FOREWIND

DOGGER BANK
TEESSIDE A & B

October
2013

Draft Environmental Statement
Chapter 6 Appendix C Onshore Study Area Characterisation

Dogger Bank Teesside
Onshore Study Area Characterisation

Forewind

October 2011
Final Report
9W7904

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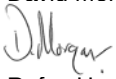
Date/initials check	
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1 INTRODUCTION

1.1 Purpose

The purpose of this report is to identify the key environmental considerations within the Dogger Bank Teesside Onshore Study Area (the onshore study area) that may have implications for the development of the onshore cable systems infrastructure required for the Dogger Bank Teesside projects. The findings contained within this report are intended to provide a basis for further detailed investigations and to assist in the search for suitable locations for the onshore cable systems infrastructure required for the Dogger Bank Teesside projects.

1.2 Design and Technical Assumptions

This report is based upon the following technical assumptions;

- Buried High Voltage Direct Current (HVDC) electrical cable systems;
- A total capacity of up to 4.8GW; and
- Onshore transition pits at the landfall point to connect the offshore export cables to the onshore cables.

It should be noted that at this stage in the project development, these specific technical parameters are not yet fully developed and are subject to change.

1.3 Teesside Onshore Study Area

A broad onshore study area has been identified in which it is envisaged that the onshore cable systems infrastructure (cable systems) and converter stations will eventually be sited. This is shown in **Figure 1.1**, with the central grid reference being NZ 597 210. The whole area is approximately 253.89 square kilometres, and covers a large proportion of the Redcar and Cleveland Borough Council administration.

The onshore study area is located to the east of the River Tees, and stretches from Redcar across to Middlesbrough in the north, along the coast in the east, and meets the northern-most edge of the North York Moors National Park boundary in the south. There is an assumption for a preference for the cable systems to connect into a site in close proximity to the existing National Grid Substations at Lackenby (See **Figure 1.1**) where the connections to the national electricity transmission network will be made.

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- Offshore Cable Route Study Area

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0 0.5 1 2
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 1.1: Onshore Study Area

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:

9W7904/TOSAC/1.1/00

SCALE	1:200,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

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2 METHODOLOGY

2.1 Approach

An iterative assessment process has been undertaken; this has included the following steps:

1. Desk-top review of existing data and gap analysis;
2. Purchase and collation of additional data sets;
3. Review of planning policy documentation;
4. Review of environmental and planning documents for surrounding developments; and
5. A Geographical Information System (GIS) aided study to characterise the development considerations present within the onshore study area.

2.2 Data sources

A variety of data sources have been utilised to inform the work undertaken. The majority of the national data sets were largely sourced from the earlier Zone Characterisation (ZoC) studies, undertaken as part of the Zone Appraisal and Planning (ZAP) work (Forewind, 2010). These are required under the Crown Estate Round 3 leasing process.

In addition to the national and international datasets, a number of regional and local datasets have been sourced from a variety of organisations. All datasets have been combined and analysed using GIS software. **Table 1.1** summarises the datasets obtained and the data providers.

Table 1.1: Datasets and Providers

Data Provider	Datasets
Existing data review	
Zone Characterisation (ZoC) Report (Forewind)	*Utilities*: existing substations, grid connections, national grid gas pipes, overhead cables, airfields *Designated sites*: Special Area of Conservation, Special Protection Areas, Ramsar sites, Special Sites of Scientific Interest, National Nature Reserves, Local Nature Reserves; Country Parks, National Parks, RSPB reserves, Areas of Outstanding Natural Beauty, Heritage Coasts *Habitats*: Ancient woodlands *Archaeological designations*: World Heritage Sites, Scheduled Ancient Monuments, Battlefields, Listed Buildings, Registered Parks and Gardens *Hydrology and hydrogeology:* Lakes, rivers *Infrastructure/Land Use*: built up areas, roads, schools, hospitals, railways

Data Provider	Datasets
	Geology: 1:625,000 bedrock and superficial geology
Data collection	
Find Mapping and Data Consultancy	Water abstractions, detailed river line, nodes and offline drainage, groundwater vulnerability mapping, waste and landfill sites. 1:50,000 superficial geology
Natural England	Agricultural Land Classification
Tees Archaeology	Historic Environment Records for Redcar & Cleveland
North East Environmental Records Information Centre (ERIC)	Records of the following within a 1km buffer zone around the onshore study area: Local Wildlife Sites (LWS); UK Biodiversity Action Plan (BAP) habitats; and notable and protected species records
Bing Maps	Aerial photography
Redcar & Cleveland Borough Council	Development Plan Documents, Strategic Flood Risk Assessment; Flood Zone Maps
Various sources	Relevant Environmental Statements, committee reports/decision notices/appeal decisions

3 PLANNING POLICY FRAMEWORK

3.1 National Planning Policy

The Planning Act (2008) makes provision for the Government to produce National Policy Statements (NPS). These establish the national need for a particular type of major infrastructure, together with a series of criteria relating to the benefits and impacts of a development, which the Infrastructure Planning Commission (IPC) will consider when making recommendations in relation to a Nationally Significant Infrastructure Project (NSIP) application.

The aims of the NPS are to:

- Integrate environmental, social and economic objectives, including climate change commitments, for the delivery of sustainable development;
- Set out the national need for infrastructure development and set the policy framework for IPC decisions; and
- Provide a major step towards to the overall goal of speeding up the process of delivering infrastructure.

There are three NPS that hold particular relevance for offshore wind and its associated onshore development:

- Overarching NPS for Energy (EN-1, July 2011) (Department of Energy and Climate Change ((DECC)), 2011a);
- NPS for Renewable Energy Infrastructure (EN-3, July 2011) (DECC, 2011b); and
- NPS for Electricity Networks Infrastructure (EN-5, July 2011) (DECC 2011c).

The overarching NPS sets out the Government's policy for delivery of major energy infrastructure and is part of a suite of Energy NPS that were formally designated by the Secretary of State for Energy and Climate Change on 19th July 2011, having been debated and approved by the House of Commons the previous day.

3.2 Regional and Local Planning Policy

Having a plan led system, as detailed under Section 38(6) of the Planning and Compensation Act (2004), means that when determining a planning application, the development plan must be taken into account, in the absence of other material considerations.

The following key plans and policy documents currently form the regional, county and local planning policy framework:

- Redcar and Cleveland Borough Council (RCBC) Local Development Framework (LDF) currently containing:
    - Core Strategy Development Plan Document (DPD) Adoption (2007);
    - Development Policies DPD (2007);
    - Various Supplementary Planning Documents (SPDs), including the Landscape Character SPD (2010);
    - Adopted Proposals Map
- Redcar and Cleveland Local Plan (saved policies) (1999).

RCBC is in the process of adopting the LDF and it is anticipated that it will be fully adopted in 2013. The LDF will consist of a variety of Development Plan Documents (DPDs), Supplementary Planning Documents along with the Sustainability Appraisal, Statement of Community Involvement and the Local Development Scheme.

The relevant adopted LDF documents currently comprise of the following DPDs: the Adopted Proposals Map; 'Core Strategy DPD Adoption' (2007) and the 'Development Policies DPD' (2007). The policies in these documents have been adopted, along with saved policies from the Local Plan (1999), which will only be revoked once the LDF is adopted in full.

3.3 Planning Policies

This section outlines the policies relevant to the development of the cable route as taken from the relevant documents as outlined above. They have been broadly grouped in to the categories shown in **Table 3.1**.

Table 3.1: Policies applicable to the development of the onshore cable route

Policy Category	Policy Purpose
Renewable Energy	In terms of renewable energy policy the development is supported at the national, regional and local planning policy levels.
Nature Conservation and Ecology	The planning policy with regard to nature conservation and ecology focuses on the protection of designated sites, protected species and notable habitats, including Biodiversity Action Plan (BAP) habitats.
Archaeology and Cultural Heritage	Planning policy supports the protection of archaeology and cultural heritage features at all levels of planning policy.
Landscape	Planning policies regarding the protection of landscape seek to avoid development within designated areas and to protect, maintain and enhance the existing landscape character and important views.
Hydrology and Flood Risk	Hydrogeology and flood risk planning policies seek to safeguard water resources and prevent development in areas of flood risk as well as preventing any increase in flood risk to existing developments.
General Environmental	In addition to the specific topics outlined above, there are a number of policies in relation to; development within rural areas, sustainable development, agriculture, waste and settlements. Wherever possible, the development will need to be in accordance with these policies. Any issues will be addressed though the EIA process which will include the topics of land use, agriculture, air quality, noise and vibration and tourism. It is considered that these matters can be addressed through careful site selection, design and construction methodologies and will ensure that the project is in alignment with planning policy in these areas.

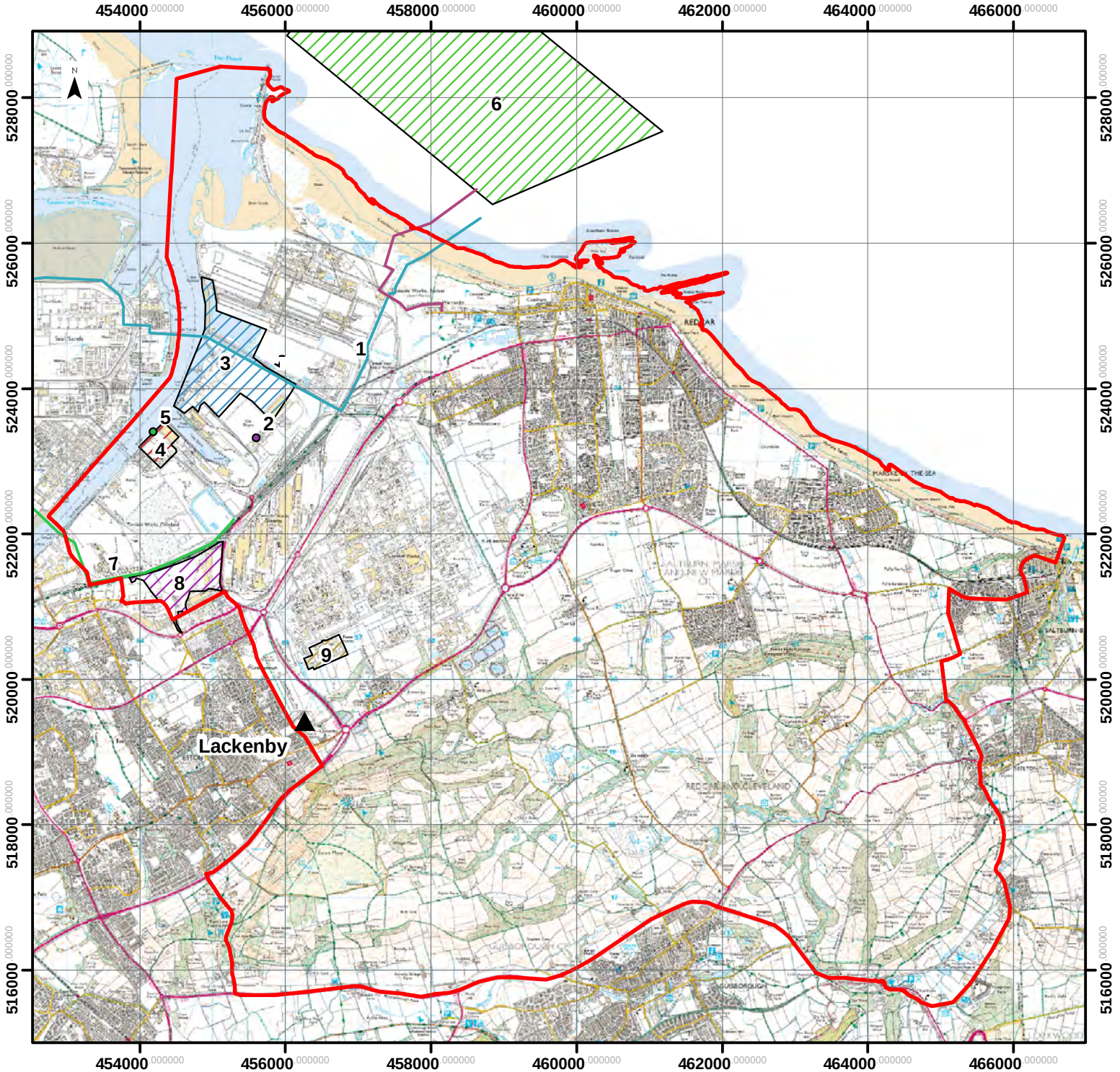
4 OTHER DEVELOPMENTS IN THE TEESSIDE AREA

4.1 Overview of Environmental Statements

An initial review of recent major infrastructure developments within the onshore study area has identified the following key documents that can provide further information on the development:

- EDF, Teesside Offshore Wind Farm (Environmental Statement, March 2004, Entec UK Ltd);
- PD Teesport, Northern Gateway Container Terminal (Environmental Statement, April 2006, Royal Haskoning);
- MGT, Tees Renewable Energy Plant (Environmental Statement, July 2008, PB Power);
- PD Teesport, QEII Berth Development (Environmental Statement, March 2009, Royal Haskoning);
- ASDA Teesside Wind Power Project (Planning Statement, November 2009, Green Peninsular); and
- RWE, Breagh Pipeline Project (Environmental Statement, February 2010, Envest).

The above reports provide a source of information on environmental baseline, assessments, consultations, mitigation and planning conditions within the onshore study area. At the present stage of the cable systems routeing assessment, due to the complexity of the developments and their diverse spatial and temporal parameters, it is difficult to fully assess these projects in the context of the potential cable routeing options. However the environmental information available within these Environmental Statements (ES) will be useful in progressing the second stage of the assessment and the subsequent ES for the preferred cable systems route. **Figure 4.1** provides the location of the above projects in relation to the onshore study area.



Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area

Key Proposed Projects

1 Breagh Pipeline Project
2 Asda Wind Turbine Project
3 Northern Gateway Container Terminal
4 Tees Renewable Energy Plant
5 QEII Berth Development
6 Teesside Offshore Wind Farm and Export Cable
7 National Grid Cable
8 South Tees Eco Park
9 Teesside Power Station

0 0.5 1
Kilometres

PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT
Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 4.1: Key Projects

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:
9W7904/TOSAC/4.1/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

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5 CHARACTERISATION

5.1 Key Considerations

The data received has been mapped and analysed using GIS. **Table 5.1** outlines the key considerations that have been identified as characterising the onshore study area. **Figures 5.1** to **5.12** show the development considerations present within the onshore study area. **Figure 5.13** shows the combined constraints.

Where distances between locations of features are reported, these distances have been measured from the closest edge of the boundary to the closest point or edge of the feature.

Table 5.1. Key Considerations within the Onshore study area

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
Land Use	The land use in the onshore study area is a mixture of industrial, residential and arable farmland. The north west of the onshore study area, alongside the River Tees is predominantly comprised of the industrial estate with Lackenby Power Station, Wilton Complex, Steel works, and Teesport docks. The town of Redcar is located in the north of the onshore study area with the smaller conurbations of Marske-by-the-Sea, New Marske, Lazenby, Upleatham and the border areas of Saltburn-by-the-Sea and Skelton scattered around the north and east. The southern half of the onshore study area is predominantly agricultural farmland with patches of woodland. The town of Guisborough borders the southern boundary and South Bank, Grangetown and Eston along the west. There are numerous schools within the residential areas around the onshore study area and there is one hospital located within Redcar. Public Rights of Way (PRoW) are prevalent across the onshore study area, in particular in the south and eastern areas of the onshore study area. A stretch of the Teesdale Way long distance walk which passes between Warrenby near Redcar and the Cumbrian Pennines in England, passes across the north western part of the onshore study area Wilton and Cleveland golf clubs are present within the onshore study area with Sultburn Golf Club adjacent to the eastern boundary. The Natural England Agricultural Land Classification classifies the northern area as urban and non-agricultural. The southern extent of the onshore study area is predominantly classified as Grade 3 which is good and moderate with large areas of Grade 2, 4 and to a lesser extent 5.	The following policies are from the Core Strategy DPD and are applicable to the onshore study area: *CS10 Steel, Chemical and Port related Industries*: *'A total of 230 hectares of land will be safe-guarded for chemical and steel manufacturing industries'; and* *The continued development and expansion of the chemical, steel and port related industries will be supported'.* *CS9 Protecting Existing Employment Areas* Scattered areas around the onshore study area are safeguarded for development for business and general industry. *CS23 Green Infrastructure* Strategic green areas, open spaces and landscape areas will be protected where appropriate. The relevant Saved Local Plan Policies to the onshore study area are: *TO5 Cleveland Way and the Teesdale Way* The routes of the Cleveland Way and the Teesdale Way will be safeguarded from any development which may prejudice their use as long distance footpaths.	**5.1**

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
		T16 Proposed cycle routes The line of the proposed cycle routes along the black path and between Guisborough and Nunthorpe will be protected from development. *IND3 General Industry, Business and Warehousing* Various areas around the onshore study area will be reserved primarily for general industry, business uses or warehousing. *L6: Major Leisure and Housing Development at Majuba Road, Redcar* The land is allocated for major leisure and linked housing development. Retail or food and drink units incidental to the main leisure use may be permitted. *H1: Housing Allocations* Areas have been identified on the proposals map allocated for new housing development.	
Utilities and transport	The principal transport infrastructure within the onshore study area includes four A-roads: A1085 (running through the north west and north east); A174 (running across the onshore study area from the west to east); A1042 (running down part of the centre of the area) and the A173 (in the south west of the onshore study area). Three B-Roads and other minor roads are present across the area. One passenger railway line runs across the upper half of the onshore study area, linking Saltburn, Redcar and Marske to Middlesbrough. Various railway stations are present in the urban areas and within the industrial area in the north west including: South Bank, British Steel Redcar, Redcar East, Longbeck, Marske, railways	The most relevant policy for transport issues regarding the development may be found in the Core Strategy DPD *CS26 Managing Travel Demand*: Proposals which support sustainability and minimise *congestion, environmental and safety issues* will be supported.	**5.2**

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	stations. Overhead power cables link into the existing Lackenby electrical substation. Buried utilities are also located within the south west of the onshore study area, close to Lackenby substation.		
Nature Conservation Designations	**Teesside Onshore study area** There are a number of statutory designated sites located within the onshore study area. *Internationally designated sites* The Teesmouth and Cleveland Coast Ramsar site is located within the northern area of the onshore study area . The area encompasses a range of habitats (sand and Intertidal Mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes), which support internationally important populations of waterbirds. The site is also designated as a Special Protection Area (SPA). *Nationally designated sites* There are four nationally designated sites within the onshore study area boundary. The South Gare & Coatham Sands Site of Special Scientific Interest (SSSI) and Redcar Rocks SSSI, form part of the Teesmouth and Cleveland Coast designated site. These sites are located within the north coast of the onshore study area boundary. South Gare & Coatham Sands SSSI is of considerable interest for its flora, invertebrate fauna and birdlife. Redcar Rocks SSSI is designated for its geological interest. Lovell Hill Pools SSSI is designated for its assemblages of dragonflies and damselflies. The pools also support populations of great crested newts.	CS24 *Biodiversity and Geological Conservation* seeks to protect and enhance the biodiversity and geological resources in the area.	**5.3 (statutory)** **5.4 (non-statutory)**

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	A small part of the Teesmouth National Nature Reserve (NNR) falls within the north western corner of the onshore study area. It is a coastal site with a range of habitats including intertidal mud and sand flats, sand dune systems, saltmarsh and grazing marsh. *Non-statutory designated sites* There are twenty Local Wildlife Sites (LWS) located within the boundary of the onshore study area, along with Coatham Marsh Wildlife Trust Nature Reserve, the Teesmouth and Cleveland Coast RSPB Important Bird Area (IBA), and Saltholme RSPB Reserve. **Buffer area** *Internationally designated sites (within 2km)* The North York Moors Special Area of Conservation (SAC) is located on the edge of the buffer zone. This site contains the largest continuous tract of upland heather moorland in England. There are also extensive blanket bogs within the site. The site is also designated as an SPA with its habitat supporting breeding merlin and golden plover. *Nationally designated sites (within 2km)* There are five SSSIs within the buffer zone: Seaton Dunes and Common SSSI; Seal Sands SSSI; Tees & Hartlepool Foreshore & Wetlands SSSI Saltburn Gill SSSI and North York Moors SSSIs. The North York Moors is also designated as a National Park. There are also two Local Nature Reserves within the buffer: Seaton Dunes and Common LNR, Flatts Lane Woodland Country Park LNR and Guisborough Branch Walkway LNR. *Non-statutory designated sites (within 1km buffer)*		

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	There are seven additional LWS within 1km of the onshore study area. In addition, there are three Country Parks: Flatts Lane Woodland, Guisborough Forest and Saltburn Valley. The North Yorkshire Moors RSPB IBA falls within the south east of the onshore study area.		
Habitats	ERIC provided a number of locations of UKBAP priority habitat types within the onshore study area. This included areas of reedbed and Maritime Cliff and Slope along the coastline and scattered parcels of woodland (some classified as Ancient), waterbodies, intertidal mudflats, coastal floodplain grazing marsh, coastal sand dunes, upland heath and a small area of lowland meadow in the south eastern corner.	Core Strategy DPD CS24 *Biodiversity and Geological Conservation* seeks to protect and enhance the biodiversity and geological resources in the area.	**5.5**
Species	ERIC provided records of protected species for the onshore study area and within a 1km buffer. **Teesside Onshore Study Area** *Mammals (terrestrial)* Within the onshore study area boundary, there are records of otter (nine records); water vole (eight records); pine marten (19 records); hazel dormouse (one record); red squirrel (one record); common pipistrelle (nine records); Daubenton's bat (three records); Noctule (one record); soprano pipistrelle (one record) and whiskered bat (one record). *Amphibians and reptile* Within the onshore study area boundary, there are records of great crested newt (25 records); palmate newt (18 records); smooth newt (36 records); common frog (60 records) and common toad (53 records). There are also records of adder (one record); common lizard (10 records) and slow worm (nine records).	Core Strategy DPD CS24 *Biodiversity and Geological Conservation* seeks to protect and enhance the biodiversity and geological resources in the area.	**5.5**

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	Other There is also a single record of barn owl and bluebell within the onshore study area. **1km buffer** *Mammals (terrestrial)* In addition to the onshore study area, within the 1km buffer, there are records of: otter (21 records); water vole (eight records); pine marten (two records); common pipistrelle (14 records); soprano pipistrelle (one record); Daubenton's (three records); Noctule (two records); and Natterer's (one record). *Amphibians and reptile* In addition to the onshore study area, within the 1km buffer, there are records of : great crested newt (12 records); palmate newt (16 records); smooth newt (41 records); common frog (46 records);and common toad (36 records). There are also records of adder (two records) and slow worm (seven records); *Notable species* ERIC also provided numerous records of notable species (UKBAP or Red Data Book) within the onshore study area and 1km buffer including: brown hare (UKBAP), hedgehog (UKBAP); harvest mouse (UKBAP); butterflies (large heath, small heath; wall; dingy skipper); beetles (17 species) and birds (26 species).		
Landscape	England is divided into landscapes of similar features. Teesside and the northern half of onshore study area falls into the Natural England Landscape Character Area 23 '*Tees Lowlands'*; the characteristics of which include: ● A broad low-lying plain of gently undulating, predominantly arable, farmland with wide views to distant hills. ● Meandering, slow-moving river Tees flows through the heart of the area dividing	Planning policy seeks to avoid impacts on important landscape character areas. CS 22 *Protecting and Enhancing the Borough's Landscape* •supports the protection and enhancement of the Borough's landscape based on the character areas	**5.6**

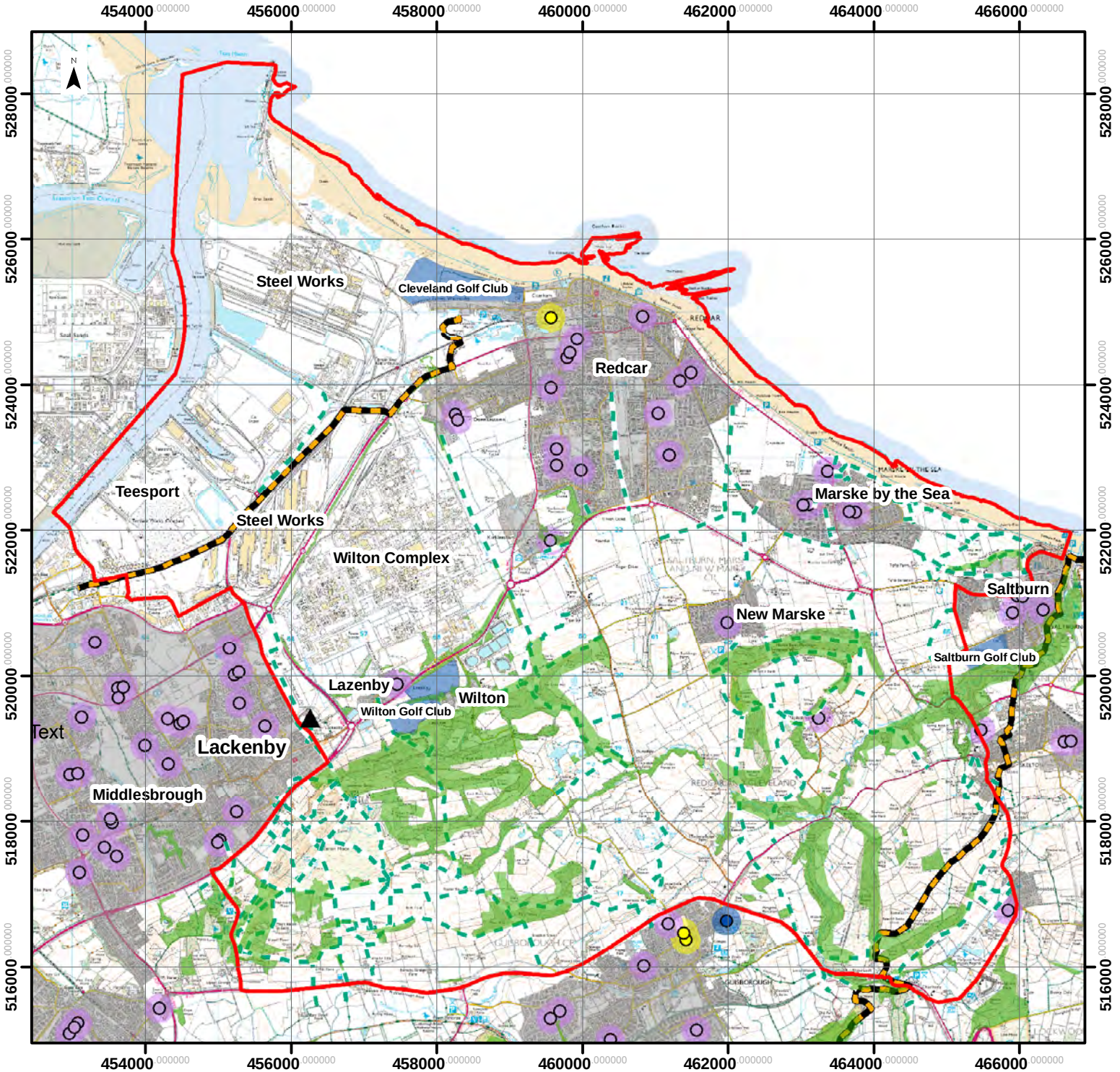
Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	the lowlands to north and south. ● Contrast of quiet rural areas with extensive urban and industrial development concentrated along the lower reaches of the Tees, the estuary and coast. ● Large-scale chemical and oil refining works, dock facilities and other heavy plants along the Tees estuary form a distinctive skyline by day and night. ● Overhead transmission lines and pylons, motorway corridors, railway lines and other infrastructure elements are widespread features. ● Woodland cover is generally sparse but with local variation such as at Skerne Carr, on steep banks of the middle reaches of the Tees, and to parkland and managed estates. ● Distinctive areas of peaty fenland flats and carrs within the Skerne lowlands. Extensive areas of mud flats, saltmarsh wetlands and dunes at mouth of the river Tees which support valuable wildlife habitats. ● Minor valleys and linear strips of open land extend as 'green corridors' from rural farmland into the heart of the Teesside conurbation. The southern part of the onshore study area falls into the Character Area 25 'North Yorkshire Moors and Cleveland Hills'; the characteristics of which include: ● Upland plateau landscape underlain mainly by sandstone and mudstone of Middle Jurassic age, and in the south, calcareous sandstone and limestone of Upper Jurassic age, with areas of undulating land arising from deposits of glacial till, sand and gravel. ● Plateaux dissected by a series of dales, often broad and sweeping, but with steep-sided river valleys in places, and floored by Lower Jurassic shales. ● Extensive areas of heather moorland on plateaux and hills, creating a sense of	identified through the Landscape Character Assessment; and •restricts any development which leads to the loss of important features of landscape character and supports measures to enhance, restore or create those special features.	

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	space, expansiveness and openness. ● Arable landscape to south and east, but part still on elevated, sweeping plateaux and hills. ● Sparsely settled, with population concentrated in the dales and around the fringes. ● Valley landscapes characterised by predominantly pastoral farming with clear demarcation between the enclosed fields, farms, settlements and the moorland ridges above. The transition is often marked by bracken fringes. ● Panoramic views over moorland ridges, dales, surrounding lowland vales and the sea. ● Extensive areas of coniferous plantations, especially on the Tabular Hills in the south-east and Hackness north of Pickering; with remnant areas of predominantly ancient semi-natural woodland occurring mainly on valley side slopes, on escarpments and fringing hills. ● Traditional stone walls and hedgerows enclosing fields in the dales and lower fringing farmland - now often replaced by fences. ● Farms and villages built of predominantly rubble limestone or dressed sandstone, with red pantile or slate roofs. ● Distinctive and dramatic coastal landscapes with high cliffs, small coves and bays, coastal towns and fishing villages. ● Rich archaeological heritage from many different periods, especially on the high moorland plateaux. There are no Areas of Outstanding Natural Beauty or Registered Parks and Gardens within 1km of the onshore study area. The North York Moors National Park is located within the 1km buffer around the		

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	onshore study area.		
Geology	The bedrock geology towards the north and west of the onshore study area is dominated by the Redcar mudstone formation (mudstone with thin sandstone and limestone beds in the lower part). Mercia mudstone (layer of red and green mudstone, with gypsum and sandstone with halite in the lower part) occurs in the north west, and there are smaller bands of staithes sandstone. The southern portion of the site is more complex with a number of formations present including: • Cleveland Ironstone Formation; • Staithes Sandstone Formation; • Whitby Mudstone Formation • Saltwick and Formation • Saltwick and Cloughton Formation; and • Moorgrit Member. Redcar Rocks SSSI is located in the north of the onshore study area and is designated since it provide the best exposure of rocks belonging to the oldest part of the Jurassic (205-142 million years ago) succession in the north-east of England. The superficial geology of the onshore study area is predominantly Devensian till deposits. Towards the south there are large outcrops of bedrock. Tidal flat deposits (consolidated soft low plasticity clay, with layers of sand, gravel and peat) in the cover the north and west off the onshore study area, a band of Glaciolacustrine deposits of clay and silt across the centre. In addition to this there are areas blown sand in the north and undifferentiated beach and tidal flat deposits towards the coast.	RCBC policy CS24 relates to the geology of the area, and is in line with PPS9. It supports protection of geological sites of special scientific interest.	**5.7 (Bedrock), 5.8** **(Superficial)**

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
Hydrogeology and Groundwater	Using 50K mapping, artificial groundwater was found in the north-western and southern parts of the onshore study area. Areas of groundwater vulnerability (minor aquifers) were also found corresponding with these areas. Four Environment Agency groundwater abstraction licences were found within the onshore study area with two in close proximity to the River Tees and the other two within the southern portion of the onshore study area. The onshore study area is not located within a Groundwater Source Protection Area.		**5.9**
Hydrology and Flood Risk	The River Tees is a major watercourse flowing along the north western side of the onshore study area. There are numerous smaller hydrological features within the onshore study area including Kettle Beck, Kinkerdale Beck and Dabholm Gut, along with Skelton Beck in the east which leads into Tocketts Beck, Waterfall Beck, Howl Beck, Dunsdale Beck and Moordale Beck. There are numerous other smaller drains scattered around the onshore study area. The north western corner of the onshore study area lies within the Environment Agency's Flood Risk Zone 3a and most of the periphery of this area is classified as Flood Risk Zone 2. The course of the becks, in the south east of the onshore study area is located within Flood Risk Zone 3b Flood risk zone 3a indicates there is a '*high probability'* of flooding, zone 2 is defined as '*medium probability'* and zone 3b is '*functional floodplain'*.	A Strategic Flood Risk Assessment (SFRA) has been undertaken by Redcar and Cleveland Borough Council. This included a detailed assessment of flood hazards for the area at risk of tidal flooding and how this risk impacts on allocated development sites. The study has found that only a small number of the SFRA development allocation sites are at risk from flooding. Flood risk to these sites is seen as a 'residual risk' manageable through mitigation measures such as selected land raising and flood resilience techniques. The SFRA concluded that all of the sites assessed in the Level 2 SFRA should be suitable for development subject to a detailed flood risk assessment (FRA) (JBA Consulting, 2010).	**5.10**
Land Quality	There are a number of authorised landfill sites within the onshore study area. The majority are located in the north western part of the onshore study area, associated with the industrial area. There are a couple of other authorised sites close to the urban area of Guisborough in the south of the onshore study area. Historic landfill sites and Environmental Permitting Regulations Licenced Sites are scattered around the onshore study area, with the highest density in the north west. Currently no areas of land have been determined as contaminated under Part 2A of the Environmental Protection Act 1990. Information regarding possible sites	The RCBC Policy DP7 of the Development Plan DPD sets out the requirements for developments sited near or on contaminated land: *'Applicants proposing development on or near potentially contaminated land or unstable land will be required to undertake a site investigation to assess the type, extent of contamination or instability and any remediation options.'*	**5.11**

Consideration	Relevance to the Teesside Onshore study area	Relevant Local Planning Policy	Figure no.
	requiring further investigation by the council under Part 2A was unavailable at the time of this report.		
Archaeology and Cultural Heritage	There are a number of Scheduled Monuments within the onshore study area, in particular around the south western portion in the Historic Landscape south of Lazenby. Listed Buildings are present , scattered around the onshore study area and particularly within the residential areas of Redcar, Marske-by-the-Sea, Lazenby and Skelton. Scattered throughout the onshore study area, there are numerous Historic Environment Records (HER). There are a number of Conservation Areas within the residential areas of Wilton, Kirkleatham, Upleatham, Saltburn-by-the-Sea and Skelton. The Eston Hills Historic Landscape falls within the south of the onshore study area. There are no World Heritage Sites, Historic Battlefields, Registered Parks and Gardens or areas designated as Heritage Coasts within the onshore study area. The North Yorkshire and Cleveland Heritage Coast is located just outside the eastern edge of the onshore study area boundary.	Policies aim for the preservation of archaeological sensitivities and conservation areas and the avoidance of impacts (DPD9 *Character of Conservation Areas*, CS25 *Built and Historic Environment*).	**5.12**



Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- Waterbodies
- Golf Course
- Woodland
- Residential Areas
- Public Right of Way
- National Trail
- Education Establishment (+ 200m Buffer)
- Hospital (+ 200m Buffer)
- Leisure Or Sports Centre (+ 200m Buffer)

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Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.1: Land Use

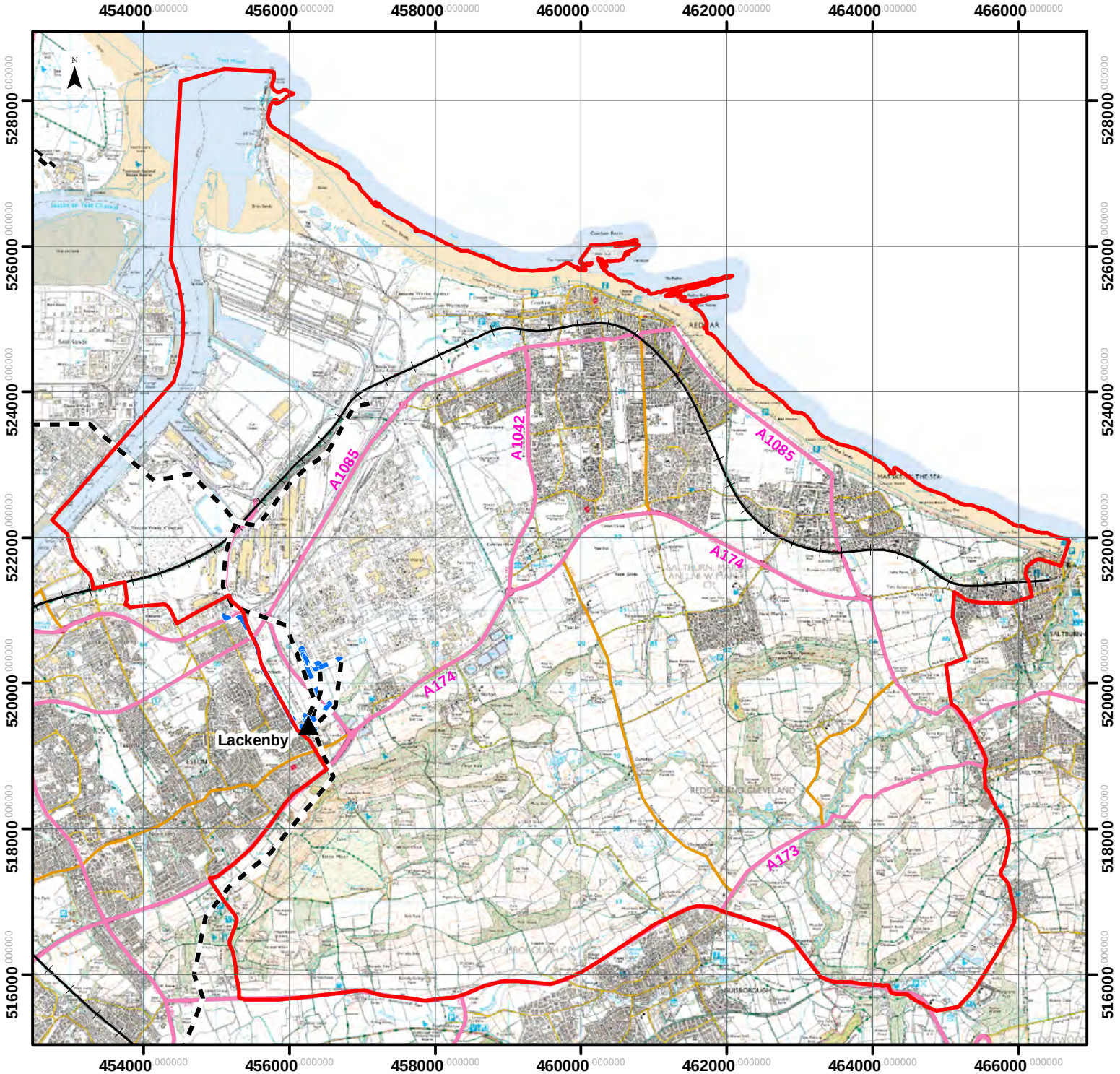
REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:

9W7904/TOSAC/5.1/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

ROYAL HASKONING



Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- Overhead Power Line (400kV)
- Underground Cables
- Railway
- A Road
- B Road

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Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.2: Transport and Utilities

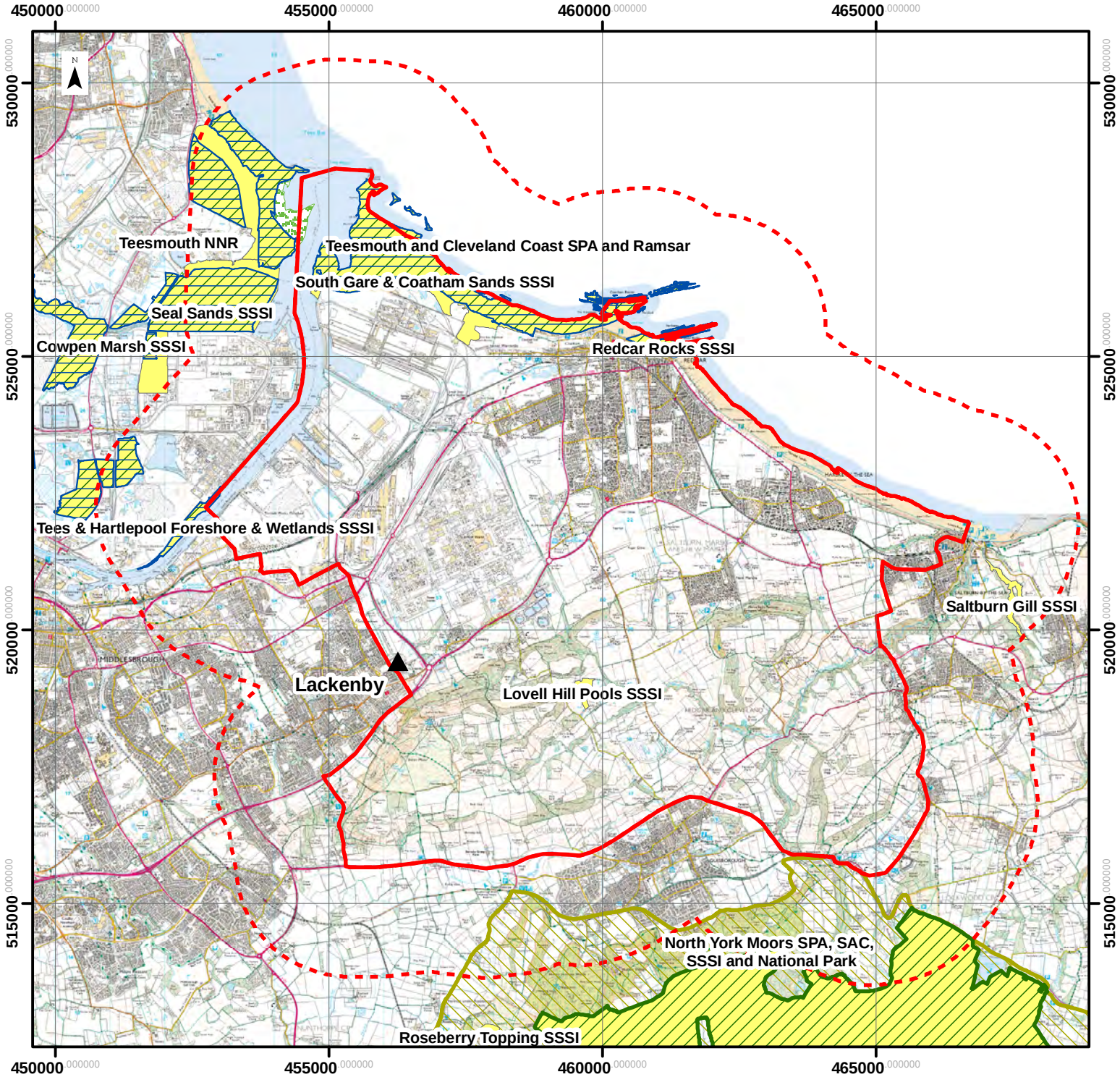
REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:

9W7904/TOSAC/5.2/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

ROYAL HASKONING



Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- 2km Study Area Buffer
- Teesmouth and Cleveland Coast Ramsar Site
- Special Protection Area (SPA)
- National Nature Reserve (NNR)
- Site of Special Scientific Interest (SSSI)
- National Park
- Special Area of Conservation

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Kilometres

PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT
Teesside Onshore Study Area Characterisation

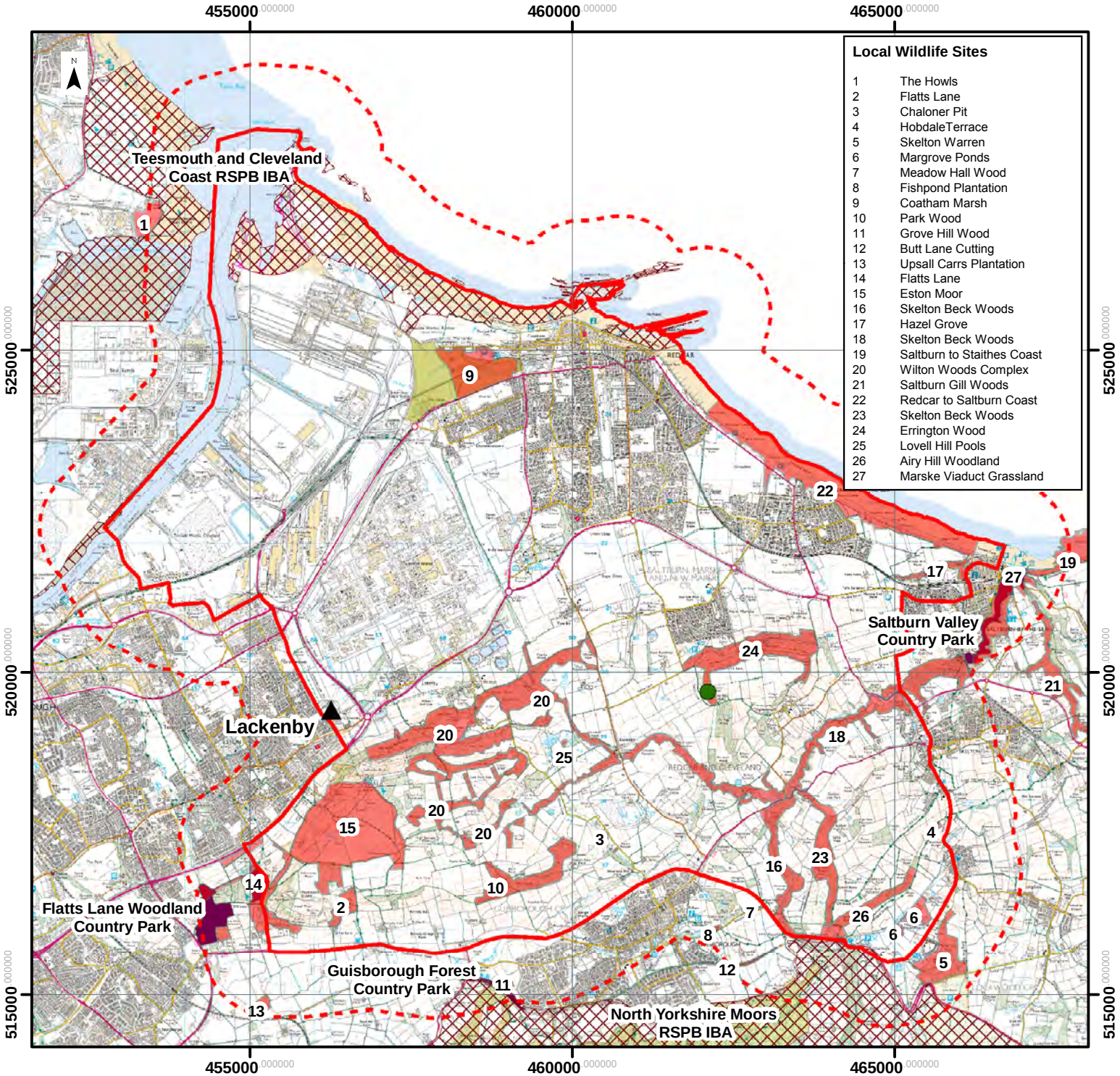
DRAWING TITLE
Figure 5.3: Nature Conservation Designations: Statutory

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:
9W7904/TOSAC/5.3/00

SCALE	1:100,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

ROYAL HASKONING



Local Wildlife Sites

1	The Howls
2	Flatts Lane
3	Chaloner Pit
4	HobdaleTerrace
5	Skelton Warren
6	Margrove Ponds
7	Meadow Hall Wood
8	Fishpond Plantation
9	Coatham Marsh
10	Park Wood
11	Grove Hill Wood
12	Butt Lane Cutting
13	Upsall Carrs Plantation
14	Flatts Lane
15	Eston Moor
16	Skelton Beck Woods
17	Hazel Grove
18	Skelton Beck Woods
19	Saltburn to Staithes Coast
20	Wilton Woods Complex
21	Saltburn Gill Woods
22	Redcar to Saltburn Coast
23	Skelton Beck Woods
24	Errington Wood
25	Lovell Hill Pools
26	Airy Hill Woodland
27	Marske Viaduct Grassland

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- 1km Study Area Buffer
- Local Wildlife SItes (LWS)
- RSPB International Bird Area (IBA)
- Saltholme RSPB Reserve
- Country Parks
- Soapwell Wood Woodland Trust Site
- Coatham Marsh Wildlife Trust Nature Reserve

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Kilometres

PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT
Teesside Onshore Study Area Characterisation

DRAWING TITLE
Figure 5.4: Nature Conservation Designations: Non-Statutory

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:
9W7904/TOSAC/5.4/00

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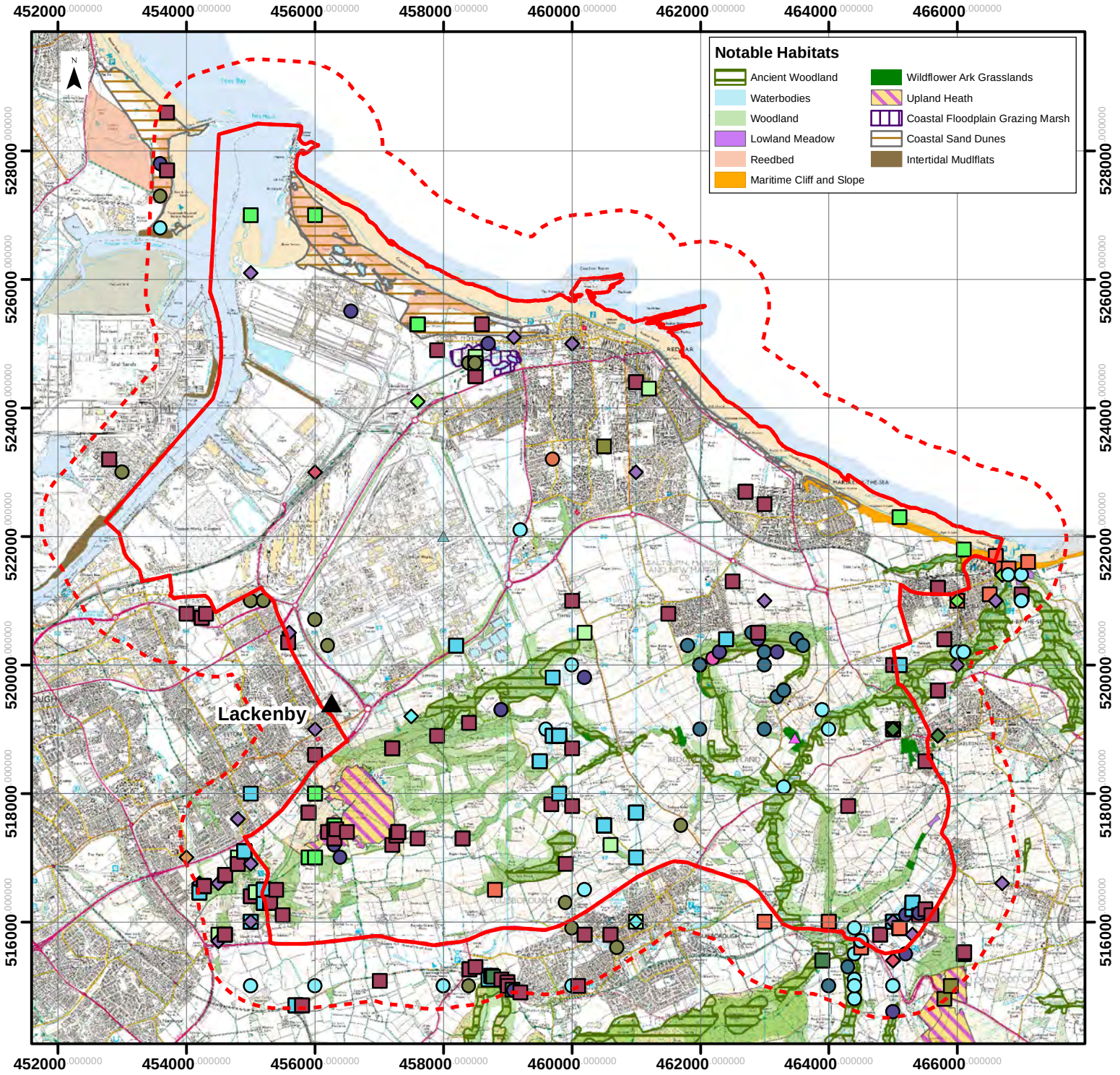
ROYAL HASKONING



Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- 1km Study Area Buffer

Protected Species

- Adder
- Common Frog
- Common Lizard
- Great Crested Newt
- Palmate Newt
- Smooth Newt
- Slow-worm
- Common Pipistrelle
- Daubenton's Bat
- Natterer's Bat
- Noctule Bat
- Pipistrellus
- Soprano Pipistrelle
- Whiskered Bat
- Barn Owl
- Bluebell
- Common Toad
- Eurasian Red Squirrel
- European Otter
- European Water Vole
- Hazel Dormouse
- Pine Marten

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Kilometres

PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT
Teesside Onshore Study Area Characterisation

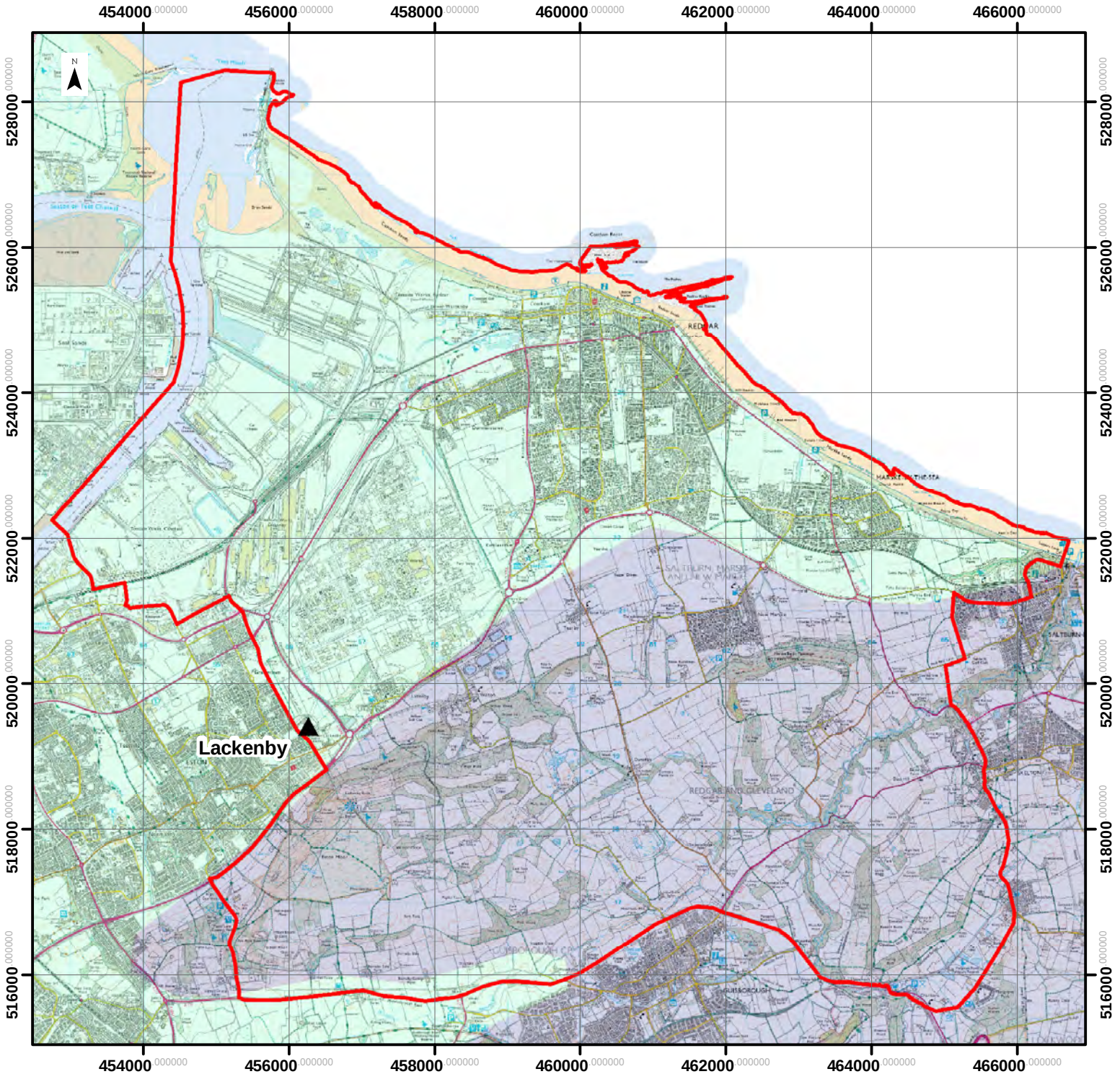
DRAWING TITLE
Figure 5.5: Notable Habitats and Protected Species

REV	DATE	REMARKS	Drn. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:
9W7904/TOSAC/5.5/00

SCALE	1:85,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

ROYAL HASKONING



Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area

National Landscape Character Areas

- North Yorkshire Moors and Cleveland Hills
- Tees Lowlands

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Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.6: Landscape Character

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:

9W7904/TOSAC/5.6/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

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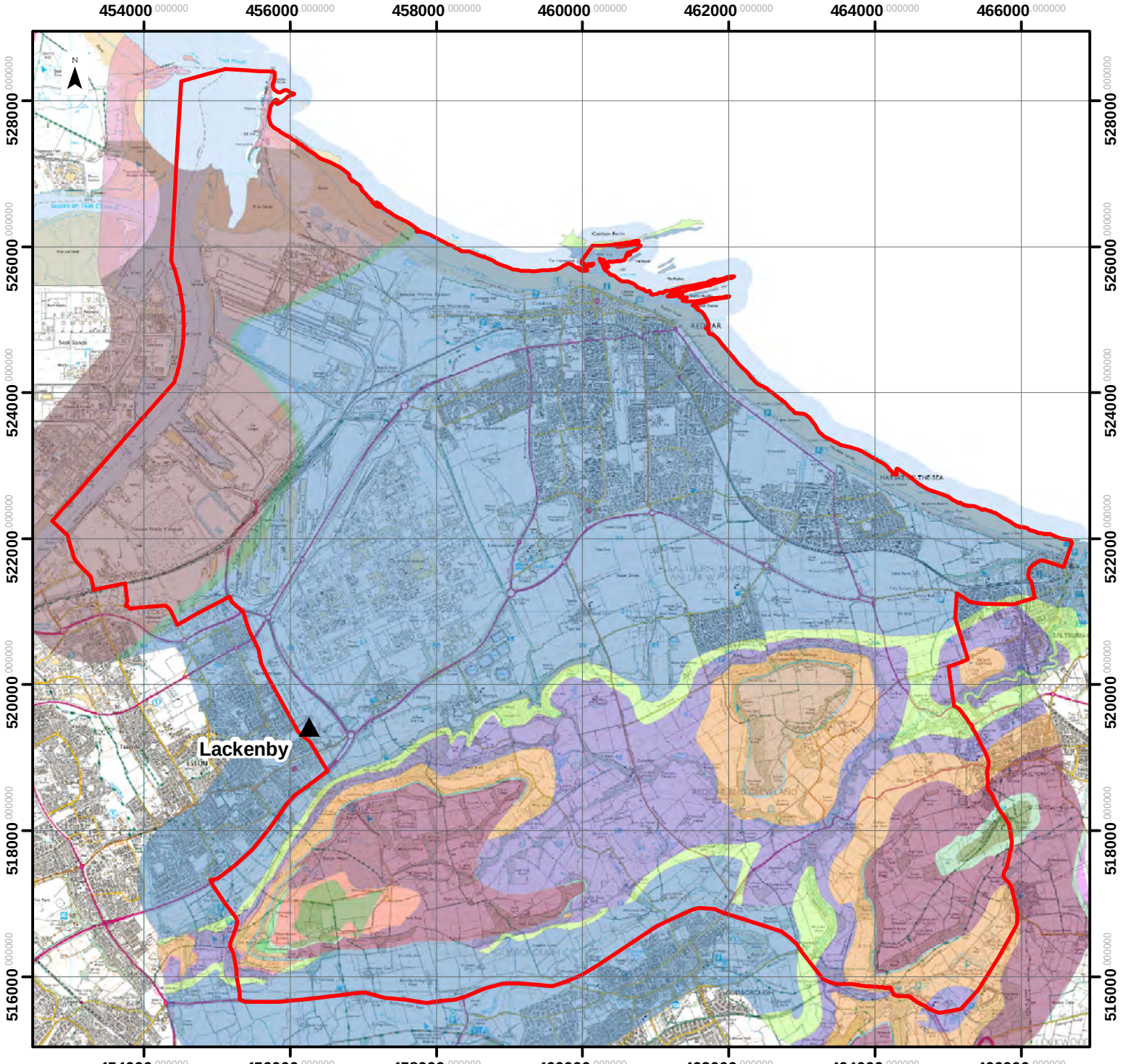

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area

Bedrock Geology

- Cleveland Ironstone Formation
- Cloughtin Formation
- Crinoid Grit Member
- Dogger Formation
- Eller Beck Formation
- Main Ironstone Seam
- Mercia Mudstone Group
- Moor Grit Member
- Penarth Group
- Redcar Mudstone Formation
- Saltwick Formation
- Saltwick Formation and Cloughton Formation
- Scalby Formation
- Scarborough Formation
- Sherwood Sandstone Group
- Staithes Sandstone Formation
- Whitby Mudstone Formation

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Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.7: Bedrock Geology

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:

9W7904/TOSAC/5.7/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

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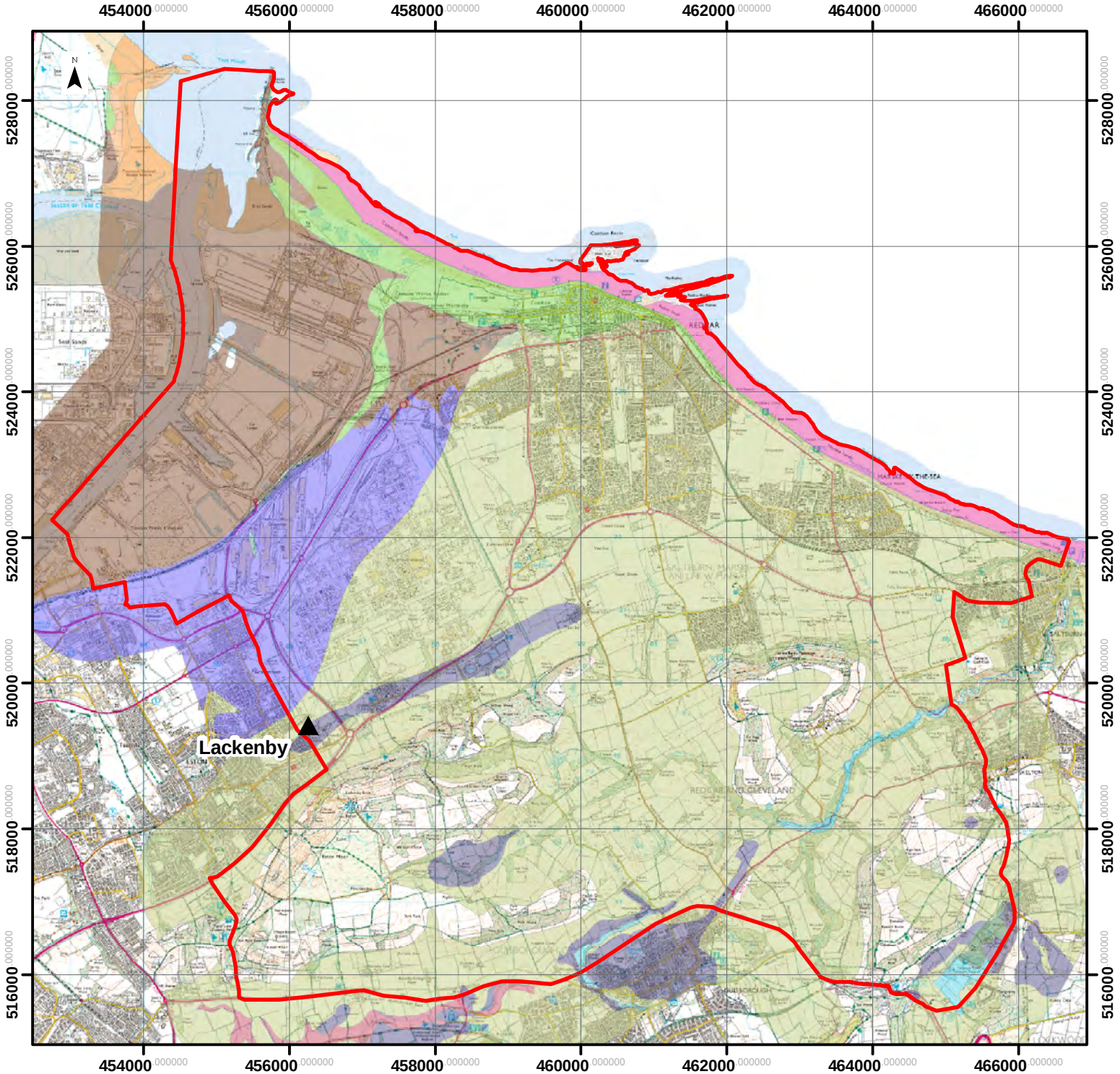

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area

Superficial Geology

- Alluvium
- Beach and Tidal Flat Deposits (Undifferentiated)
- Beach Deposits
- Blown Sand
- Glaciofluvial Deposits, Devensian
- Glaciolacustrine Deposits, Devensian
- Lacustrine Deposits
- Peat
- Tidal Flat Deposits
- Till, Devensian

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DOGGER BANK R3 DEVELOPMENT

Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.8: Superficial Geology

REV	DATE	REMARKS	Dm. By	Ckd. By
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DRAWING NUMBER:

9W7904/TOSAC/5.8/00

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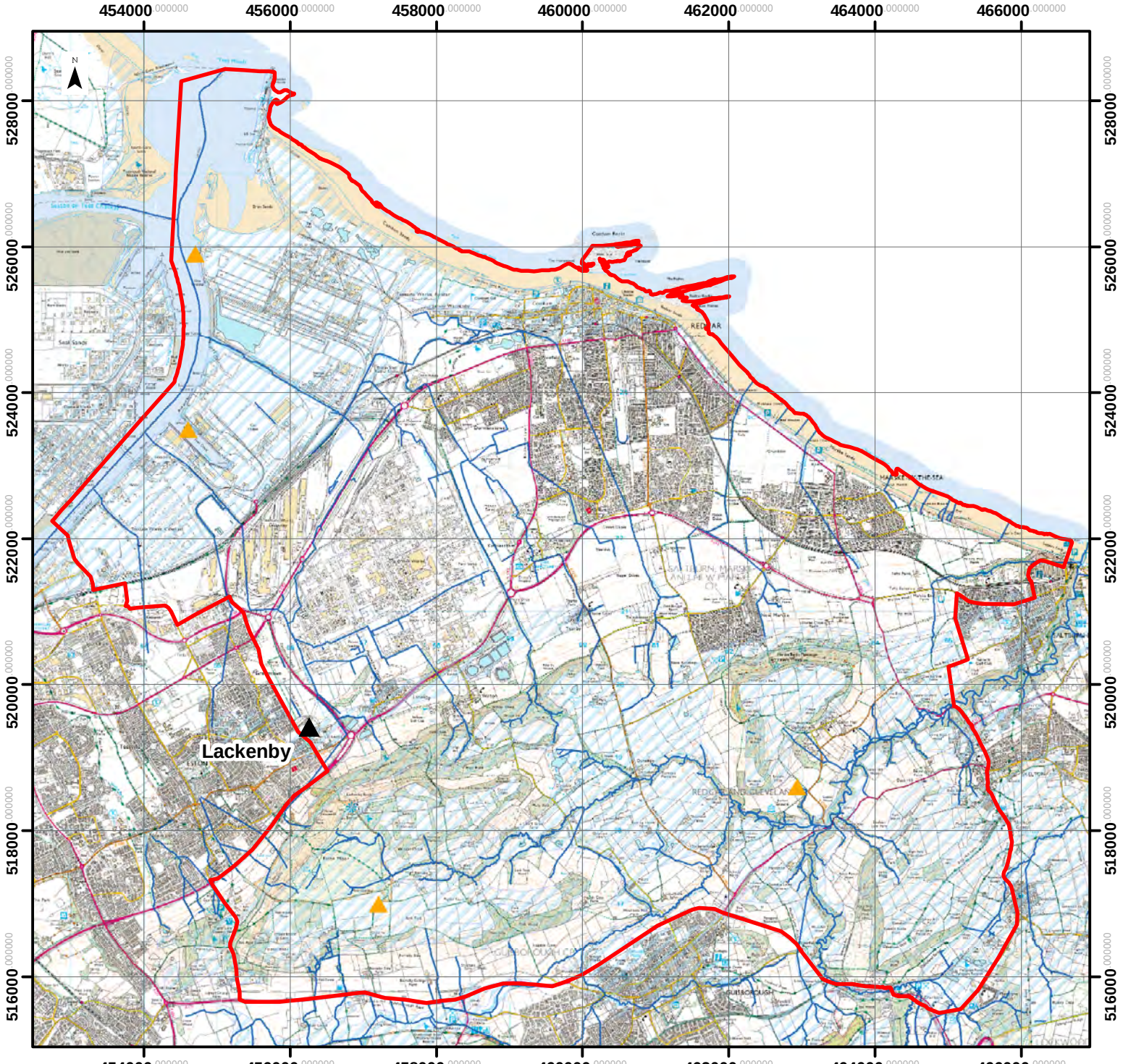

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- Watercourses
- Waterbodies
- Groundwater Vulnerability (Minor Aquifer)
- Water Abstraction Licence Granted

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PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.9: Hydrology and Hydrogeology

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:

9W7904/TOSAC/5.9/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

ROYAL HASKONING

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- Flood Risk Zone 2
- Flood Risk Zone 3a
- Flood Risk Zone 3b
- SFRA Development Allocations

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Teesside Onshore Study Area Characterisation

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Figure 5.10: Flood Risk

REV	DATE	REMARKS	Dm. By	Ckd. By
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DRAWING NUMBER:

9W7904/TOSAC/5.10/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

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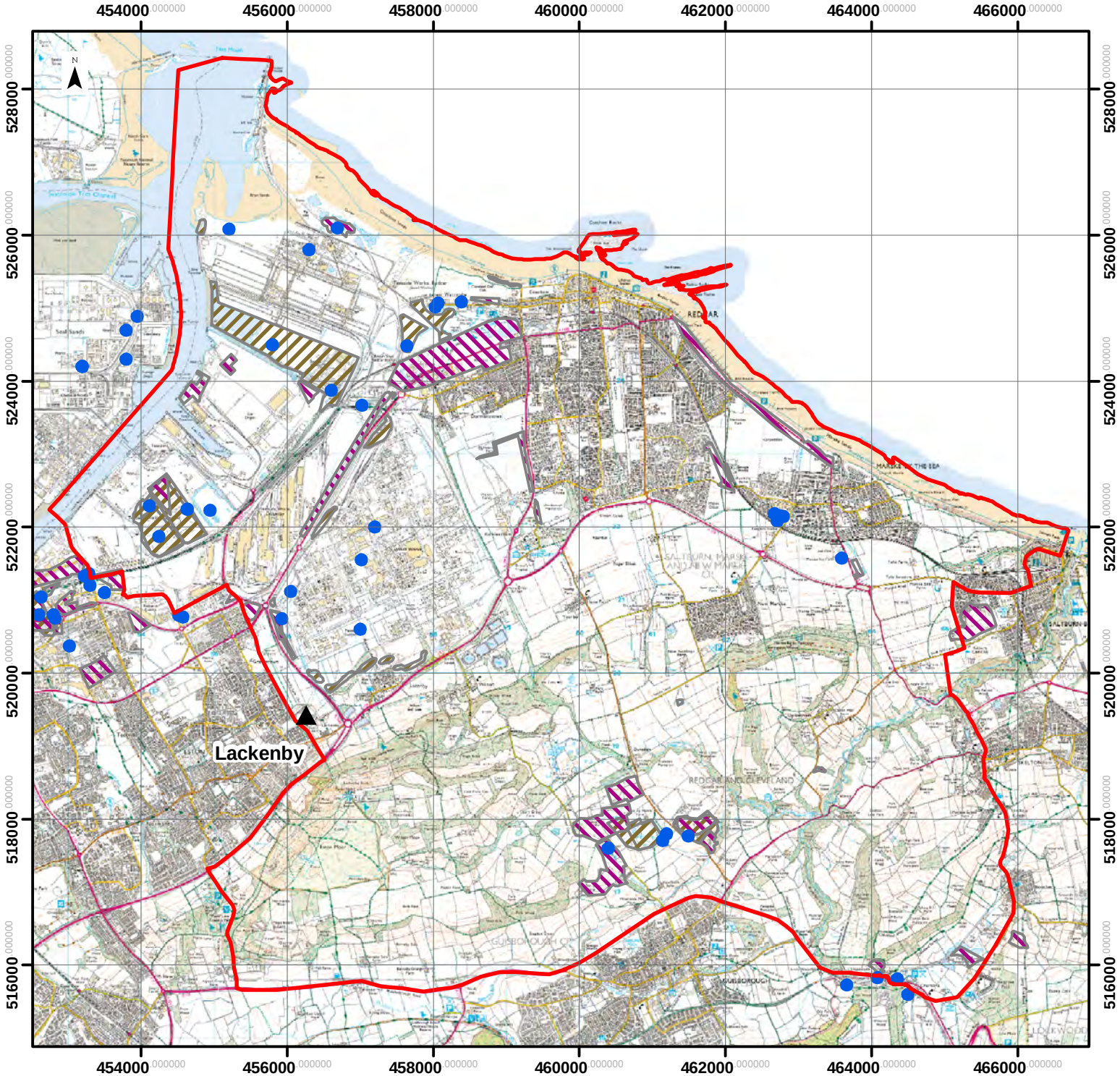

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- Environmental Permitting Regulations Licenced Site
- Historic Landfill Sites
- Authorised Landfill Sites

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DOGGER BANK R3 DEVELOPMENT
Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.11: Land Quality

REV	DATE	REMARKS	Dm. By	Ckd. By
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DRAWING NUMBER:
9W7904/TOSAC/5.11/00

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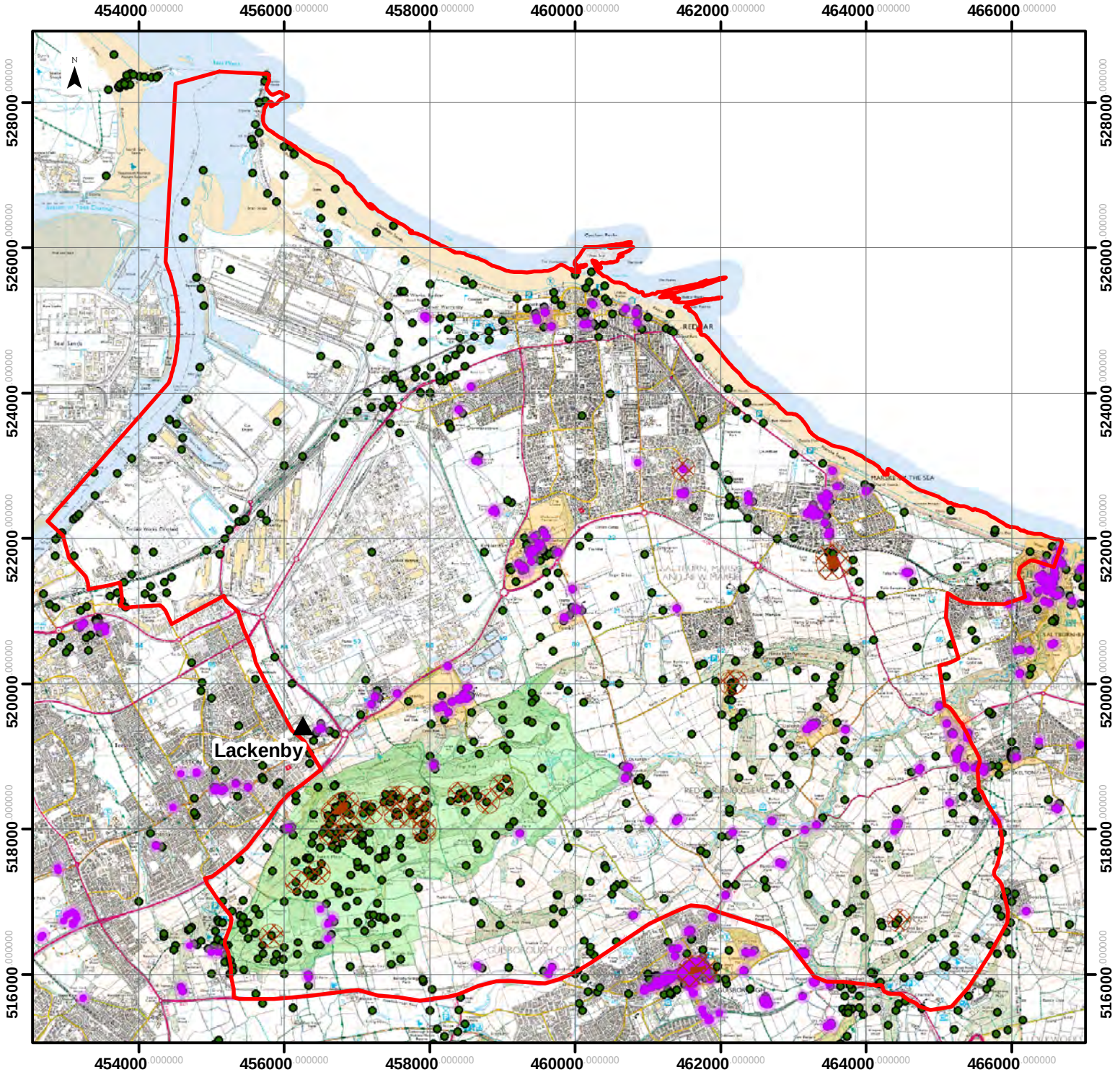

Legend

- Lackenby National Grid substation 400KV
- Onshore Study Area
- Scheduled Monument
- Scheduled Monument + 150m Buffer
- ListedBuilding_Points
- Listed Building + 100m Buffer
- Historic Environmental Record Point
- Conservation Area
- Eston Hills Historic Landscape

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DOGGER BANK R3 DEVELOPMENT
Teesside Onshore Study Area Characterisation

DRAWING TITLE

Figure 5.12: Archaeology

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:
9W7904/TOSAC/5.12/00

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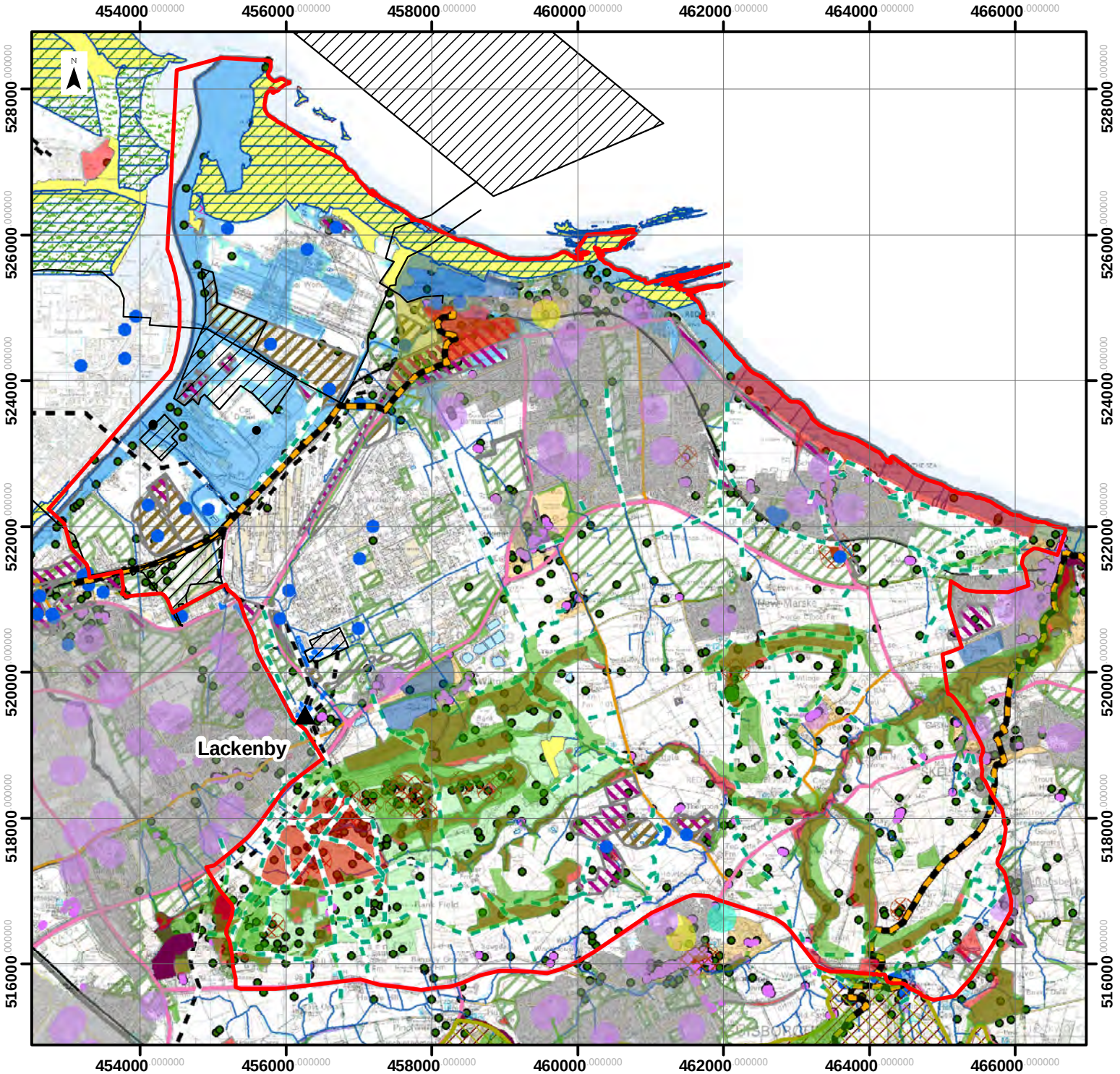

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PROJECT TITLE
DOGGER BANK R3 DEVELOPMENT
Teesside Onshore Study Area Characterisation

DRAWING TITLE
Figure 5.13: All Considerations

REV	DATE	REMARKS	Dm. By	Ckd. By
0	18/04/2012	Original	MCG	DM

DRAWING NUMBER:
9W7904/TOSAC/5.13/00

SCALE	1:75,000	PLOT SIZE	A4	DATUM	OSGB	PROJECTION	BNG

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6 SUMMARY

This report describes the first stage of activities to characterise the Dogger Bank Teesside Onshore study area for the Dogger Bank Teesside projects. The onshore study area has been characterised by a variety of development considerations that may have a bearing on the location and design of the onshore cable systems infrastructure.

The considerations identified within this report will be used as the starting point for further surveying, consultation and assessment to aid in the identification and design of the onshore cable systems infrastructure.

6.1 Initial Recommendations

6.1.1 Land Use

The routing of the cable systems should take account the land use through which it passes and the key land use policies stated in **Table 5.1**. Buried electrical cables can be installed without sterilising the land above for other uses, such as sport, recreation or agriculture. It is not recommended to route cables under residential and commercial properties as these locations would be difficult to install and maintain. Therefore it is recommended, where possible, to route the cable systems through agricultural and other green field areas.

In terms of land use planning policy, routing through land designated for CS23 Green Infrastructure is likely to be compatible with buried cable systems, whereas land designated under H1 Housing Allocations is not considered compatible with the installation of buried cable systems and these areas should be avoided where possible.

6.1.2 Utilities and Transport

Major road, railway and pipeline crossings should be minimised where possible during the routing process to avoid disruption during installation and maintenance. It is likely that some crossings are inevitable due to the geography of the area and the presence of other constraints, such as large residential areas. Where utilities and major transport crossings are required, horizontal directional drilling (HDD) techniques are likely to be required to cross these key pieces of infrastructure. Liaison with the highways authority and utility companies affected is recommended at the earliest possibility to agree crossing locations and techniques.

6.1.3 Nature Conservation Designations

In order to comply with nature conservation and ecology policies, all impacts on designated sites should be avoided wherever possible. Where direct impacts cannot be avoided, they should be minimised via the EIA process through careful design and the use of mitigation measures to further reduce any adverse impacts. A key mitigation for any coastal sites designated for ornithological population is likely to be scheduling the construction programme to avoid key breeding and overwintering seasons.

6.1.4 Habitats and Species

The presence of notable habitats and protected species should be identified at the earliest stage and if present, should be safeguarded throughout the project development to ensure compliance with all relevant planning policies. This should be achieved through the EIA process and where necessary should be undertaken in consultation with Natural England. Following the identification of a preferred cable corridor a Phase 1

habitat survey is recommended to identify key habitats and allow avoidance of all notable habitats and protected species where possible through route design.

6.1.5 Landscape

The buried nature of the cable systems will minimise impacts on landscape features during the operational phase of the development. During the construction and decommissioning phases, the cable route may result in temporary landscape and visual impacts and therefore the routing of the cable systems should take account of designated landscapes, conservation areas, viewpoints and other sensitive landscape receptors to minimise these construction impacts where possible.

6.1.6 Geology

Designated sites of geological interest, such as the Redcar Rocks SSSI, should be avoided through cable routing where possible. Geotechnical investigations may be required at HDD locations to determine ground conditions to feed into the finalisation of drilling compound locations.

6.1.7 Hydrogeology and Groundwater

Appropriate site design and working methodologies should be adopted during the construction, operational and decommissioning phases of the project to safeguard the surface waters and groundwater within the onshore study area.

6.1.8 Hydrology and Flood Risk

The routing process should seek to avoid or minimise watercourse crossings where possible in order to minimise impact on these features during construction. Agricultural and field drainage systems should be considered during construction of the cable systems and carefully reinstated following construction where necessary.

In order to comply with planning policy, development within the flood risk zones should be avoided where possible. However, due to the nature of the buried cable systems, flood risk, outside of the construction phase, is not considered a key development constraint for the cable system elements of the project and these areas do not need to be avoided. Flood risk should be considered a more critical issue for the siting of the converter stations, as permanent above ground installations.

6.1.9 Land quality

Authorised and historic landfills should be avoided where possible. However, due to the industrial nature of the onshore study area, it is possible that there will be unstable or contaminated land present within many areas. Further study is required to further identify potentially contaminated areas. Once identified, potentially contaminated areas should be avoided where possible to avoid risks to human workers during construction and the risk of mobilising contaminants into soils, surface waters and groundwater.

6.1.10 Archaeology and Cultural Heritage

The cable route selection process should seek to avoid impacts on known Scheduled Monuments, Listed Buildings and nationally significant archaeological features or remains. Further study is required to identify the potential for previously unknown archaeological remains within the onshore study area. If areas of high likelihood are identified these should be avoided where possible, or investigated further to establish the sensitivity and importance of any remains.

6.2 Further Studies

The next stage of the assessment can only be carried out once the offshore, landfall and converter station assessments have been completed. Once a landfall has been identified and a converter station site(s) selected, the baseline characterisation provided within this report can be utilised, along with further studies and consultation, to define a cable corridor that can be assessed in detail to develop a final cable route for construction and operation.

Further studies and assessment required to define a cable corridor include;

- Identification of a preferred landfall location;
- Identification of a preferred converter station site(s);
- Consultation with key stakeholders, landowners and the local authority;
- Further engineering and design studies to define the project parameters; and
- Further environmental studies, including initial traffic, noise, archaeology, landscape, ecology and land quality studies.

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PD Teesport, Northern Gateway Container Terminal (Environmental Statement, April 2006, Royal Haskoning).

PD Teesport, QEII Berth Development (Environmental Statement, March 2009, Royal Haskoning).

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