the navigation authority for the canal. PD Ports use Keadby and Grove Wharf therefore key. And TB confirmed that the reason for the question is that although MCA/Trinity House would remain interested in the works– they will defer to the Navigation Authority. Therefore, it is requested that the NRA needs to make this very explicit.	**3.** AECOM/SSE to undertake engagement with ABP Humber to try and obtain PAVIS/VTS data, where available **4.** AECOM/SSE to approach RYA (centrally) but also individual marinas, if possible, to obtain additional local insights **5.** AECOM/SSE to confirm lighting and marking requirements in relation to the cofferdam (if required) with ABP Humber

Agenda Item	Notes	Key Actions

Q2 – Will the applicant be seeking additional powers for operation of wharf. EW confirmed that we do not envisage the need for a HRO at this stage. Planning consent put in place for Railway Wharf is deemed sufficient for K3. Deepening of berths/dredging is not envisaged as being required.

Q3 – have we considered use of PMSC for wharf operation – not mandatory but benchmark for safe operation of wharf? Compliance with MGN and marine safety code. EW confirmed that it would be for contractor to comply with this. During procurement of contractor, it will be important to emphasise requirements for compliance with best practice and this will be advocated in the NRA.

PAVIS – ABP Humber vessel management and safety system. Section in NRA on use

SV

Stakeholder Engagement – SV suggested that although we intend to consult RYA – it would be good if you we could contact the marinas directly as they will have better understanding of mariners. SV – querying who we are speaking to. EW confirmed Richard Hill at RYA – SV believes he is new but in senior role.

EW confirmed that we have looked at number of day berths/long stay berths etc. but information is patchy. Plug gaps in AIS data. SV confirmed the need to ensure we are trying to plug the gaps. Volume/vessel types/dimensions – marinas. Harbourmaster this afternoon can hopefully give a good steer on.

SV

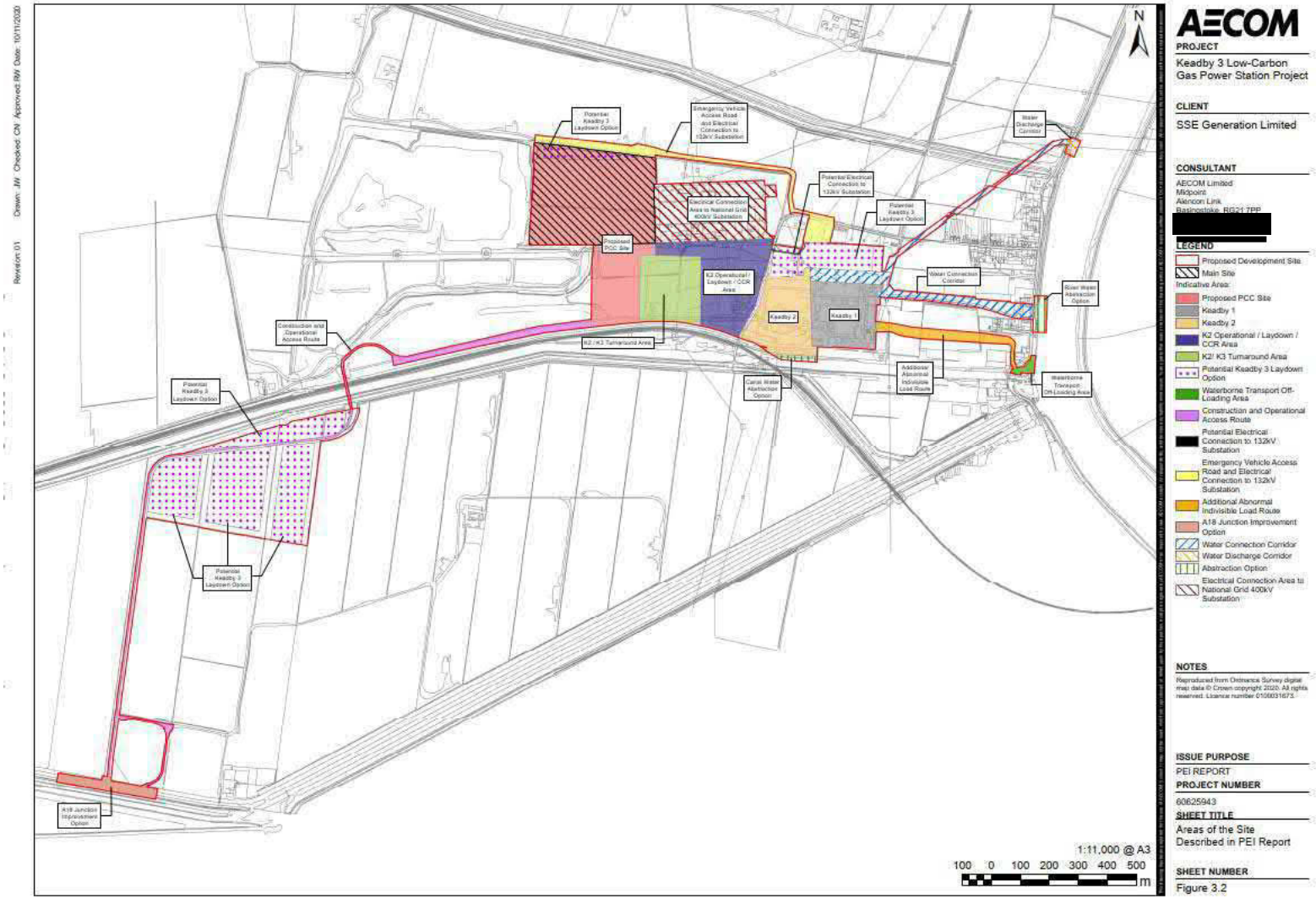
Confirmed that on the basis of the presentation, nothing jumps out as concerning. Worthy of note is the river water abstraction option. Additional risk mitigation measures required in the form of navigation marking for the obstruction and also lighting – harbourmaster should give us a steer on this this afternoon. Notice, night-time lighting, mooring dolphins marked along the section currently.

Night-time working – SV confirmed that flood lighting should not impinge upon the mariner; EW noted that bylaws contain specific wording on navigational distraction. Discussion that although no decisions yet made, we expect minor advantages to mariners using canal of night-time working are likely outweighed by H&S. EW believes that K2 experience was that perhaps only one mariner affected, and lock closed when they wanted to use it but the mariner hadn't looked at notice.

SV asked in relation to the works that have currently taken place in canal whether CRT requested that that was marked in any way? JF confirmed that we can ask a member of the project team. Works managed by Siemens as Principal

Agenda Item	Notes	Key Actions
	Contractor confirmed that he doesn't need an answers as Trinity House remit stops when becomes non-tidal. Trinity House does not envisage a SoCG necessary – can contribute to DCO process as a stat consultee. EW confirmed that engagement is ongoing with MMO, and that a Deemed Marine Licence with MMO likely to be the route we would go down. [For further information, please see Appendix B, Slide 31 – 46]	
Forward Look, Next Steps and Timescales	Next steps – plan to submit Q2 this year. Will engage on SoCG in near future, noting that it is not envisaged that these will be required with either body if ABP is the Navigation Authority. [For further information, please see Appendix B, Slide 48]	
Open Discussion, Questions and Any Other Business	No further discussion beyond points above; meeting closed 11:14.	

Appendix A – Indicative DCO Red Line Boundary (Note – from 2020/21 PEIR)



Appendix B – Meeting Slide Pack

KEADBY 3 LOW CARBON
GAS POWER STATION

Navigational Risk Workshop 1

MCA and Trinity House

25 February 2021

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KEADBY 3 LOW CARBON GAS POWER STATION

Stage Two Consultation – Technical Engagement

Overview of today's presentation

1. Introductions and objectives of meeting
2. Strategic context and overview of what is proposed at Keadby
3. Overview of potential works
   - R. Trent
   - Keadby & Stainforth Canal
4. Access and use of Railway Wharf
5. Approach to Navigational Risk Assessment
6. Next Steps and Timescales
7. Open Discussion, Questions and AOB

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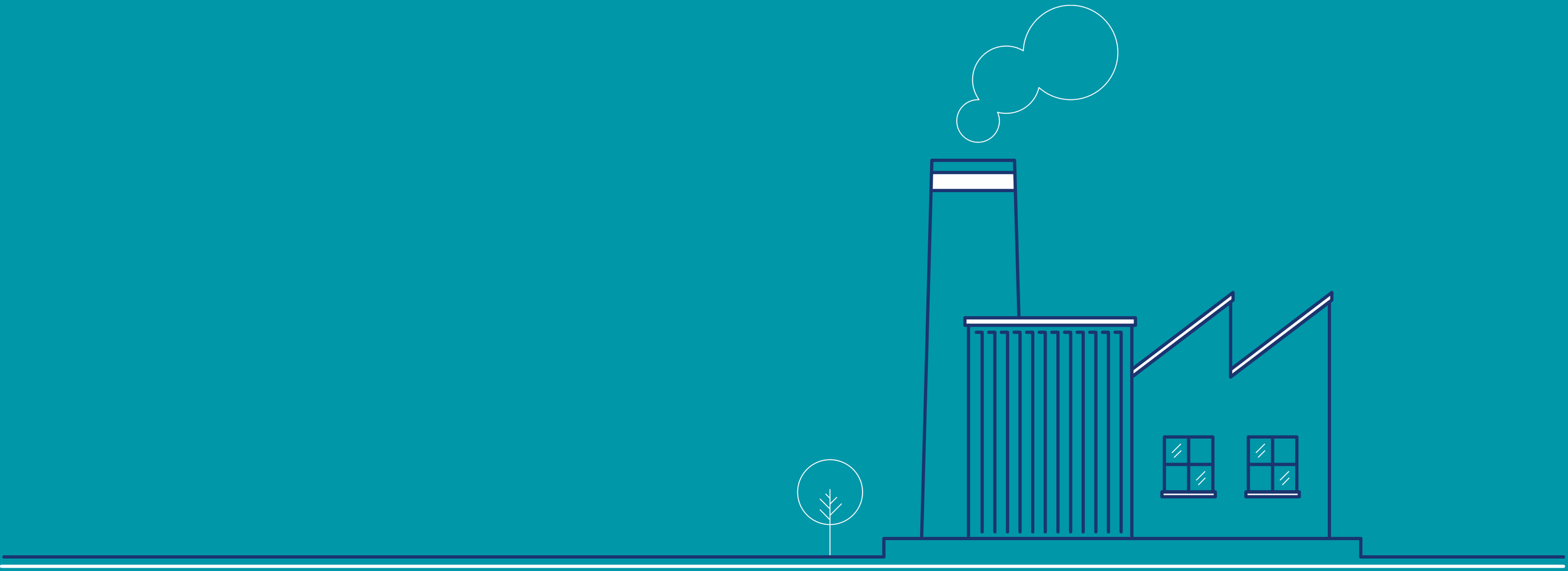
Introductions & Objectives of Meeting

Other attendees -

Meeting Objective:

- *Present our approach to Navigational Risk Assessment, obtain feedback on data sources and review opportunities for gathering additional information, data and historical experience from consultees*

SUMMARY OF THE KEADBY 3 PROJECT
- STRATEGIC CONTEXT -



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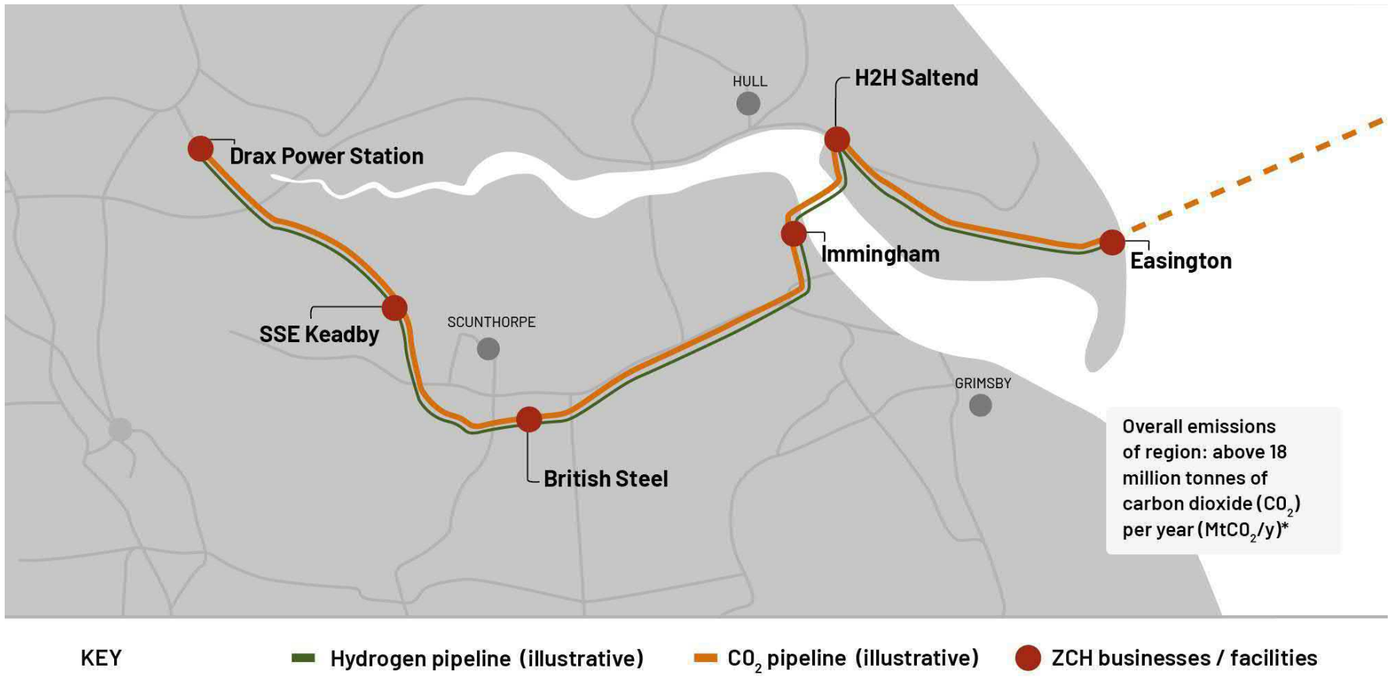
STRATEGIC CONTEXT – ZERO CARBON HUMBER PARTNERSHIP

The UK has legislated to cut national carbon dioxide emissions to **Net Zero** by **2050**

SSE Thermal is partnering with leading organisations across the Humber Region to accelerate the development of carbon capture and underground storage (CCUS) - this includes Keadby 3, which is intended to link in to the Zero Carbon Humber (ZCH) Partnership and Northern Endurance Partnership (NEP) for offshore geological storage of CO_2, representing an important contribution to towards **Net Zero**



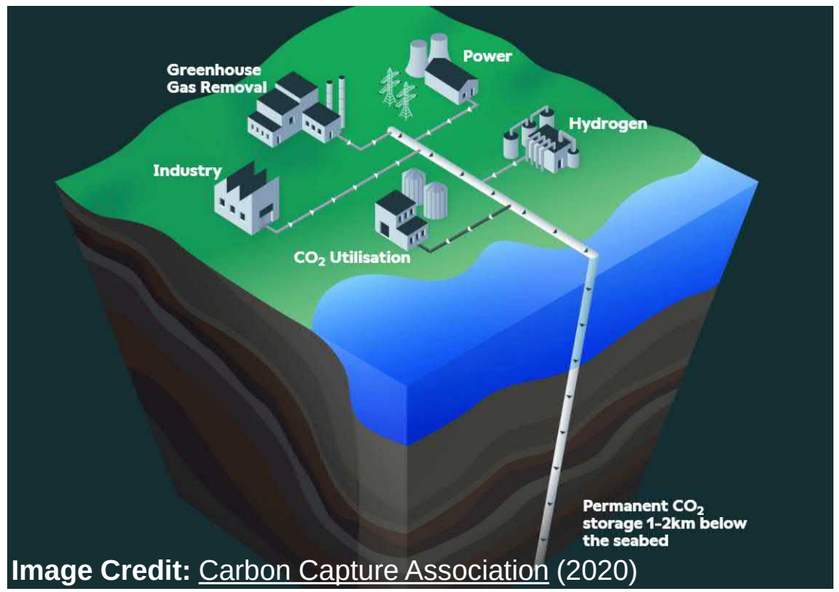


Image Credit: Carbon Capture Association (2020)


Net Zero Teesside
&
ZEROCARBON HUMBER
Northern Endurance Partnership
TEESSIDE
HUMBER
NORTH SEA
POTENTIAL FUTURE EXPANSION
POTENTIAL FUTURE EXPANSION
ENDURANCE
145km
85km
TEESSIDE
MIDDLESBROUGH
SCARBOROUGH
HUMBER
HULL
GRIMSBY
YORK
SCUNTHORPE

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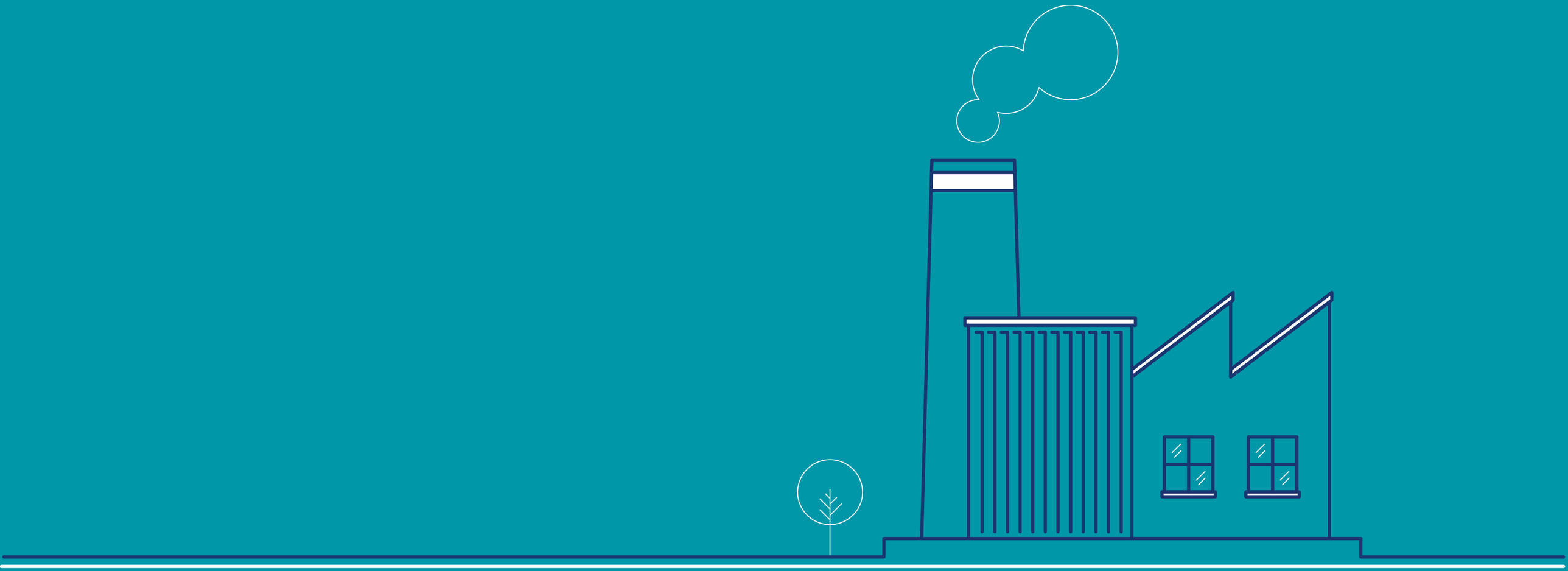
SUMMARY OF THE KEADBY 3 PROJECT
- TECHNICAL OVERVIEW -



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OVERVIEW OF WHAT IS PROPOSED

KEADBY 3 LOW CARBON GAS POWER STATION PROJECT

The Keadby 3 Low Carbon Gas Power Station Project is a high efficiency low carbon combined cycle gas turbine (CCGT) power station with a capacity of up to 910MW electrical output, including a post combustion carbon capture plant (CCP)

Keadby 3 would

- be fuelled by natural gas
- be able to export low carbon electricity to the National Grid
- be sited to make use of existing connections for natural gas, cooling water and electricity on land adjacent to Keadby 1 and 2
- include other associated development required to construct, operate and maintain the Proposed Development

The Applicant responsible for constructing, operating, maintaining and decommissioning CCP

ZCH responsible for construction, operation and decommissioning of the CO_2 gathering network from onshore industrial facilities including the Proposed Development and is preparing a separate DCO for the export pipeline.

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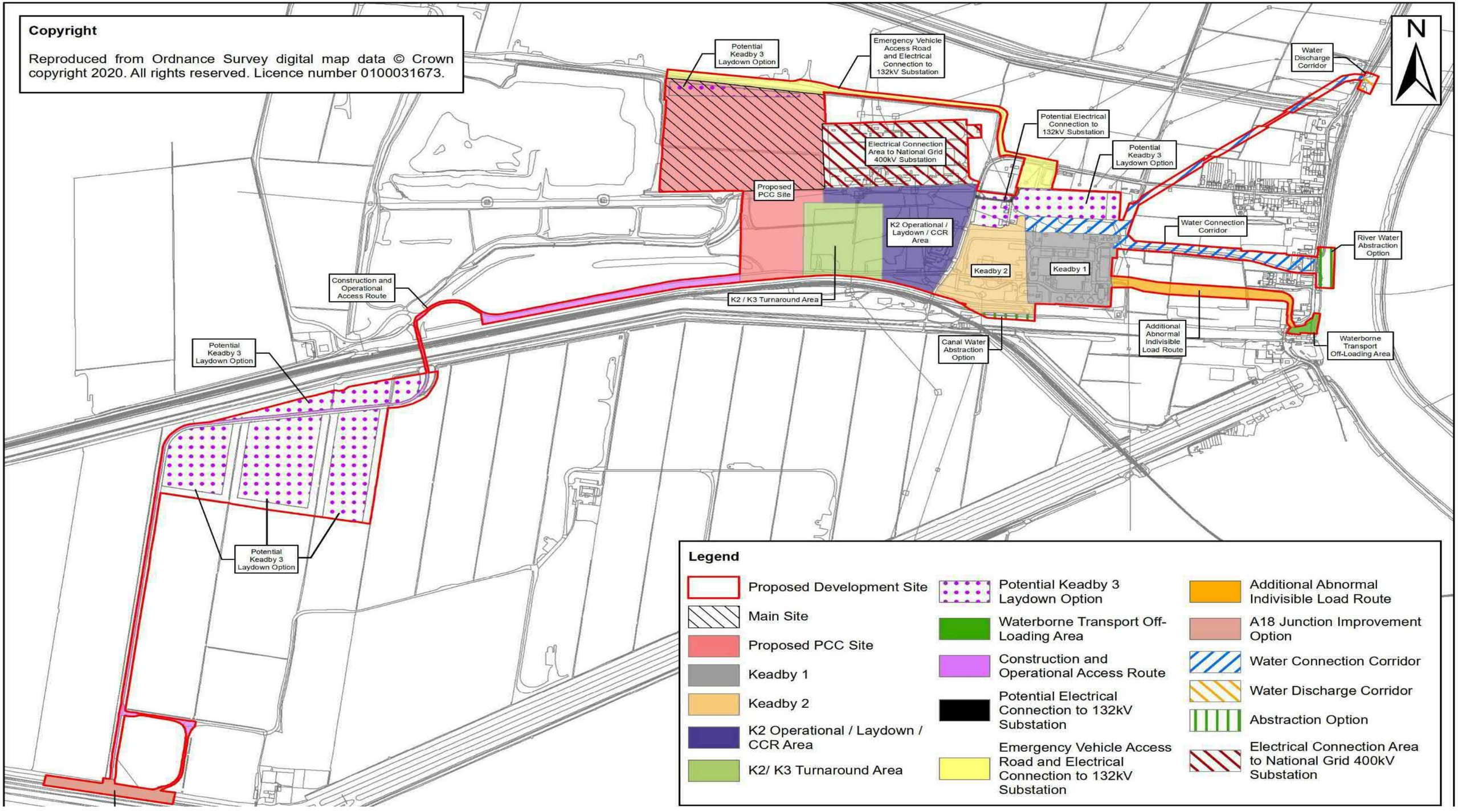
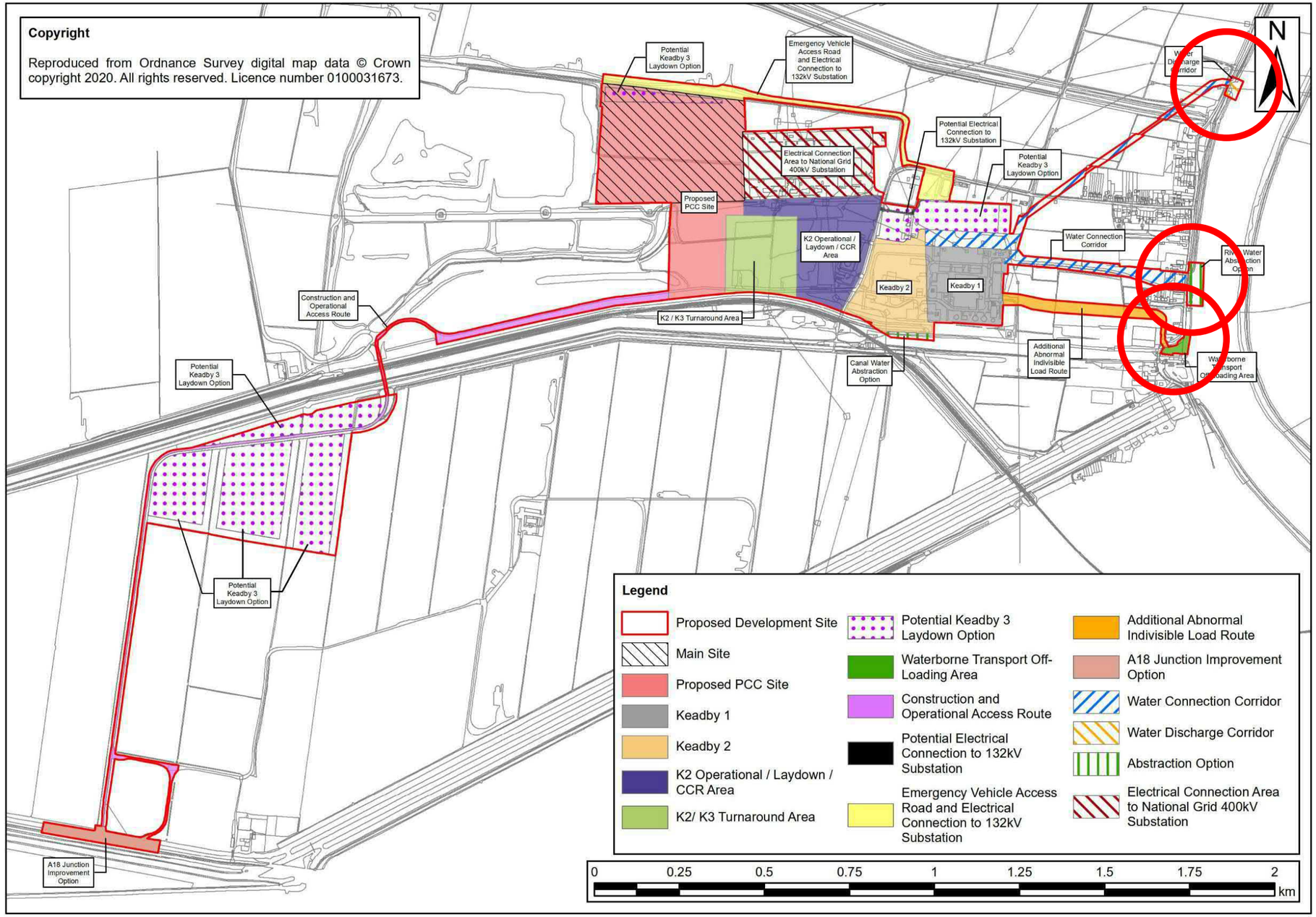


OVERVIEW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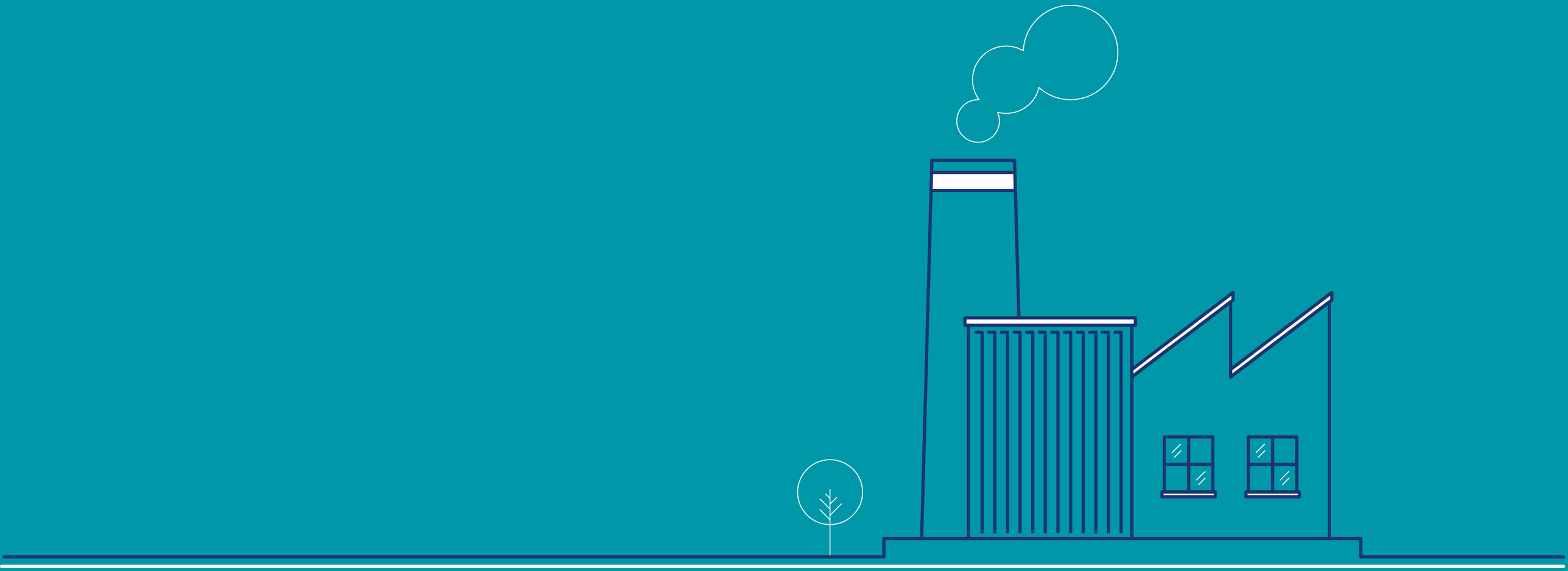
N
Potential Keadby 3 Laydown Option
Emergency Vehicle Access Road and Electrical Connection to 132kV Substation
Potential Electrical Connection to 132kV Substation
Electrical Connection Area to National Grid 400kV Substation
Potential Keadby 3 Laydown Option
Proposed PCC Site
K2 Operational / Laydown / CCR Area
Water Connection Corridor
Keadby 2
Keadby 1
Construction and Operational Access Route
K2 / K3 Turnaround Area
Additional Abnormal Indivisible Load Route
Canal Water Abstraction Option
Potential Keadby 3 Laydown Option
Potential Keadby 3 Laydown Option
A18 Junction Improvement Option
Legend
Proposed Development Site
Main Site
Proposed PCC Site
Keadby 1
Keadby 2
K2 Operational / Laydown / CCR Area
K2/ K3 Turnaround Area
Potential Keadby 3 Laydown Option
Waterborne Transport Off-Loading Area
Construction and Operational Access Route
Potential Electrical Connection to 132kV Substation
Emergency Vehicle Access Road and Electrical Connection to 132kV Substation
Additional Abnormal Indivisible Load Route
A18 Junction Improvement Option
Water Connection Corridor
Water Discharge Corridor
Abstraction Option
Electrical Connection Area to National Grid 400kV Substation
0 0.25 0.5 0.75 1 1.25 1.5 1.75 2 km

STAGE II CONSULTATION



STAGE II CONSULTATION

Comments	Canal	Trent
Canal & Rivers Trust *The Trust's input would be crucial to ensure that the impact on navigational safety can be fully assessed. We advise that full details of the design of any abstraction equipment and the method of construction (including details of any cofferdams) would need to be submitted to and approved by the Trust prior to the commencement of the works on this part of the development.*	**X**	

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STAGE II CONSULTATION

Comments	Canal	Trent
Canal & Rivers Trust *We request further information from the applicant to ensure that this part of the proposal does not result in a hazard for navigational safety at the entrance to the canal at Keadby or the need for unscheduled closure of the canal. As we understand that materials will be transported long distance, it may be difficult to organise set closure times for the canal, and we believe that measures to allow for night time off-loading could be considered to give the applicant more flexibility to allow for offloading during night hours when the canal is not in heavy use.*	**X**	**X**

STAGE II CONSULTATION

Comments	Canal	Trent
Canal & Rivers Trust *We request that details should be provided by the applicant as to the anticipated size and loading times of vessels in this location to ensure that this part of the proposal does not result in a hazard for navigational safety at the entrance to the canal at Keadby, or result in unplanned closures of the waterway. Should this not be possible, then we would advise that improvements are made to the lighting the proposed loading point so that crane works can be carried out during the night, which will have a reduced impact on boat movements in and out of Keadby Lock.*	**X**	

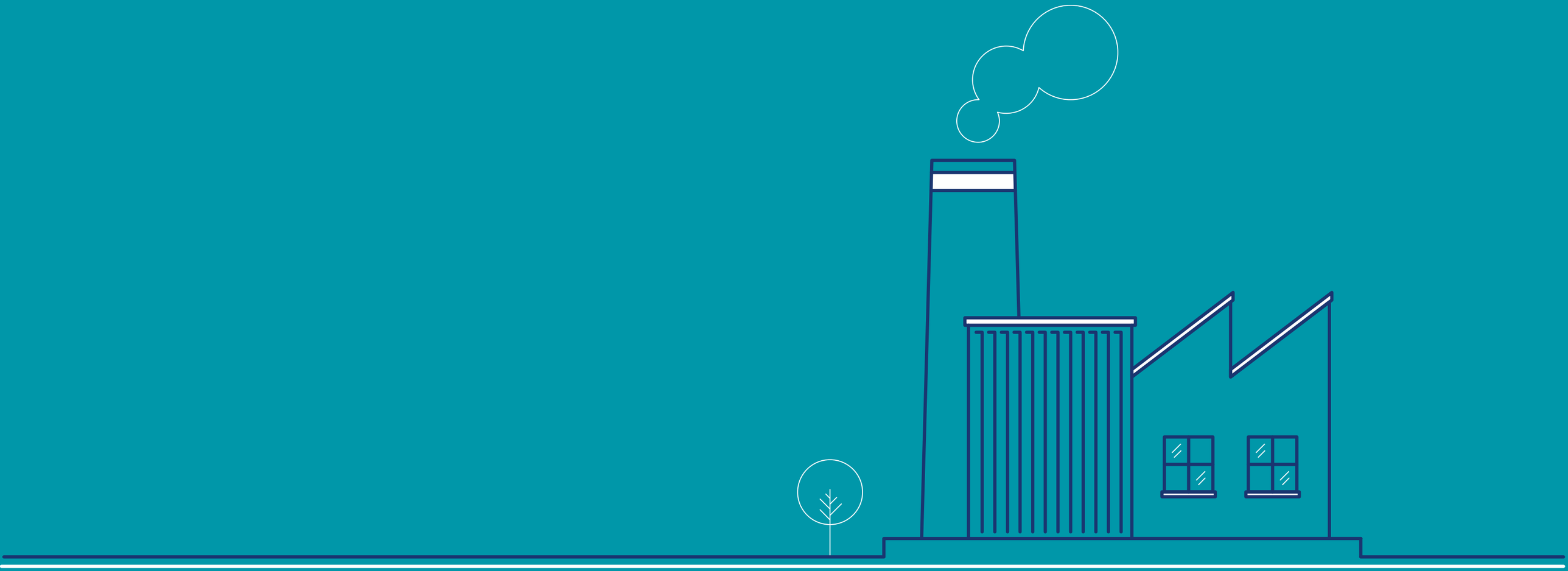
STAGE II CONSULTATION

Comments	Canal	Trent
Maritime and Coastguard Agency *For those works within the marine environment, we would expect to see a full consideration of their potential impact on the safe navigation of vessels transiting the area, and the safety of other marine users. The MCA would like to see further information and detail provided to determine the significance of these predictions. Where possible, the developer should also seek to consult other local marine stakeholders, including both commercial shipping and recreational vessel groups.*	**?**	**X**

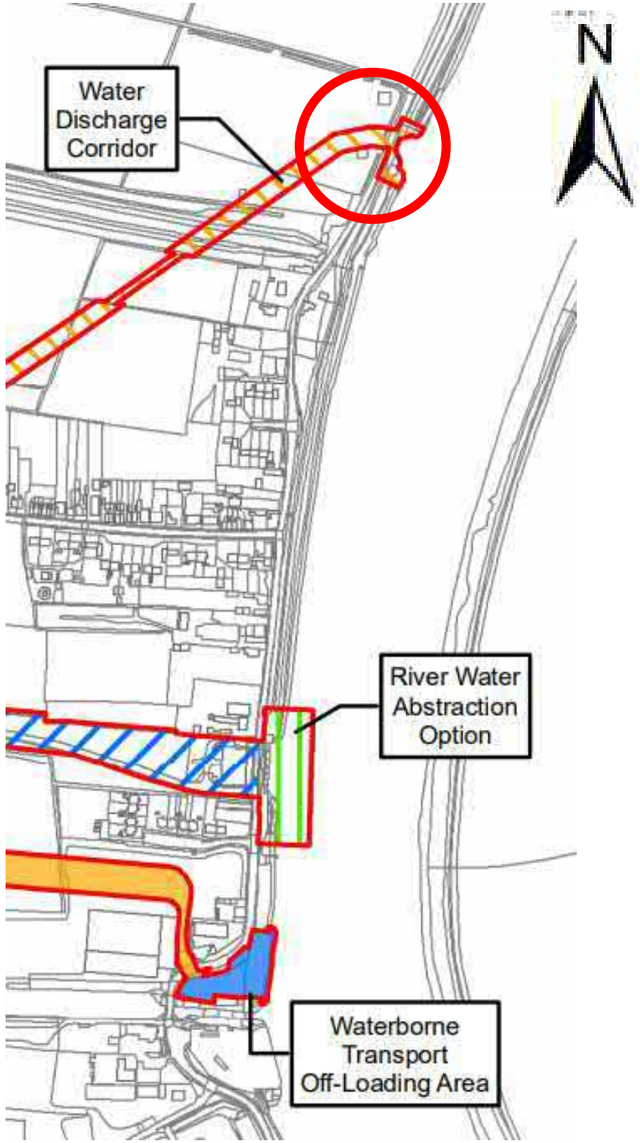
STAGE II CONSULTATION

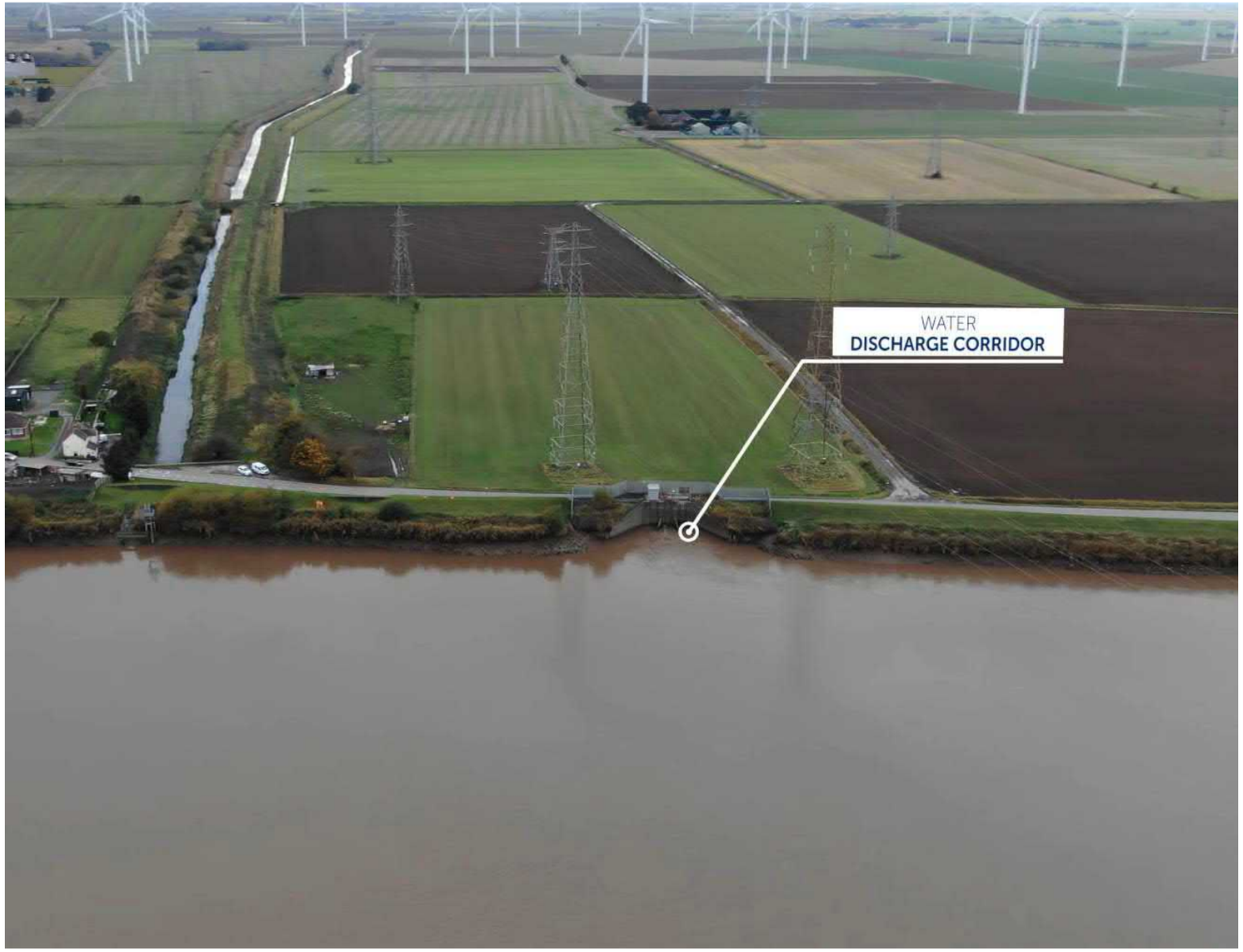
Comments	Canal	Trent
Trinity House *Trinity House is primarily concerned with the works that are to take place below the high water mark. Therefore, as these works lie within the jurisdiction of ABP Humber, we advise that all marine safety risk mitigation measures should be agreed with ABP Humber in the first instance.*		**X**

OVERVIEW OF POTENTIAL WORKS



WATER DISCHARGE CORRIDOR





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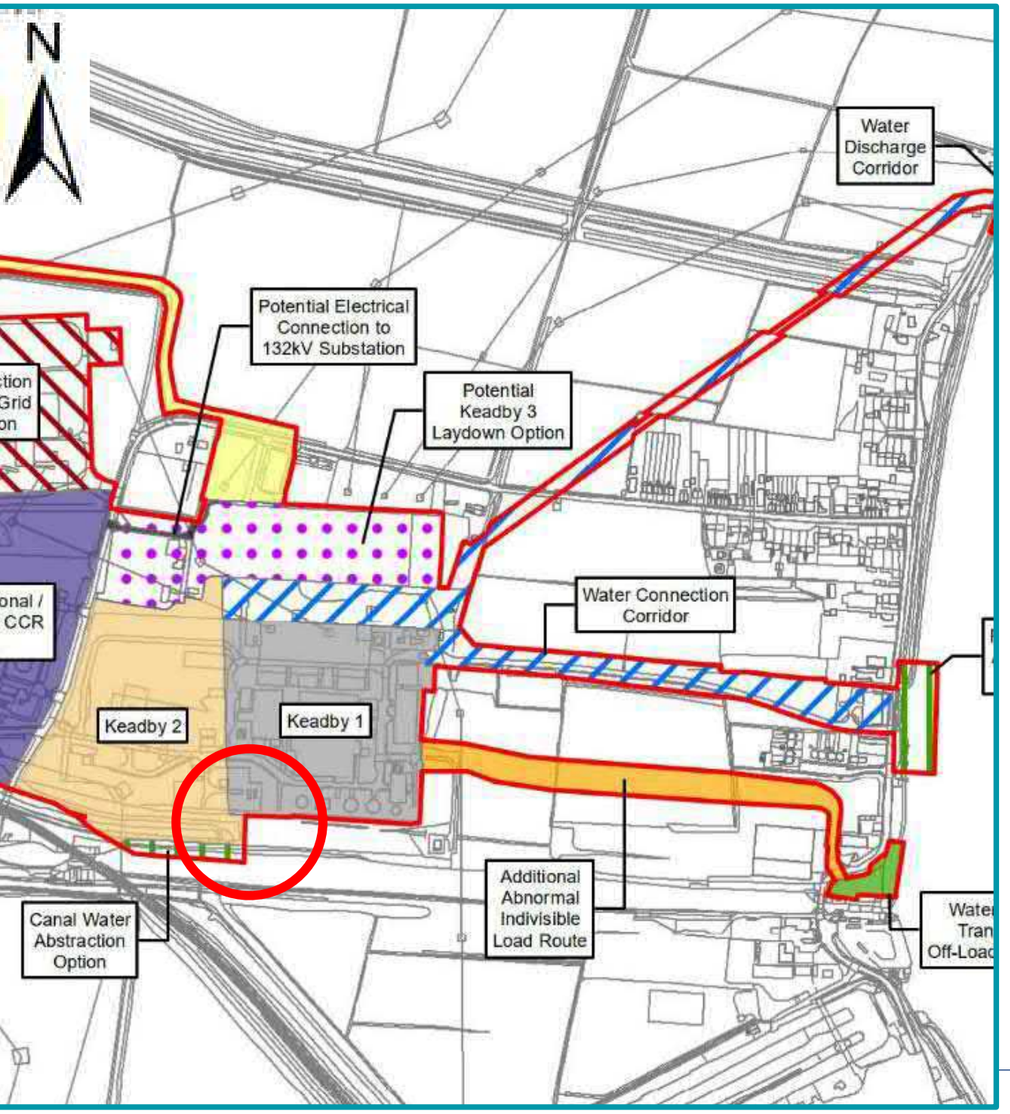
WATER DISCHARGE CORRIDOR

Construction

- Important to note this is an **existing outfall/** discharge corridor
  - used by Keadby 1
  - proposed to be used by Keadby 2
- Discharge corridor and outfall proposed with limited upgrade works, only if necessary
- No in-river working/ cofferdams proposed

CANAL WATER ABSTRACTION OPTION



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CANAL WATER ABSTRACTION OPTION

Construction

- Comparable to K2 intake construction (see images left and below)
- Preliminary extent of cofferdam in the Canal estimated at ~15m

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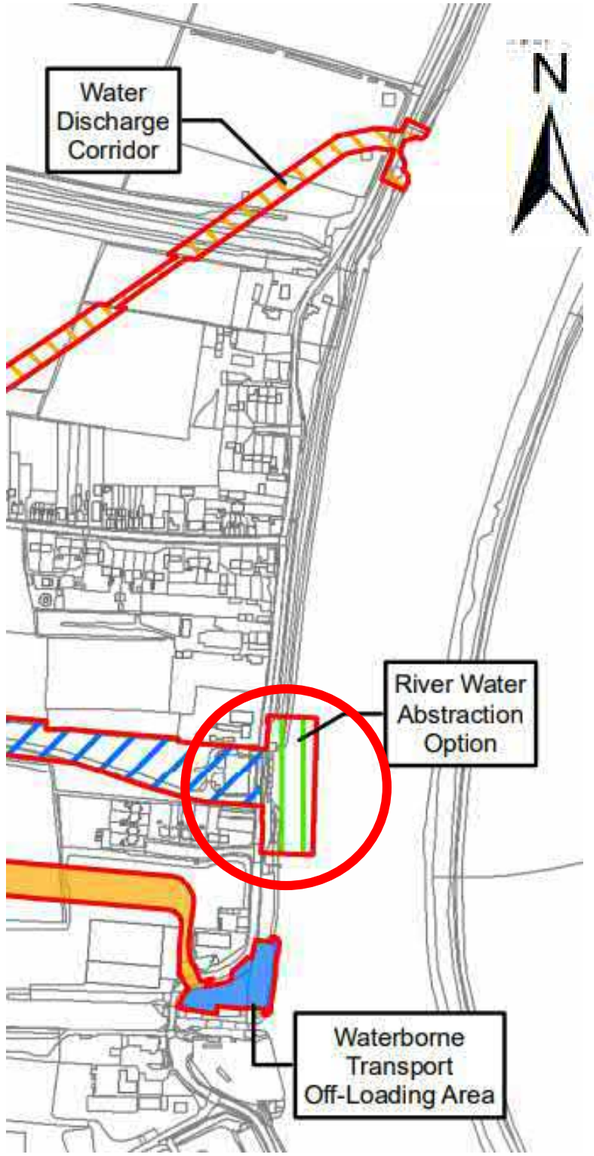
RIVER WATER ABSTRACTION OPTION



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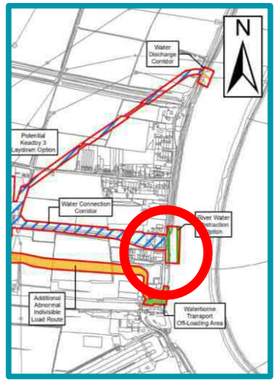
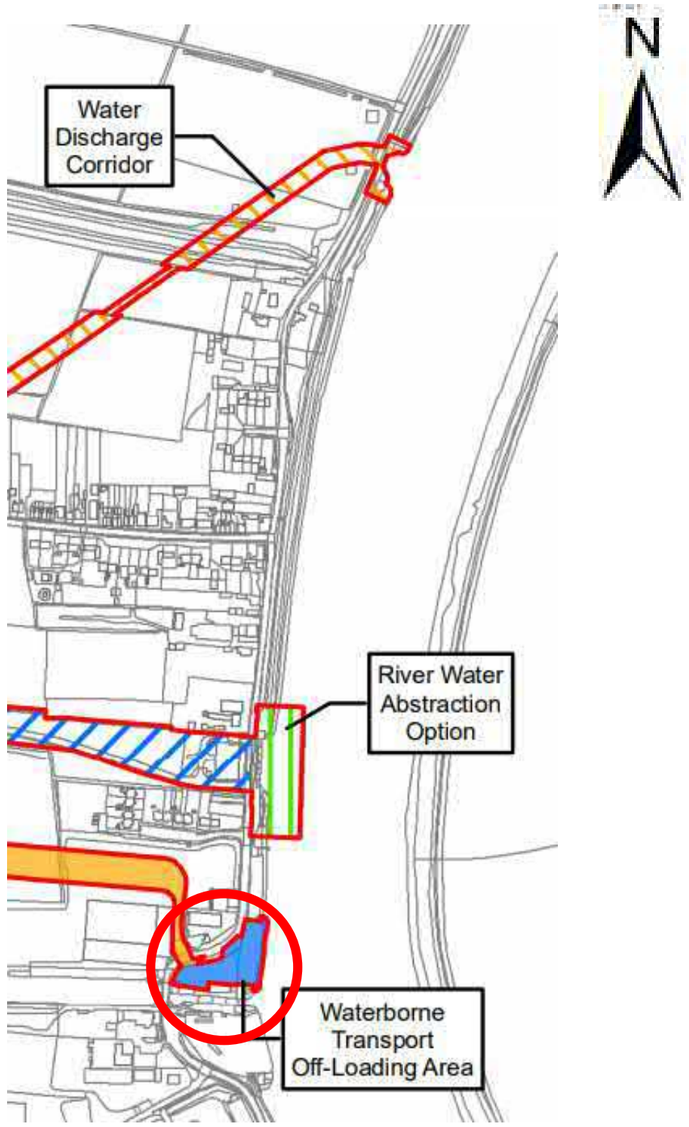
RIVER WATER ABSTRACTION OPTION (NOTE THAT THIS IS NOT OUR PREFERRED OPTION)



- If we cannot abstract from the canal, we will utilise the existing (consented) abstractions from the River Trent for Keadby 1
- Existing pipework/ infrastructure in river likely to be upgraded/ replaced given age/ condition and to enable compliance with Eels (England and Wales) Regulations 2009
- Preliminary extent of cofferdam in the River Trent estimated at ~25m (very minor ingress into the river)

WATERBORNE TRANSPORT OFF-LOADING AREA



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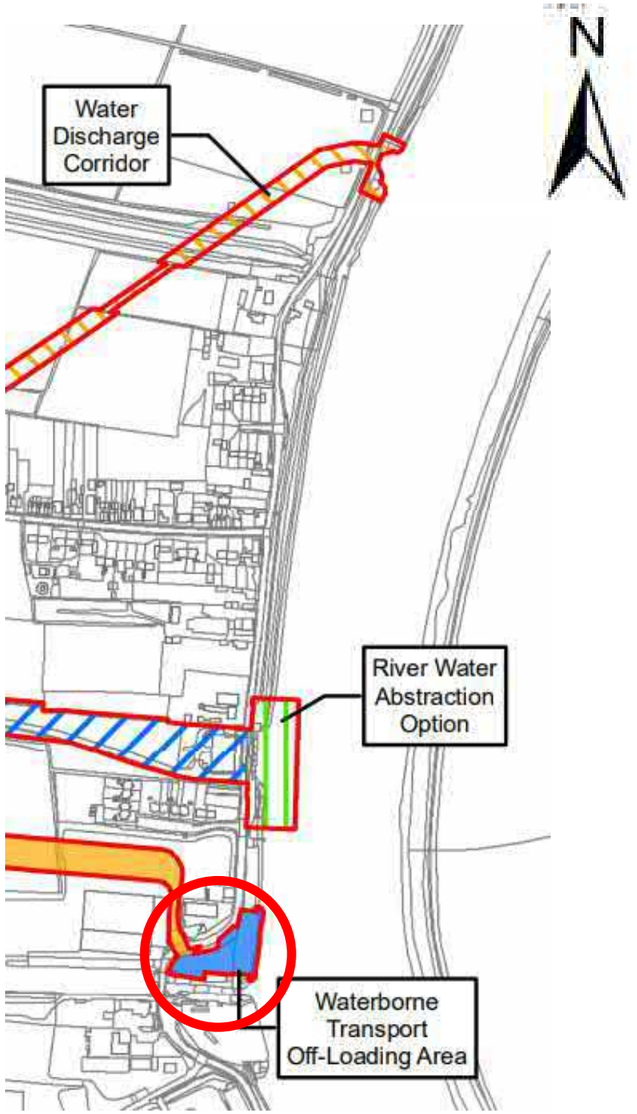
WATERBORNE TRANSPORT OFF-LOADING AREA

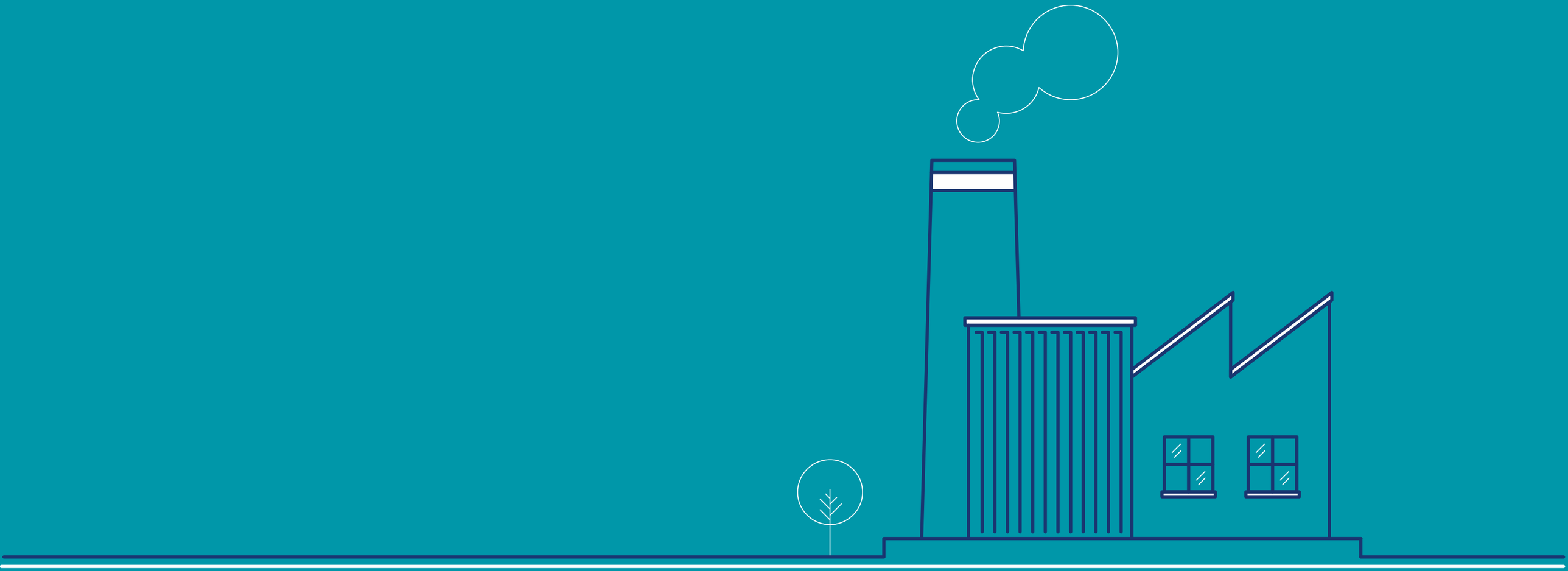


Existing Waterborne Transport Offloading Area

- Use will be consistent with use for Keadby 2 construction enabling abnormal loads to use waterborne transport – no MMO MLA activity thus far)
- No “in-river” works proposed during construction stage
- Powers sought will be for temporary retention, improvement of concrete pad (if larger mobile cranes required) and use of the existing Railway Wharf facilities (‘Waterborne Transport Offloading Area’
- Indicative order limits have been extended since PEI Report to account for feedback raised by CRT (i.e. an additional ~5m oversail to allow for swinging a larger crane over delivery vessel)
- Load bearing capacity of wharf and crane pads recently upgraded to facilitate delivery of abnormal loads for Keadby 2 construction – not proposing anything similar for Keadby 3 as these engineering works are adequate

sse Thermal

ACCESS AND USE OF RAILWAY WHARF



sse Thermal

WATERBORNE TRANSPORT OFF-LOADING AREA

SSE Thermal

WATERBORNE TRANSPORT OFF-LOADING AREA

Predicted Usage

- The Framework Construction Traffic Management Plan will include an Abnormal Indivisible Loads (AIL) strategy that recognises strategic policy (and as encouraged by CRT S42 responses), ‘more by sea’ to be pursued
- Small components and modules will be transported using the existing road network but some of the more significant modules would be transported by ship along the River Trent to an Railway Wharf

WATERBORNE TRANSPORT OFF-LOADING AREA

Predicted Usage

- AIL strategy will acknowledge that where the Wharf or access route to site from the quayside is unsuitable for some of the larger modularised units, other AIL routes would be implemented (e.g. unit landed at Goole and transported to site using existing road network)
- Usage during construction of K2 under review
- Keadby 3 shipment estimated based on K2 with the addition of Carbon Capture Plant (CCP)
- Vessel type consistent with K2 construction / local transhipment activities (i.e. at Keadby and adjacent facilities at Grove Point)

WATERBORNE TRANSPORT OFF-LOADING AREA

Predicted Usage

- Vessel dimensions likely to be comparable to Keadby 2
- Review of historical transhipment programme/specifications suggest largest vessels likely to be:
  - 66m length / 10m beam
  - 80m length / 12m beam
  - 82m length / 11m beam
  - 82 length / 11.5m beam

MAMMOET Hansa Meyer Global

Keadby 2 CCGT Project

Railway Wharf Shipment Schedule

Last Updated: 18/09/2020

Shipment Number	Vessel Name	Heavy Lifts	Other Packages	Scheduled ETA	Scheduled ETD
1	[illegible]	[illegible]	[illegible]	06/02/2020 - 04:45	07/02/2020 - 18:30
2	MV AMY (V1)	Pre Fab Modules		13/02/2020 - 10:45	13/02/2020 - 22:45
3	MV AMY (V2)	Pre Fab Modules		19/02/2020 - 04:25	19/02/2020 - 16:30
4	MV AMY (V3)	Pre Fab Modules		24/02/2020 - 08:30	24/02/2020 - 20:30
5	MV AMY (V4)	Condenser		26/02/2020 - 08:30	26/02/2020 - 21:30
6	MV AMY (V5)	Pre Fab Modules		28/02/2020 - 10:30	28/02/2020 - 22:30
7	H&S Bravery	Steam Turbine Set		19/03/2020	19/03/2020
8	MV AMY	Pre Fab Modules		20/03/2020	20/03/2020
9	HRSG 1 - TBC	2 x HRSG		26/03/2020	26/03/2020
10	HRSG 2 - TBC	2 x HRSG		27/03/2020	27/03/2020
11	HRSG 3 - TBC	2 x HRSG		28/03/2020	28/03/2020
12	HRSG 4 - TBC	2 x HRSG		30/03/2020	30/03/2020
13	HRSG 5 - TBC	2 x HRSG		01/04/2020	01/04/2020
14	HRSG 6 - TBC	2 x HRSG		02/04/2020	02/04/2020
15	HRSG 7 - TBC	2 x HRSG & 2 x ABC		04/04/2020	04/04/2020
16	HRSG 8 - TBC	2 x HRSG & 1 ABC		06/04/2020	06/04/2020
17	HRSG 9 - TBC	2 x HRSG		08/04/2020	08/04/2020
18	HRSG 10 - TBC	2 x HRSG		09/04/2020	09/04/2020
19	H&S Bravery	STGEN		27/05/2020	28/05/2020
20	RMS Cuxhaven (nom)	Pre Fab Modules		10/06/2020	10/06/2020
21	H&S Wisdom (nom)	2 x HRSG		11/06/2020	11/06/2020
22	H&S Bravery (nom)	2 x HRSG		12/06/2020	12/06/2020
23	TBC	Pipework		19.06.2020	19.06.2020

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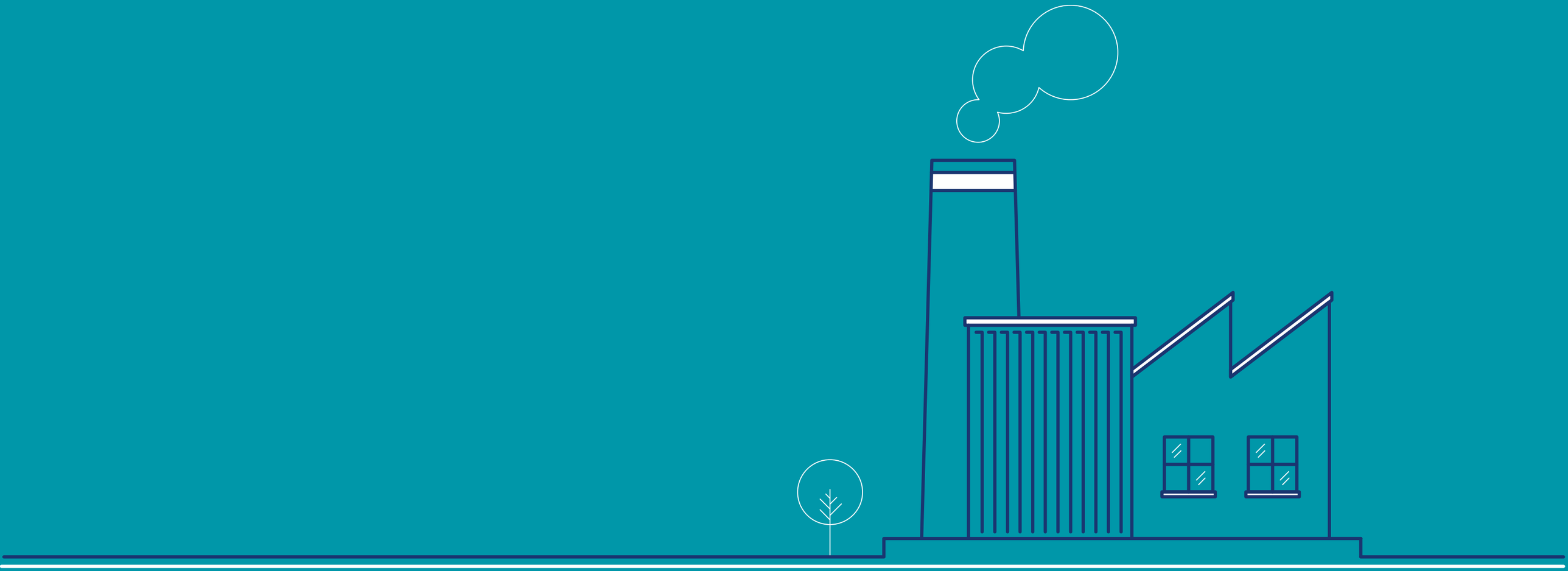
APPROACH TO NAVIGATIONAL RISK ASSESSMENT (NRA)



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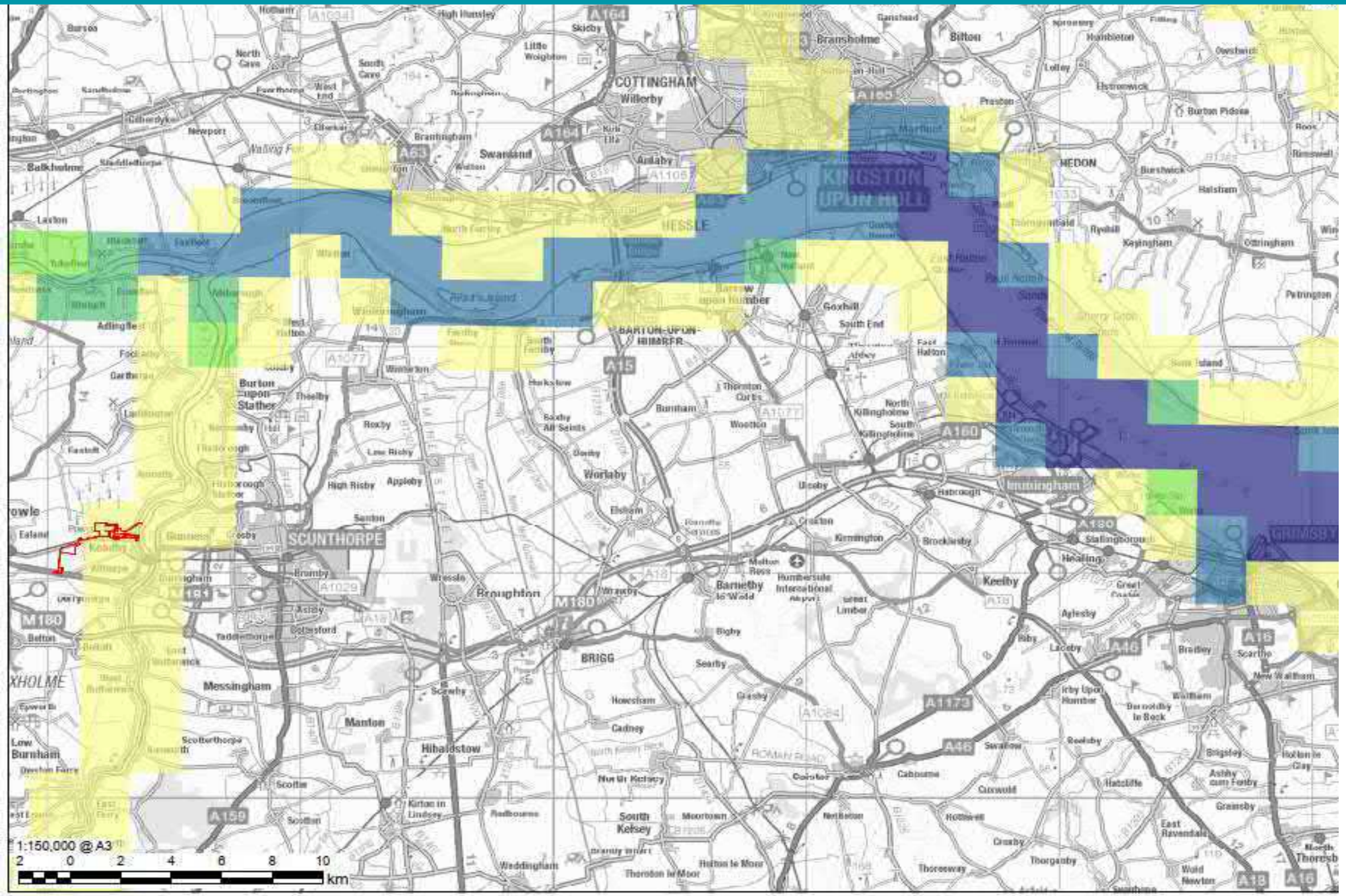
APPROACH TO NRA: MARINE BASELINE / DATA

Sources of Data

- AIS Grids and Track data has been reviewed (initially from 2015 and 2017; 2018 and 2019 data has been requested)
- Limitations of this data acknowledged
  - E.g. AIS not mandatory for all vessels (i.e. <10s / recreational traffic etc unlikely to be recorded)
- Still remains useful to provide an initial broad overview – see next slides

2017 VESSEL DENSITY GRIDS



AECOM

PROJECT

Keadby 3 Low Carbon Gas Fired Generating Station

APPLICANT

Keadby Generation Limited

CONSULTANT

AECOM Limited
3 City Walk
Leeds
LS11 9AR
[redacted]

LEGEND

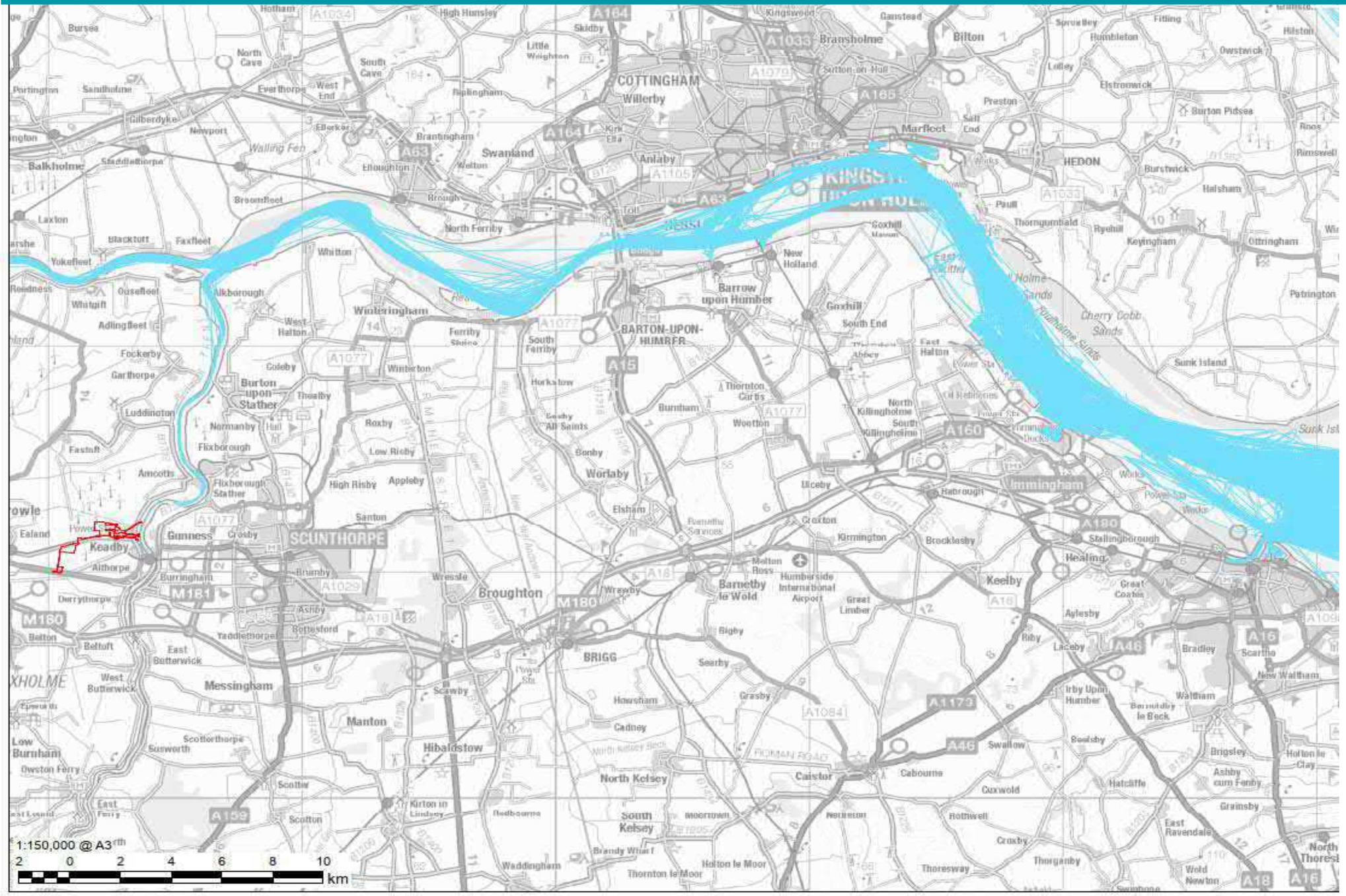
- The Order Limits

Vessel Density Grid 2017 (MMO)

Total Vessels - Annual Average

- 0 -200
- 200 - 500
- 500 - 1000
- 1000 - 10000
- >10000

2017 ANONYMISED AIS TRACK LINES



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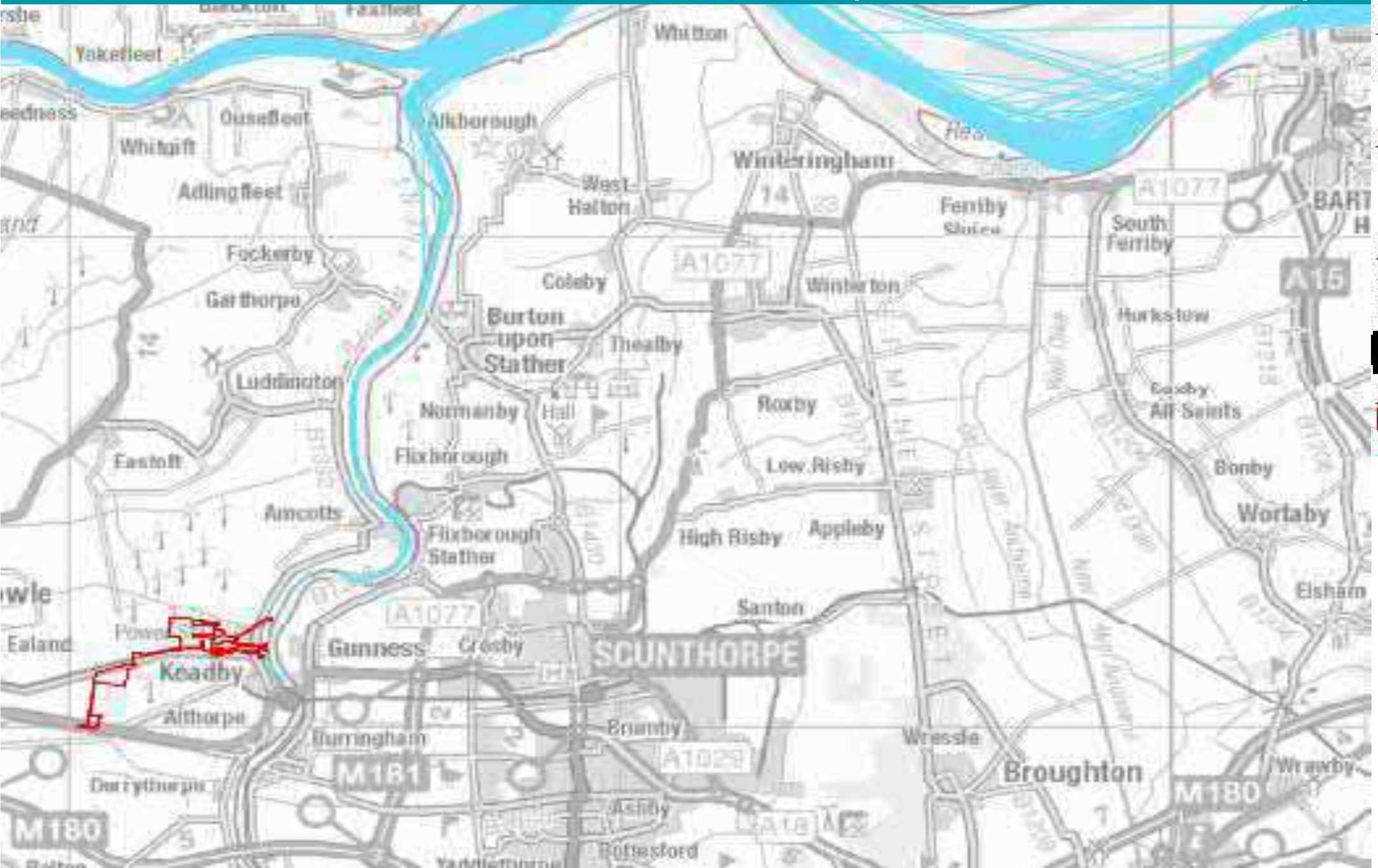
LEGEND

The Order Limits

Anonymised AIS Derived Track Lines 2017

2017 ANONYMISED AIS TRACK LINES (FOCUS ON KEADBY)



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LEGEND

The Order Limits

Anonymised AIS Derived Track Lines 2017

APPROACH TO NRA: MARINE BASELINE / DATA

Sources of Data

- Marine Public Register (indicating existing consented works / infrastructure)
- Industrial data (i.e. existing moorings, pipelines, wharves etc
- Data gathered February 2021 to reflect latest consented / recorded activities and infrastructure
- This is used to consider any risks to existing infrastructure and/or other mariners within the NRA

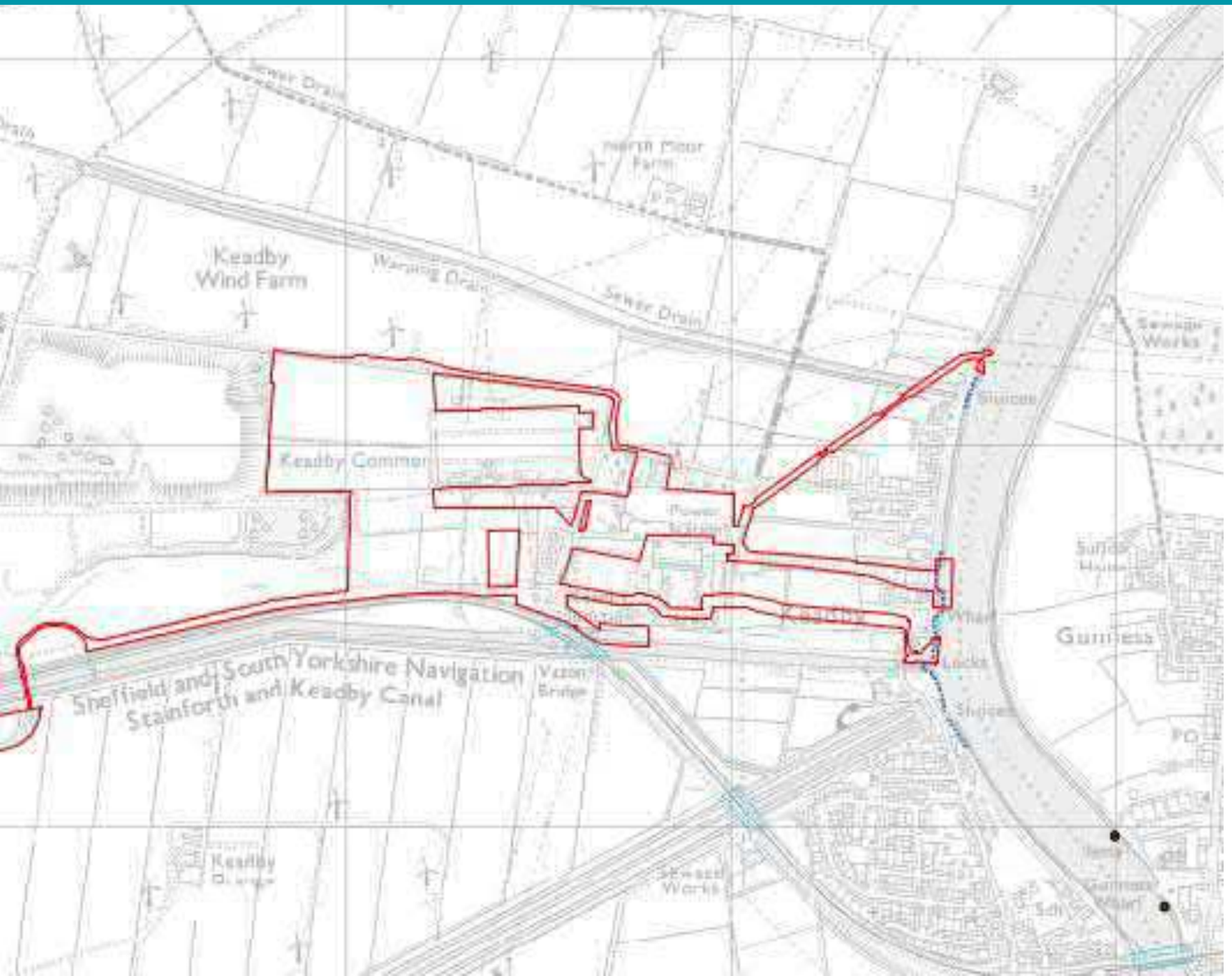
Historical Accidents

- Marine Accident Investigation Branch (MAIB) data
- Any local incident reports, where available

Key Considerations

- Operational Cooling Water System (CWS) associated with K1
- K1 O&M (including periodic dredging)

APPROACH TO NRA: MARINE BASELINE / DATA



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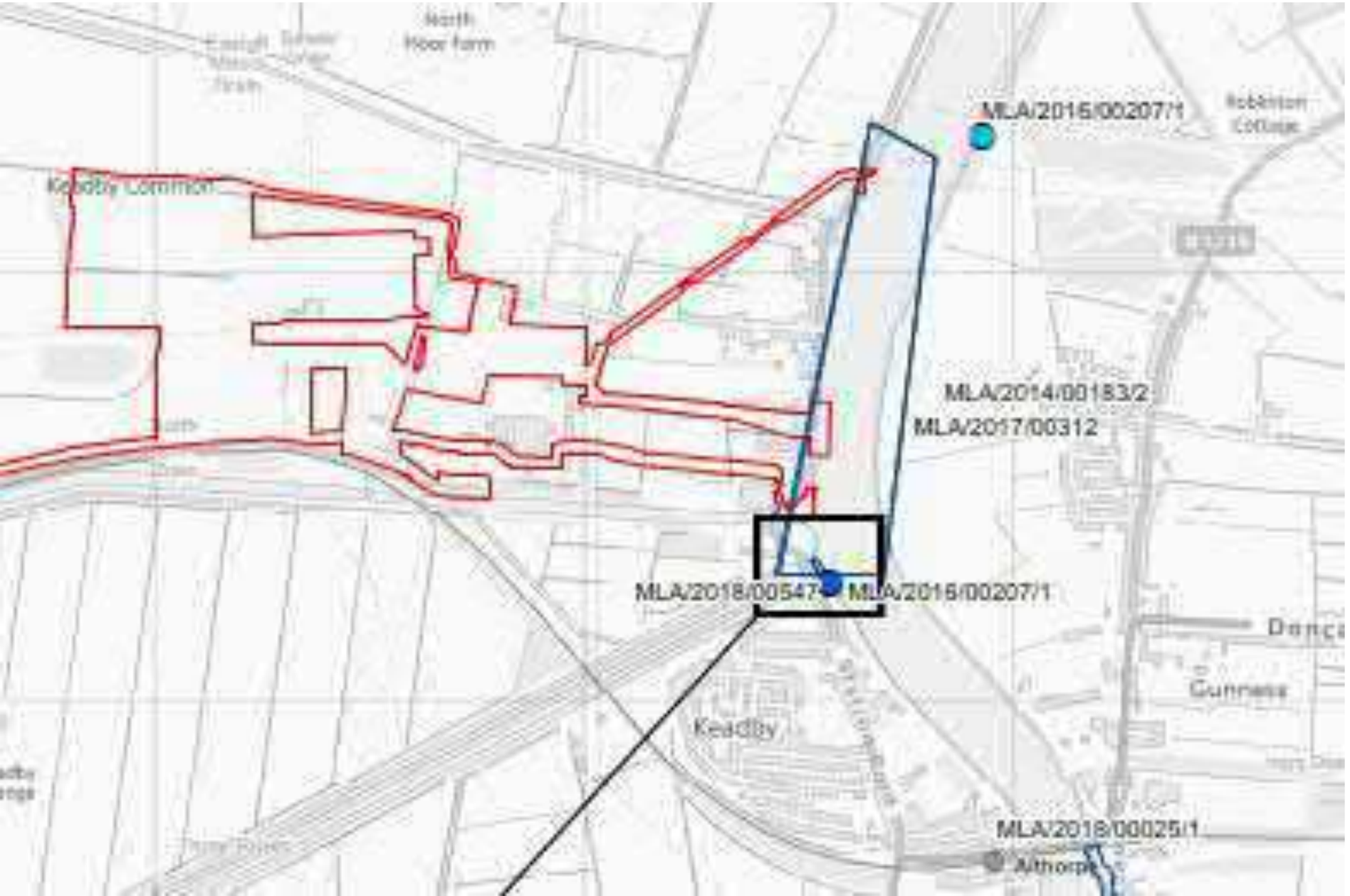
LEGEND

- The Order Limits
- File
- Shoreline Construction, Undefined
- Shoreline Construction, Pier (Jetty)
- Shoreline Construction, Wharf (Quay)
- Shoreline Construction, Bridge

APPROACH TO NRA: MARINE BASELINE / DATA



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Leeds
[redacted]

LEGEND

- The Order Limits
- Gunness Outfall
- Keadby Outfall
- MMO License Application Boundary (MMO)

APPROACH TO NRA: MARINE BASELINE / DATA

Sources of Data

- Historical MMO Dredging Licence / engagement with Keadby 1 O&M Team
- High volumes of river muds / silt and wider fouling risks require periodic management
- This is an ongoing period (consented) activity at Keadby 1 – operations discussed in following slide…

APPROACH TO NRA: MARINE BASELINE / DATA

Keadby 1 (Consented) O&M Considerations for NRA

Dredging (Option I)

- Cutter Suction Dredger

Dredging (Option II)

- Bucket Dredger

Diving Operations

- River-based dive operation (less constrained access/easier)
- Supported with small safety boat

Clearance and Maintenance

- Hand-removal of any residual silts
- Insertion of stop gates (i.e. to isolate the CWS)

APPROACH TO NRA: HISTORICAL EXPERIENCE

Keadby 2

- Use of Railway Wharf/Canal encouraged by consultees during consultation (s.36 Variation)
- Canal infeasible due to typical vessel size required for modules
- No formal NRA undertaken for K2 (Railway Wharf planning application - PA/2019/1554 – focused on terrestrial risks and management of piling works for reinforcement of the Wharf)
- NRA will be carried out for K3 – SSE wish to work with stakeholders from the outset to understand and address any issues from the outset
- Historical experience vital to assist with this…

APPROACH TO NRA: HISTORICAL EXPERIENCE

Experience from Keadby 2

- Engagement undertaken with heavy lift contractor for K2 to help inform planning / NRA for K3
- Key ‘lessons learned’:
  1. Updates on vessel shipment plan were welcome
  2. Use of the SSE Website to host a “live” shipment plan positive
  3. A better granularity of shipment plan likely to be of assistance to mariners
  4. Night-time unloading unlikely to be compliant with heavy lift contractor requirements / Harbour Authority controls
  5. Lighting for night-time working unlikely to sufficiently mitigate against Heath and Safety risks (noting potential impact to local residents also)
  6. Engagement and advance warning

APPROACH TO NRA: CONSULTATION

Bodies Identified and Ongoing Considerations

User	Notes
Canal and Rivers Trust	• Ongoing engagement • Permit for work (Canal) / ~Notice to Mariners (Canal)
ABP Humber	• Ongoing engagement • River Permit (Trent) / Notice to Mariners (Trent) • Compliance with Conservancy Act / bylaws
PD Ports (Keadby)	• Ongoing engagement regarding usage of Railway Wharf
Royal Yachting Association	• Confirmatory engagement may be undertaken
Department for Transport / Marine Accident Investigation Branch (MAIB)	• Historical MAIB data under review • Metadata has been requested to tie this to specific locations on Trent
Maritime and Coastguard Agency	• Ongoing engagement
Trinity House	• Ongoing engagement
Marine Management Organisation	• Confirmatory engagement may be undertaken
Other / Recreational Mariners	• Sea Cadets / British Canoeing / British Rowing – ongoing engagement

APPROACH TO NRA: DATA REQUESTS / HISTORICAL EXPERIENCE

Additional Data

- Keen to discuss data availability from ABP Humber, PD Ports and CRT?
- Local VTS?
- Historical experience of the K2 shipment / unloading?
- Other comparable experience?

NEXT STEPS

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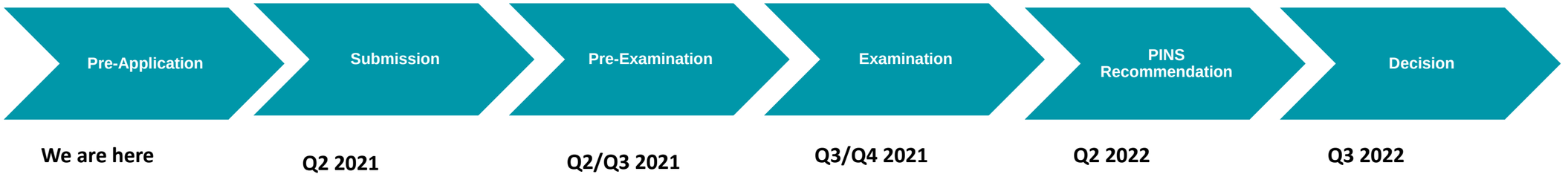
DCO APPLICATION PROCESS



- Stage II Consultation recently completed
- Technical engagement ongoing alongside production of Environmental Statement
- We will prepare a Consultation Report, to be submitted with the DCO application, which shows how we have considered comments received during Stage 1 (Spring 2020) and Stage 2 (Winter 2020) consultation
- We are proposing to submit the DCO application to the Planning Inspectorate (PINS) in Q2 2021
- Following submission, the application will be considered over the course of approximately a year, including a pre-examination period where we will develop Statements of Common Ground and seek to agree these with key stakeholders for submission into examination, and a 6-month examination

OPEN DISCUSSION / AOB

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THANK YOU

For further information, please contact:

consultation@keadby3.co.uk

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