




F I V E 
ESTUARIES
OFFSHORE WIND FARM

FIVE ESTUARIES
OFFSHORE WIND FARM
PRELIMINARY ENVIRONMENTAL
INFORMATION REPORT

VOLUME 3, CHAPTER 10: AIR QUALITY

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GLOSSARY OF TERMS

Term	Definition
Air Quality Strategy	The 2007 Air Quality Strategy for England, Scotland, Wales and Northern Ireland provides details of national air quality objectives for air pollutants.
Ancient Woodland	Typically, a woodland that has existed continuously since 1600 or before (this can include areas where trees have been cut down and/ or replanted).
Array Areas	The areas where the WTGs will be located.
Cable Works TCC	TCC associated with cable works.
Critical Level	The concentration of an air pollutant above which adverse effects on ecosystems may occur based on present knowledge.
Critical Load	Deposition flux of an air pollutant below which significant harmful effects on sensitive ecosystems do not occur, according to present knowledge.
DCO	An order made under the Planning Act 2008 granting development consent for a NSIP from the Secretary of State for Business, Energy and Industrial Strategy.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact in question with the sensitivity of the receptor in question, in accordance with defined significance criteria.
ES	The documents that collate the processes and results of the EIA.
European sites	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan	A voluntary consultation process with specialist stakeholders to agree the approach to the Environmental Impact Assessment.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial, resulting from the activities associated with the construction,



Term	Definition
	operation and maintenance, or decommissioning of the project.
Habitats Regulations	The Conservation of Habitats and Species Regulations 2010.
HDV	Vehicles ≥ 3.5 tonnes. Includes Heavy Goods Vehicles and buses.
LDV	Vehicles < 3.5 tonnes. Includes Light Goods Vehicles and cars.
Landfall	The landfall denotes the location where the offshore export cables are brought ashore and jointed to the onshore cable circuits in TJBs.
Local Nature Reserve	Statutory designation for places with wildlife or geological features that are of special interest locally.
Maximum Design Scenario	The maximum design parameters of the combined project assets that result in the greatest potential for change in relation to each impact assessed.
Mitigation	Mitigation measures are commitments made by the project to reduce and/or eliminate the potential for significant effects to arise as a result of the project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts through the assessment process.
Objective	An Objective set by the UK Government's Expert Panel on Air Quality to be achieved either without exception or with a permitted number of exceedances within a specific timescale.
Onshore ECC	At PEIR, the Onshore ECC is the wider cable corridor within which the typically 60 m cable route is located. The Onshore ECC is typically approximately 200 m to 250 m wide, however some areas require a wider corridor (such as where trenchless crossing may take place).
OnSS	Where the power supplied from the wind farm is adjusted (including voltage, power quality and power factor as required) to meet the UK System-Operator Transmission-Owner Code for supply to the National Grid substation.
OnSS Access Zone	The area which will contain the final OnSS access route (both construction and operational)
OnSS Construction Zone	The area in which the final OnSS TCC footprint will be located.
OnSS Zone	The area in which the final OnSS footprint will be located.



Term	Definition
PEIR	The PEIR is written in the style of a draft ES and forms the basis of statutory consultation. Following that consultation, the PEIR documentation will be updated into the final ES that will accompany the application for the DCO.
Relevant Exposure	Locations where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period.
Review and Assessment	A statutory duty for all local authorities to review local air quality and assess whether health-based air quality Objectives will be achieved.
RLB	The area within which development will be carried out including all works, access routes, TCCs, visibility splays and discharge points.
SSSI	A geological or biological conservation designation denoting a nationally protected area in the UK.
SAC	Area of protected habitats and species as defined in the European Union's Habitat Directive (92/43/EEC).
SPA	A designated area for birds under the European Union Directive on the Conservation of Wild Birds (2009/147/EC).
TJB	An underground unit where the offshore cable joins the onshore cable.
Trackout	The transport of dust and dirt from the construction/ demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles leave the construction/ demolition site with dusty materials, which may then spill onto the road, and/ or when heavy duty vehicles transfer dust and dirt onto the road having travelled over muddy ground on site.



DEFINITION OF ABBREVIATIONS AND ACRONYMS

Term	Definition
AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Levels
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
AQSR	Air Quality Standards Regulations
AW	Ancient Woodland
CAS	Clean Air Strategy
CBC	Colchester Borough Council
CERC	Cambridge Environmental Research Consultants
CoCP	Code of Construction Practice
DM	Do Minimum
DMRB	Design Manual for Roads and Bridges
DS	Do Something
ECC	Export Cable Corridor
HDD	Horizontal Directional Drilling.
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
HDV	Heavy Duty Vehicle
LDV	Light Duty Vehicle
LNR	Local Nature Reserve
LWS	Local Wildlife Site
NF OWF	North Falls Offshore Wind Farm.
NPS	National Policy Statements
NPPF	National Planning Policy Framework
NRMM	Non-Road Mobile Machinery
O&M	Operation and Maintenance
OnSS	Onshore Substation
PM	Particulate Matter
TCC	Temporary Construction Compounds



Term	Definition
TDC	Tendring District Council



10 AIR QUALITY

10.1 INTRODUCTION

- 10.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) considers the likely significant effects associated with the onshore elements of the Five Estuaries Offshore Wind Farm (VE) on air quality.
- 10.1.2 This chapter describes the scope, relevant legislation, assessment methodology, and the baseline conditions existing at the site and its surroundings. It considers any potential significant environmental effects VE would have on the baseline environment, the mitigation measures required to prevent, reduce or offset any significant adverse effects, and the likely residual effects after these measures have been implemented. Consideration has also been given to potential cumulative air quality effects with other proposed developments.
- 10.1.3 In particular it considers the construction, operational and decommissioning onshore activities.
- 10.1.4 The chapter is complemented with the following technical annexes:
- > Volume 3, Annex 10.1: Air Quality - Construction Dust Assessment Methodology;
 - > Volume 3, Annex 10.2: Air Quality - Non-Road Mobile Machinery (NRMM) Emissions Assessment;
 - > Volume 3, Annex 10.3: Air Quality - Offshore Activities Assessment;
 - > Volume 3, Annex 10.4: Air Quality - Road Traffic Dispersion Modelling; and
 - > Volume 3, Annex 10.5: Air Quality - Air Quality Mitigation Measures.
- 10.1.5 This chapter has been informed by the following PEIR chapters:
- > Volume 3, Chapter 1: Onshore Project Description; and
 - > Volume 3, Chapter 8: Traffic and Transport.

10.2 STATUTORY AND POLICY CONTEXT

LEGISLATION

AIR QUALITY STANDARDS REGULATIONS

- 10.2.1 The Air Quality Standards Regulations 2010 (AQSR) transpose both the European Union (EU) Ambient Air Quality Directive (2008/50/EC), and the Fourth Daughter Directive (2004/107/EC) within UK legislation.
- 10.2.2 The AQSR includes limit values, target values, Objectives, Critical Levels and exposure reduction targets for the protection of human health and the environment. Limit values are legally binding and are considered to apply everywhere with the exception of the carriageway and central reservation of roads and any location where the public do not have access (e.g. industrial sites). Compliance is regulated at a national level (based upon a series of zones and agglomerations).



AIR QUALITY STRATEGY

- 10.2.3 The UK Government and the devolved administrations are required under the Environment Act 1995 (His Majesty's Stationery Office (HMSO), 1995) to produce a national air quality strategy to improve air quality. The latest Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland was published in 2007 (Defra, 2007).
- 10.2.4 The AQS provides the over-arching strategic framework for air quality management in the UK and contains non-statutory national air quality Objectives established by the UK Government and Devolved Administrations for the protection of public health and the environment.
- 10.2.5 The ambient air quality standards of relevance to human receptors in this assessment (collectively called Air Quality Assessment Levels (AQALs) throughout this report) are provided in Table 10.1.

Table 10.1: Relevant ambient AQALs

Pollutant	Standard ($\mu\text{g}/\text{m}^3$)	Measured As
Nitrogen Dioxide (NO_2)	200	1-hour mean not to be exceeded more than 18 times a year.
	40	Annual mean.
Particulate Matter (PM_{10})	50	24-hour mean not to be exceeded more than 35 times a year.
	40	Annual mean.
Particulate Matter ($\text{PM}_{2.5}$)	25	Annual mean.

- 10.2.6 The above AQALs apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period – herein referred to as relevant exposure. Table 10.2 provides an indication of those locations.

Table 10.2: Human health relevant exposure

Averaging Periods	Should Apply At	Should Not Apply At
Annual Mean	Building facades of residential properties, schools, hospitals etc.	Facades of offices. Hotels. Gardens of residences. Kerbside sites.



Averaging Periods	Should Apply At	Should Not Apply At
24-hour mean	As above together with hotels and gardens of residential properties.	Kerbside sites where public exposure is expected to be short term.
1-hour mean	As above together with kerbside sites of regular access, car parks, bus stations etc.	Kerbside sites where public would not be expected to have regular access.

LOCAL AIR QUALITY MANAGEMENT

- 10.2.7 As reinforced within the AQS, Part IV (Section 82) of the Environment Act 1995 (HMSO, 1995) includes a statutory duty for local authorities to undergo a process of Local Air Quality Management (LAQM). This requires local authorities to review and assess air quality within their boundaries to determine the likeliness of compliance, regularly and systematically.
- 10.2.8 Where any of the prescribed AQALs are not likely to be achieved, the authority must designate an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to prepare an Air Quality Action Plan (AQAP), which details measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the Objective.

ECOLOGICAL HABITATS

- 10.2.9 Ecological habitats vary in terms of their sensitivity, perceived ecological value, geographic importance, and level of protection. Within the UK, there are three types of nature conservation designations: international, national and local designations, with a greater level of protection afforded to the former, relative to the latter.
- 10.2.10 The EU Habitats Directive (The Council of European Communities, 1992) requires member states to introduce a range of measures for the protection of habitats and species. This requirement was transposed into UK legislation by the Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations'). These regulations were amended in 2019 to make them operable from 1 January 2021 despite the UK's withdrawal from the EU, via the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (The Secretary of State, 2019).
- 10.2.11 The Habitats Regulations introduces the precautionary principle for protected European sites, i.e. that projects can only be permitted to proceed; having ascertained that there will be no adverse effect on the integrity of the designated site. It requires an assessment to determine if significant effects are likely, followed by an 'appropriate assessment' by the competent authority, if necessary.
- 10.2.12 European Sites include Special Areas of Conservation (SAC) and Special Protection Areas (SPA), previously termed the Natura 2000 network, and now collectively called the national site network following the changes introduced by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.



10.2.13 Other sites of international significance are Ramsar sites, which are wetlands protected under the 1971 Ramsar Convention¹. Many of these sites in the UK were initially selected on the basis of their importance to waterbirds and are therefore also classified as SPAs.

10.2.14 The Countryside and Rights of Way Act 2000 (HMSO, 2000) provides protection to Sites of Special Scientific Interest (SSSI) to ensure that developments are not likely to cause damage. This act also provides a degree of protection to local nature conservation sites, which can be particularly important in providing ‘buffers’ to SSSIs and European sites.

POLICY

NATIONAL POLICY

NATIONAL PLANNING POLICY

10.2.15 The 2021 update to the National Planning Policy Framework (NPPF) (Ministry of Housing, Communities & Local Government (MHCLG), 2021a) sets out relevant planning policy for England.

10.2.16 The NPPF states that the planning system should contribute to, and enhance, the natural and local environment, by preventing new development from contributing to unacceptable concentrations of air pollution.

10.2.17 The NPPF is accompanied by web based supporting Planning Practice Guidance (PPG) (MHCLG, 2021b) which includes guiding principles on how planning can take account of the impacts of new development on air quality.

10.2.18 Details of the policies of relevance to this assessment are provided in Table 10.3 together with an indication of where each requirement is addressed.

NATIONAL POLICY STATEMENTS

10.2.19 The National Policy Statements (NPS) are a series of principal decision-making documents to appropriately assess Nationally Significant Infrastructure Projects (NSIP). As such, this assessment has made explicit reference to the relevant Energy NPS requirements.

10.2.20 Those relevant to VE are:

- > Overarching National Policy Statement for Energy (EN-1);
- > National Policy Statement for Renewable Energy Infrastructure (EN-3); and
- > National Policy Statement for Electricity Networks Infrastructure (EN-5).

10.2.21 Revised draft NPS were consulted on in 2021. To ensure VE is compliant with regards to future relevant policies, due consideration has been given to these draft NPS.

¹ Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat



10.2.22 Details of the current and future draft policies of relevance to this assessment are provided in Table 10.3 together with an indication of where each requirement is addressed. Where any part of the NPS has not been followed, an explanation as to why the requirement is not deemed relevant, or has been met in another manner, is provided.

10.2.23 Policies that are relevant to air quality considerations for wind farm developments are set out within EN-1. EN-3 and EN-5 do not specifically include details on the assessment of air quality.

THE CLEAN AIR STRATEGY

10.2.24 The Clean Air Strategy (CAS), published in 2019 (Defra, 2019), sets out a wide range of actions by which the UK Government, in partnership with the Devolved Administrations will seek to reduce pollutant emissions and deliver cleaner air across the UK. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air, focussing on transport, domestic, farming and industry.

LOCAL POLICY

10.2.25 The Tendring District Council (TDC) Local Plan 2013-2033 and Beyond: Section 2 (TDC, 2022) was adopted in January 2022. The following policies are applicable to air quality:

- > Policy SPL 3 Sustainable Design;
- > Policy PPL 4 Biodiversity and Geodiversity; and
- > Policy PPL 10 Renewable Energy Generation and Energy Efficiency Measures.

10.2.26 Details of the policies of relevance to this assessment are provided in Table 10.3 together with an indication of where each requirement is addressed.

GUIDANCE

10.2.27 The air quality assessment has been carried out in accordance with the principles contained within the following guidance documents:

- > A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Institute of Air Quality Management (IAQM) , 2020);
- > Design Manual for Roads and Bridges (DMRB) LA 105 (Highways England, 2019);
- > Guidance on the Assessment of Dust from Demolition and (IAQM, 2016);
- > LAQM Technical Guidance 22 (TG22) (LAQM.TG(22)) (Defra, 2022);
- > Land-Use Planning and Development Control: Planning for Air Quality (Environmental Protection UK (EPUK) & IAQM, 2017);
- > Natural England's Approach to Advising Competent Authorities on the Assessment of Road Traffic Emissions under the Habitats Regulations (NEA001) (Natural England, 2018); and
- > Technical Guidance on Detailed Modelling Approach for an Appropriate Assessment for Emissions to Air (Air Quality Technical Advisory Group (AQTAG), 2015).



Table 10.3: Legislation and policy context

Legislation / Policy	Key Provisions	Section Where Comment Addressed
NPS EN-1	<p>Paragraph 5.2.2 of EN-1 states that an Environmental Statement (ES) will include an assessment of Carbon Dioxide (CO₂) emissions, but the policies set out in Section 2 [of EN-1], including the EU ETS, apply to these emissions. The IPC (now Planning Inspectorate) does not, therefore need to assess individual applications in terms of carbon emissions against carbon budgets.</p>	<p>Not applicable for this assessment. No further comment needed.</p>
NPS EN-1	<p>Paragraph 5.2.7 of EN-1 states that <i>“The ES should describe:</i></p> <ul style="list-style-type: none"> > <i>Any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;</i> > <i>The predicted absolute emission levels of the proposed project, after mitigation methods have been applied;</i> > <i>Existing air quality levels and the relative change in air quality from existing levels; and</i> > <i>Any potential eutrophication impacts.”</i> 	<p>See Section 10.10 to 10.13.</p>
Draft NPS EN-1	<p>Paragraph 5.2.6 of the Draft EN-1 states that <i>“The ES should describe:</i></p> <ul style="list-style-type: none"> > <i>Any significant air emissions, their mitigation and any residual effects distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;</i> > <i>The predicted absolute emission levels of the proposed project, after mitigation methods have been applied;</i> > <i>Existing air quality levels and the relative change in air quality from existing levels; and</i> 	<p>See Section 10.10 to 10.13.</p>



Legislation / Policy	Key Provisions	Section Where Comment Addressed
	<p>> <i>Any potential eutrophication impacts.”</i></p>	
<p>NPPF (MHCLG, 2021a)</p>	<p>Chapter 15 (Conserving and Enhancing the Natural Environment) states the following in specific relation to air quality:</p> <p><i>“Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of [...] air [...] pollution [...]. Development should, wherever possible, help to improve local environmental conditions such as air [...] quality [...]”</i></p> <p><i>“Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.”</i></p>	<p>See Section 10.7 for existing environment. See Section 10.10 to 10.13 for investigation of potential impacts.</p> <p>See Volume 5, Annex 10.5: Air Quality Mitigation Measures for details regarding the extent of mitigation proposed.</p>
<p>PPG (MHCLG, 2021b)</p>	<p>In regards to air quality, the PPG states:</p> <p><i>“The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to</i></p>	<p>See Section 10.7 for existing environment. See Section 10.10 to 10.13 for</p>



Legislation / Policy	Key Provisions	Section Where Comment Addressed
	<p><i>determine compliance with relevant Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified.”</i></p> <p><i>“Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.”</i></p> <p>The PPG sets out the information that may be required within the context of a supporting air quality assessment, stating that:</p> <p><i>“...assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions). [...] Mitigation options [...] will depend on the proposed development and should be proportionate to the likely impact”.</i></p>	<p>investigation of potential impacts.</p> <p>See Volume 5, Annex 10.5: Air Quality Mitigation Measures for details regarding the extent of mitigation proposed.</p>
<p>TDC, 2022: Policy SPL 3 Sustainable Design</p>	<p><i>“Part A: Design. All new development (including changes of use) should make a positive contribution to the quality of the local environment and protect or enhance local character. The following criteria must be met: [...]”</i></p>	<p>See Section 10.10 to 10.13.</p> <p>See Volume 5, Annex 10.5: Air Quality Mitigation Measures for details regarding the extent</p>



Legislation / Policy	Key Provisions	Section Where Comment Addressed
	<p><i>d. the design and layout of the development maintains or enhances important existing site features of [...] ecological, [...] or amenity value; [...]</i></p> <p><i>Part C: Impacts and Compatibility. New development (including changes of use) should be compatible with surrounding uses and minimise any adverse environmental impacts. The following criteria must be met: [...]</i></p> <p><i>b. the development, including any additional road traffic arising, will not have unacceptable levels of pollution on: air, [...] amenity, health or safety through [...] smell, dust, [...] fumes or other forms of pollution or nuisance;</i></p> <p><i>c. the health, safety or amenity of any occupants or users of the proposed development will not be materially harmed by any pollution from an existing or committed use; [...]</i></p> <p><i>e. during the construction phase, developers must comply with a 'considerate constructors' scheme' which employs reasonable measures and techniques to minimise and mitigate impacts and disturbance to neighbours and the existing wider community and any damage to public and private property. [...]</i></p> <p><i>When considering new development, applicants and developers should avoid adverse impacts upon the environment. Where this is not possible, mitigation measures should be put forward. As a last resort, compensate for adverse environmental impacts."</i></p>	<p>of mitigation proposed.</p>



Legislation / Policy	Key Provisions	Section Where Comment Addressed
TDC, 2022: Policy SPL 4 Biodiversity and Geodiversity	<i>“Sites designated for their international, European and national importance to nature conservation: including Ramsar sites; Special Protection Areas (SPAs); Special Areas of Conservation (SACs); Marine Conservation Zones (MCZs); National Nature Reserves (NNRs); and Sites of Special Scientific Interest (SSSIs) will be protected from development likely to have an adverse effect on their integrity.”</i>	See Section 10.10 to 10.13.
TDC, 2022: Policy SPL PPL 10 Renewable Energy Generation and Energy Efficiency Measures	<i>“Proposals for renewable energy schemes will be considered having regard to their scale, impact (including cumulative impact) and the amount of energy which is to be generated.”</i>	See Section 10.10 to 10.13.



10.3 CONSULTATION

- 10.3.1 To date, consultation with regards to the scope of the air quality assessment has comprised:
- > Submission of a Scoping Report (OWFL, 2021); and
 - > VE Evidence Plan (Air Quality Expert Topic Group (ETG)) process, comprising discussions with Natural England and Essex County Council.
- 10.3.2 Essex County Council is representing TDC as part of the consultation process.
- 10.3.3 A Scoping Opinion for VE was sought from the Planning Inspectorate (PINS) which included relevant responses from statutory consultees. This included responses to the proposed assessment methodology for further consideration.
- 10.3.4 A Technical Note was issued to relevant Air Quality ETG members detailing the extent of the methodology proposed for the PEIR. Natural England and TDC (on behalf of Essex County Council) both agreed to the proposed approach via email. The air quality assessment has been prepared on the basis of these agreed principles.
- 10.3.5 Table 10.4 provides a summary of consultation comments received to date relating to Air Quality, and associated responses.



Table 10.4: Summary of consultation relating to air quality

Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
<p>PINS, Scoping Opinion, November 2021</p>	<p>NRMM emissions during construction:</p> <p>As per the Scoping Report (VE OWFL, 2021), it was initially proposed to scope out impacts associated with emissions generated from NRMM used within the construction phase. This was based on advice provided within Defra’s LAQM.TG(22) (Defra, 2022) which states that providing suitable controls are applied, emissions generated from NRMM are unlikely to contribute to a significant impact upon local air quality. A series of controls were included within the Scoping Report (VE OWFL, 2021).</p> <p>PINS indicated that following the implementation of appropriate controls/ measures it is possible that significant effects from emissions generated by NRMM would be avoided. However, it believed there was insufficient information to fully validate this opinion – with the recommendation to undertake an assessment or provide evidence demonstrating agreement with the relevant consultation bodies and the absence of likely significant effects occurring.</p>	<p>Essex County Council, within the consultation response contained within the Scoping Opinion (PINS, 2021) agreed NRMM emissions could be scoped out following the implementation of suitable mitigation.</p> <p>A series of controls are detailed in Volume 5, Annex 10.5: Air Quality Mitigation Measures. These measures are included within the draft Code of Construction Practice (CoCP) developed to set procedural standards for proposed onshore construction activities. Implementation of the CoCP will be secured as a requirement of the DCO, therefore ensuring their effective application. In accordance with Defra’s LAQM.TG(22) (Defra, 2022), following application of these controls, emissions generated from NRMM are unlikely to contribute to a significant impact upon local air quality.</p> <p>Natural England, within the consultation response contained within the Scoping Opinion (PINS, 2021) raised no comment with regards to the scoping out impacts associated with emissions generated from NRMM. Furthermore, no comments were raised during the ETG process (to date) regarding NRMM emissions.</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
		<p>Based on the above consultation outcomes (received to date), it can be concluded that relevant consultation bodies are in agreement that NRMM can be scoped out from assessment, providing suitable controls are applied.</p> <p>Notwithstanding this, a qualitative assessment of NRMM emissions has been undertaken – in recognition of PINS request. See Section 10.10 and Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.</p>
<p>PINS, Scoping Opinion, November 2021</p>	<p>Operational phase traffic movements and other works/ activities:</p> <p>PINS agreed that road traffic movements generated by the operational activities can be scoped out – given the negligible increase in road traffic vehicles compared to baseline conditions. However, to validate this, PINS requested comparison of operations and maintenance (O&M) flows to screening criteria set out in the EPUK & IAQM guidance.</p> <p>Furthermore, PINS suggested that there is insufficient information to scope out effects associated with potential emissions generated from plant/ NRMM used during the O&M phase. PINS recommended to undertake an assessment or provide evidence demonstrating agreement with the relevant consultation bodies and the absence of likely significant effect occurring.</p>	<p>Following PINS comments, road traffic vehicles generated by operational activities have been presented and compared against EPUK & IAQM screening criteria. See Section 10.11.</p> <p>As established above, it is considered likely that consultee bodies are in agreement that NRMM construction phase impacts can be scoped out from assessment, providing suitable controls are applied. O&M activities are not anticipated to exceed the construction phase worst case criteria assessed (activities will be limited to maintenance activities). A qualitative assessment of construction phase NRMM</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
		<p>emissions has been undertaken.</p> <p>Notwithstanding the above, the extent of operational activities has been discussed and assessed. See Section 10.11 and Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.</p>
<p>PINS, Scoping Opinion, November 2021</p>	<p>Project specific air quality surveys:</p> <p>As per the Scoping Report (VE OWFL, 2021), it was initially proposed to establish the baseline for air quality through the use of Defra background mapping and Defra/ TDC monitoring data. Within their adopted Scoping Opinion (PINS, 2021), PINS agreed to this approach in principle. However, it requested that the suitability of these publicly available datasets be reviewed throughout the Environmental Impact Assessment (EIA) lifecycle and confirmed with relevant consultation bodies.</p> <p>PINS requested that the Environmental Statement (ES) should be carried out with reference to a robust baseline position reflecting the relevant study area, including an understanding of relevant pollutant concentrations.</p>	<p>Following receipt of traffic data and finalisation of the PEIR onshore Red Line Boundary (RLB), the suitability of the publicly available data has been reviewed.</p> <p>Consistent with the approach outlined within the Scoping Report (VE OWFL, 2021), publicly available datasets have been used to characterise the baseline environment. This has involved the use of the latest representative datasets recorded by Colchester Borough Council (CBC) and TDC.</p> <p>Publicly available datasets have been reviewed to determine suitability with respect to the study area. The coverage of existing local monitoring networks is considered sufficient. Supporting justifications are provided Section 10.7. Section 10.4 details the extent of data sources used within the assessment. The use of publicly available datasets to characterise the</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
		<p>baseline environment will be reviewed throughout the EIA lifecycle.</p> <p>Use of publicly available datasets has been discussed with statutory consultees during the Air Quality ETG process – whereby no comments/ responses have been raised.</p>
<p>PINS, Scoping Opinion, November 2021</p>	<p>Transboundary impacts:</p> <p>PINS agree this matter can be scoped out of further assessment.</p> <p>Given air quality impacts will be localised within Essex County Council and TDC administrative areas and not experienced across international boundaries, PINS agrees VE is unlikely to give rise to significant transboundary air quality effects.</p>	<p>Transboundary impacts have been scoped out of further assessment within Section 10.15.</p>
<p>PINS, Scoping Opinion, November 2021</p>	<p>Offshore air quality impacts:</p> <p>PINS have requested the ES include information about any potential emissions from offshore activity, e.g. from vessels, including the type and expected volume of emissions. It should explain whether there are any impact pathways to relevant human and ecological receptors. Where significant effects are likely to occur, an assessment of this matter should be included within the ES.</p>	<p>Following PINS comments, an assessment of offshore activities impacts on onshore receptors has been undertaken. See Section 10.10 to 10.13 and Volume 5, Annex 10.3: Offshore Activities Assessment.</p>
<p>PINS, Scoping Opinion, November 2021</p>	<p>Study area:</p> <p>PINS requested the ES should include a figure/ figures to identify the study areas for each element of the air quality assessment including considered human and ecological receptors.</p>	<p>Figures illustrating the study areas for each assessment (inclusive of human and ecological receptors) have been prepared.</p> <p>This is with the exception of the construction dust assessment. Figures illustrating the spatial extent</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
		<p>of the study area for the construction dust assessment will be prepared for the ES, once a final design option has been chosen.</p> <p>See Figure 10.1 to Figure 10.6.</p>
<p>Essex County Council, Scoping Opinion, November 2021</p>	<p>Scoping in of assessments: Essex County Council agree to items proposed to be scoped into assessment.</p> <p>It is considered by Essex County Council that these matters are potentially significant in terms of impacts.</p>	<p>No response needed. All scoped in assessments have been undertaken. See Sections 10.10 to 10.13.</p>
<p>Essex County Council, Scoping Opinion, November 2021</p>	<p>NRMM emissions: In order to agree scoping out of emissions from NRMM – it requires reassurance that robust measures will be implemented and enforced effectively.</p>	<p>A series of construction phase control measures will be included within the CoCP to minimise NRMM emissions. These measures are outlined within Volume 3, Annex 10.5. Implementation of the CoCP will be secured as a requirement of the DCO.</p> <p>Nonetheless, as discussed above, a full qualitative assessment of NRMM for construction has been undertaken and the extent of operational activities considered. The assessment is presented in Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.</p>
<p>ETG Presentation, November 2022</p>	<p>Approach to air quality assessment: No consultation feedback received.</p>	<p>-</p>



Date and consultation phase/ type	Consultation and key issues raised	Section where comment addressed
ETG Technical Note, November 2022	Approach to air quality assessment: No comments on proposed approach from Natural England at this stage. Agreement on proposed approach from TDC on behalf of Essex County Council.	-



10.4 SCOPE AND METHODOLOGY

SCOPE OF THE ASSESSMENT

10.4.1 The assessment scope has been informed by both national and local planning policy and guidance, established best practice and experience, as well as via the consultation process from relevant consultees.

IMPACTS SCOPED IN FOR ASSESSMENT

10.4.2 Consistent with PINS (and other statutory consultee) recommendations contained within the Scoping Opinion (PINS, 2021) and presented in Table 10.4, the following items are scoped in for assessment:

- > Construction dust assessment;
- > Road traffic emissions assessment (construction and operational phase);
- > NRMM emissions assessment (construction and operational phase); and
- > Offshore activities emissions assessment (construction and operational phase).

10.4.3 Where relevant, these assessments have considered all phases of VE.

10.4.4 Within the Scoping Opinion (PINS, 2021) PINS indicated that following the implementation of appropriate controls/ measures it is possible that significant effects from emissions generated by NRMM would be avoided. However, it believed there was insufficient information to fully validate this opinion – with the recommendation to undertake an assessment or provide evidence demonstrating agreement with the relevant consultation bodies and the absence of likely significant effect occurring.

10.4.5 Essex County Council (representing TDC) within its consultation response contained within the Scoping Opinion (PINS, 2021) agreed NRMM emissions could be scoped out following the implementation of suitable mitigation. A series of controls are detailed in Volume 5, Annex 10.5: Air Quality Mitigation Measures. These measures are included within the CoCP developed to set procedural standards for proposed onshore construction activities. Implementation of the CoCP will be secured as a requirement of the DCO, therefore ensuring their effective application. Furthermore, Natural England within their consultation response contained within the Scoping Opinion (PINS, 2021) raised no comment with regards to the scoping out impacts associated with emissions generated from NRMM.

10.4.6 Notwithstanding this, a qualitative assessment of NRMM emissions has been undertaken – in recognition of PINS request. See Section 10.10 and Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.

10.4.7 Details surrounding the decommissioning phase are yet to be fully clarified. In addition, it is also recognised that policy, legislation and local sensitivities evolve. Despite this, decommissioning activities are not anticipated to exceed the construction phase worst case criteria assessed, given forecast improvements to air quality and the potential for cables to remain in situ reducing the volume of works in comparison. Consideration of decommissioning activities is included following assessment of construction phase activities. See Section 10.12.



IMPACTS SCOPED OUT OF ASSESSMENT

10.4.8 Consistent with the recommendations from PINS contained within the Scoping Opinion (PINS, 2021) and presented in Table 10.4, the following item is scoped out for assessment:

- > Transboundary impacts – on the basis that impacts will be localised within Essex County Council and TDC administrative areas and not experienced across international boundaries. This is consistent with PINS outcome associated with the Transboundary Screening Consultation Request which states transboundary effects from onshore activities associated with Five Estuaries Offshore Windfarm Limited (VE OWFL) are unlikely (PINS, 2022).

STUDY AREA

CONSTRUCTION DUST ASSESSMENT

10.4.9 The spatial extent of the study area for the construction dust assessment has been defined on the following threshold distances outlined in IAQM construction guidance (IAQM, 2016):

- > Human receptors within 350 m of the PEIR onshore RLB and human receptors within 50 m of routes used by construction vehicles on the public highway up to 500 m from the PEIR onshore RLB; and
- > Ecological receptors within 50 m of the PEIR onshore RLB and ecological receptors within 50 m of routes used by construction vehicles on the public highway up to 500 m from the PEIR onshore RLB.

10.4.10 Further detail is provided in Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.

ROAD TRAFFIC ASSESSMENT

10.4.11 The spatial extent of the study area for the road traffic assessment has been initially defined using a series of established screening criteria to determine the extent of the affected road network. The screening criteria utilised is dependent on the application (human vs. ecological). These are discussed further in Section 10.5.

10.4.12 The criteria applied as part of this assessment relates to increases in development-generated traffic. Traffic data used for the purposes of this screening exercise has been informed by analysis undertaken and presented as part of Volume 3, Chapter 8: Traffic and Transport.

10.4.13 Human and ecological receptors within 200 m of roads expected to experience increases in traffic flows as a result of the proposed VE onshore activities have been assessed, where appropriate. If an ecological and/ or human receptor is located >200 m from an affected road link, further consideration is not required.

10.4.14 The 200 m distance screening threshold is supported in various guidance documents (IAQM, 2020 and Highways England *et al.*, 2019) and is therefore considered appropriate.

10.4.15 To minimise uncertainty associated with the dispersion modelling outcomes, a verification exercise has been undertaken utilising 2019 monitoring data collected by TDC and CBC (the latest year which has not been impacted by the COVID-19 pandemic).



10.4.16 Further detail is provided in Volume 5, Annex 10.4: Road Traffic Dispersion Modelling Methodology.

NRMM ASSESSMENT

10.4.17 Human and ecological receptors within 50 m of potential NRMM have been assessed. The maximum design parameters/ extents of any proposed construction area (PEIR onshore RLB) have been used for the purposes of defining the locations of potential NRMM.

10.4.18 This approach is considered conservative – as it assumes that all NRMM will be operated on the boundary of the PEIR onshore RLB (inclusive of all design options), and therefore increases the opportunity for interactions with sensitive receptors. However, this approach ensures all potential scenarios and associated impacts have been assessed. Further detail is provided in Section 10.8.

10.4.19 If an ecological and/ or human receptor is located >50 m from the onshore PEIR RLB, further consideration is not required.

10.4.20 Use of a 50 m distance screening threshold in relation to NRMM emissions where extensive onshore construction activities are proposed has been accepted by statutory consultees and PINS for other NSIPs e.g. The Northampton Gateway Rail Freight Interchange Order 2019. Use of a 50 m distance screening threshold has been agreed with Natural England and TDC via the ETG process.

10.4.21 Further detail is provided in Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.

OFFSHORE ACTIVITIES ASSESSMENT

10.4.22 Onshore human and ecological receptors within 1 km of vessel movements generated by VE have been assessed, consistent with the distance screening thresholds prescribed within Defra's LAQM.TG(22).

10.4.23 The offshore wind farm array is located 37 km off the coast of England at the closest point. Given this separation distance, vessel movements associated with all phases of VE are therefore only likely to interact with onshore sensitive receptors where they are:

- > Used to facilitate the installation, maintenance and decommissioning of cabling infrastructure at landfall; and/ or
- > Exiting/ entering a port.

10.4.24 The specific port location(s) to be utilised by vessels are yet to be determined, however all movements will be compliant/ in line with the relevant port's operational constraints and management plans. Therefore, further consideration of vessels exiting/entering a port has not been given.

10.4.25 The study area therefore relates to onshore human and ecological receptors located within 1 km of vessels used to facilitate the installation, maintenance and decommissioning cabling infrastructure at landfall.

10.4.26 Further detail is provided in Volume , Annex 10.3: Offshore Activities Assessment.



DATA SOURCES

10.4.27 The characterisation of the existing environment has been undertaken using the latest publicly available data sources collected prior to the COVID-19 pandemic (i.e. pre-2020), as pollutant concentrations monitored during 2020 and 2021 are expected to be atypical, and not representative of the local environment and have therefore not been considered.

10.4.28 There appears to be sufficient coverage of publicly available data sources covering the spatial extents of the study areas defined for each assessment. Use of publicly available datasets for the purposes of characterising baseline conditions were found to be sufficient, therefore no project specific surveys have been undertaken.

10.4.29 The data sources are listed in Table 10.5.

Table 10.5: Summary of data sources

Data	Source	Year Released	Coverage
2020 Air Quality Status Report (2019 annual monitoring)	TDC	2020	Local
2020 Air Quality Status Report (2019 annual monitoring)	CBC	2020	Local
Automatic Urban and Rural Network	Defra	2021	National (England)
Background Mapped Concentration Estimates	Defra	2018	National (England)

ASSESSMENT METHODOLOGY

CONSTRUCTION DUST ASSESSMENT

10.4.30 The assessment of dust generated by potential construction activities on nearby sensitive human and ecological receptors has been undertaken in accordance with the IAQM construction guidance (IAQM, 2016).

10.4.31 The likely unmitigated dust emission magnitude associated with four activities (demolition, earthworks, construction and trackout) is used in conjunction with the sensitivity of the surrounding area to determine the risk of impact for each activity. These sensitivities are:

- > Annoyance due to dust soiling,
- > The risk of health effects due to an increase in exposure to PM₁₀, and
- > Harm to ecological receptors.

10.4.32 The risk of impact is then used to determine proportionate mitigation requirements, whereby through effective application, residual effects are considered to be not significant in terms of the EIA regulations.

10.4.33 Full details of the assessment methodology are provided within Volume 5, Annex 10.1: Construction Dust Assessment Methodology.



ROAD TRAFFIC ASSESSMENT

CONSTRUCTION PHASE

- 10.4.34 For the assessment of construction phase road traffic emissions on ecological and human receptors, an initial screening exercise has been conducted to determine whether detailed modelling is required (affected road network).
- 10.4.35 The screening criteria utilised is dependent on the application (these are different criteria for human and ecological receptors). These are discussed further in Section 10.5.
- 10.4.36 Where road traffic movements cannot be screened out (in accordance with the applied thresholds - Section 10.5), further detailed assessment has been undertaken.
- 10.4.37 Where required, road traffic impacts generated by VE on human and ecological receptors have been assessed with use of the Cambridge Environmental Research Consultants (CERC) ADMS-Roads v5 dispersion model.
- 10.4.38 The dispersion modelling assessment has considered the following scenarios:
- > 2019 Base Case (2019 BC) – Base flows for the year (2019);
 - > 2027 Do Minimum (2027 DM) – Without construction phase road traffic flows for the planned construction start year (2027), inclusive of any other relevant development flows; and
 - > 2027 Do Something (2027 DS) – ‘Do Minimum’ flows, plus road traffic flows associated with construction activities for the planned construction start year (2027).
- 10.4.39 For the above future year scenarios (2027), concurrent emission factors and background (projected) pollutant concentrations have been used – representing the earliest date of potential construction.
- 10.4.40 To ensure potential air quality impacts that may arise throughout the construction phase are understood, 2027 has been adopted for the purposes of dispersion modelling (i.e. earliest date of potential construction). Use of 2027 is therefore conservative, in recognition of the forecast reductions in vehicle emission factors and background pollutant concentrations – following the introduction of legislative and policy initiatives, alongside low emission technologies/ fuels. See Section 10.6.
- 10.4.41 Traffic data used for the purposes of the road traffic emissions assessment has been informed by analysis undertaken and presented as part of Volume 5, Chapter 8: Traffic and Transport. Road traffic volumes for all potential scenarios have been considered.
- 10.4.42 To provide greater confidence in the road traffic emissions assessment outcomes, the maximum consecutive 12 month (representing annual) traffic flows have been used. Within the context of dispersion modelling, this approach assumes that the maximum consecutive 12 month vehicle flows generated throughout the whole construction phase occur under worst case air quality conditions (vehicle emission factors and background pollutant concentrations) projected for the full construction period. This is considered conservative.



- 10.4.43 The maximum road traffic flows generated on each link across all scenarios was used to facilitate a robust assessment. This approach will likely exaggerate potential impacts as it theoretically assumes all scenarios (and their likely distribution of traffic) will occur within a single scenario. In reality, the spatial extent of traffic generated by the final design option will be smaller in comparison. However, this approach ensures that all potential scenarios and interactions have been assessed.
- 10.4.44 The dispersion modelling assessment has incorporated the potential maximum traffic flows that are likely to occur in the future assessment year (i.e. 2027) should VE receive consent (based upon information currently available). The traffic flows used for the assessment includes vehicle movements associated with relevant developments in the assessment area, including:
- > Committed developments (see Volume 3, Chapter 8: Traffic and Transport); and
 - > North Falls OWF.
- 10.4.45 North Falls OWF has not received consent, but for the purposes of facilitating a robust cumulative assessment, vehicle flows generated by NF have assumed to be equivalent to peak flows generated by VE on each road link. This theoretically assumes that peak construction activities associated with both VE and NF will overlap and affect the same road links simultaneously – considered highly unlikely, and does not account for any efficiencies between the two schemes.
- 10.4.46 The dispersion modelling exercise is inherently cumulative in nature, and on reflection represents a worst-case approach in terms of approval of NF, and if peak construction activities were to overlap with VE.
- 10.4.47 The dispersion modelling assessment did not consider road traffic volumes associated with the National Grid electricity transmission (NGET) substation based upon the unavailability of information (see Volume 3, Chapter 8: Traffic and Transport). NGET will be considered within the ES Traffic and Transport assessment.
- 10.4.48 Based upon initial analysis, trips generated by NGET are likely to impact the A12, A120 and northern access routes only. A complete cumulative assessment will be undertaken for the ES in consideration of all relevant live project/ plans. The omission of NGET does not affect the validity of the in-combination screening exercise undertaken with respect to national and international ecological designations (see Section 10.10).
- 10.4.49 Further details regarding the maximum design scenario (MDS) considered are discussed in Section 10.8.
- 10.4.50 The dispersion modelling exercise has been undertaken in accordance with Defra's LAQM.TG(22).
- 10.4.51 With respect to human receptors, consideration has been given to the relevant AQALs. Concentrations of NO₂, PM₁₀ and PM_{2.5} have been predicted at locations of relevant exposure at existing sensitive receptors – adjacent to the affected road network.



10.4.52 With respect to ecological receptors, consideration has been given to the relevant Critical Levels and Critical Loads. Concentrations of NO_x have been predicted at ecological designations within 200 m of the affected road network, with use of gridded and boundary receptors (to ensure maximum impacts are understood). Empirical methods recommended by the EA within AQTAG 06 (Air Quality Advisory Group, 2014) has been used to facilitate the assessment of Critical Loads.

10.4.53 The assessment criteria outlined within Section 10.5 has been used to determine the overall significance of VE OWFL, with respect to construction road traffic modelled impacts on human and ecological receptors.

10.4.54 Full details of the assessment methodology are provided within Volume 5, Annex 10.4: Road Traffic Dispersion Modelling Methodology.

OPERATIONAL PHASE

10.4.55 In response to PINS explicit request (Scoping Opinion, 2021), road traffic flows generated by operational phase activities have been compared against EPUK & IAQM screening thresholds to determine whether further assessment is required.

10.4.56 These screening thresholds are outlined within Section 10.5.

NRMM ASSESSMENT

10.4.57 A qualitative assessment of potential construction phase NRMM emissions on sensitive human and ecological receptors has been undertaken in accordance with guidance prescribed within Defra's LAQM.TG(22). Topics requiring qualitative considerations are outlined in Section 10.5.

10.4.58 As per LAQM.TG(22), qualitative consideration of NRMM emissions is likely to provide sufficient screening of impacts.

10.4.59 In response to PINS request (Scoping Opinion, 2021), the extent of planned operational activities/ works have been discussed to determine whether further assessment in relation to NRMM emissions is required.

10.4.60 Full details of the assessment methodology are provided within Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.

OFFSHORE ACTIVITIES ASSESSMENT

10.4.61 Vessel movements generated by VE during all stages of development have been compared against screening thresholds prescribed within Defra's LAQM.TG(22) and outlined in Section 10.5.

10.4.62 The screening thresholds indicate that sensitive receptors up to 1 km from vessel movements can be affected by vessel emissions. The offshore wind farm array is located at the closest 37 km off the coast of England. Given the separation distance, vessel movements associated with all phases of VE are therefore only likely to interact with onshore sensitive receptors where they are:

- > Used to facilitate the installation, maintenance decommissioning of cabling infrastructure at landfall; and/or
- > Exiting/ entering a port.



- 10.4.63 The specific port location(s) to be utilised by vessels are yet to be determined, however all movements will be compliant/ in line with the relevant port's operational constraints and management plans. Therefore, further consideration of vessels exiting/ entering a port has not been given.
- 10.4.64 The focus of this assessment thus relates to the potential extent of vessels used to facilitate the installation, maintenance decommissioning of cabling infrastructure at landfall and their interaction with onshore sensitive receptors. In relation to this, the majority of vessel movements affecting these receptors would occur in the construction phase (and potentially the decommissioning phase, if infrastructure is not left in situ). Nearshore activities during O&M are expected to be very limited, relating to cable maintenance for example.
- 10.4.65 In recognition of the current optionality with regards to the landfall options, all scenarios and study areas have been assessed – i.e. assuming nearshore vessel movements occur within 1 km of both locations. Further detail on the applied MDS is provided in Section
- 10.4.66 Vessel movements used for the purposes of this screening assessment are consistent with the analysis undertaken, and presented within Volume 2, Chapter 1: Offshore Project Description.
- 10.4.67 Consideration has also been given to the extent of helicopter movements generated by VE, during all stages of development, and the likelihood for a significant effect to arise.
- 10.4.68 Full details of the assessment methodology are provided within Volume 5, Annex 10.3: Offshore Activities Assessment.

10.5 ASSESSMENT CRITERIA AND ASSIGNMENT OF SIGNIFICANCE

- 10.5.1 Whilst Volume 1, Chapter 3: EIA Methodology provides an indicative EIA assessment matrix, it also identifies that assessment methodologies will reflect the prevailing technical area guidance and specific requirements of receptor groups. As such the following sections provide a description of the assessment criteria and assessment methodologies used to assess air quality, which are derived from best practice guidance documents.

CONSTRUCTION DUST ASSESSMENT

- 10.5.2 The IAQM construction dust assessment methodology provides a framework to establish the unmitigated risk of construction dust impacts associated with a development at both human and ecological receptors.
- 10.5.3 This risk is based on a relationship between the anticipated dust emission magnitude and the sensitivity of the surrounding area. These have been defined with use of criteria provided within the IAQM construction guidance.
- 10.5.4 Following determination of these risks, proportionate mitigation is recommended, with the aim of rendering residual effects as not significant in terms of the EIA regulations.
- 10.5.5 Significance is only assigned to the effect after considering the construction activity with mitigation. This is because for construction activities, the aim is to prevent significant effects on receptors through the use of effective mitigation.



10.5.6 The IAQM construction guidance therefore does not provide a framework to determine the significance of unmitigated effects, as is not considered appropriate nor relevant in this context. For these reasons, the significance of the unmitigated effect of construction dust cannot be defined.

10.5.7 Full details of the assessment methodology are provided within Volume 5, Annex 10.1: Construction Dust Assessment Methodology.

ROAD TRAFFIC ASSESSMENT

HUMAN RECEPTORS

10.5.8 The assessment procedure outlined within the EPUK & IAQM guidance document (EPUK & IAQM, 2017) has been used in relation to the assessment of road traffic emissions generated by VE (for all stages of development) on human receptors.

10.5.9 This initially comprises a screening exercise to determine whether detailed modelling is required.

STEP 1: NUMERICAL SCREENING OF ROAD TRAFFIC FLOWS

10.5.10 The screening criteria provided in the EPUK & IAQM guidance document has been used to determine whether further assessment of VE generated traffic on sensitive human receptor locations is required.

10.5.11 Specific to a development located outside of an AQMA:

- > A change of light duty vehicle (LDV) flows of more than 500 annual average daily traffic (AADT); and/ or
- > A change of heavy duty vehicle (HDV) flows of more than 100 AADT.

10.5.12 Specific to a development located within or adjacent to an AQMA:

- > A change of LDV flows of more than 100 AADT; and/ or
- > A change of HDV flows of more than 25 AADT.

10.5.13 If the traffic flows are not found to exceed any of the screening criteria presented, then effects are considered to be insignificant and can be screened out of further consideration. Where the screening criteria are exceeded (and relevant human receptors are located <200 m), detailed dispersion modelling is required.

STEP 2: DISPERSION MODELLING

10.5.14 Significance criteria as provided within EPUK & IAQM guidance has been used for the purposes of informing effects arising from road traffic emissions on human receptors where dispersion modelling has been undertaken.

10.5.15 Whilst describing the impact at an existing human receptor, the resultant total concentration as well as the magnitude of change in relation to respective AQALs are both considered – using the approach detailed in Table 10.6.



Table 10.6: Impact descriptors

Concentration with development	Percentage change in air quality relative to AQAL (%)			
	1%*	2-5%	6-10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
Note:				
*=changes less than 0.5% are considered to be 'negligible'.				

10.5.16 Following derivation of impacts at all existing receptor locations assessed, the overall significance of the developmental 'effect' is determined based upon consideration, as necessary, of the following factors:

- > The existing and future air quality in the absence of the development;
- > The extent of current and future population exposure to the impacts;
- > The worst case assumptions adopted when undertaking the prediction of impacts; and
- > The extent to which the proposed development has adopted best practice to eliminate and minimise emissions.

ECOLOGICAL RECEPTORS

10.5.17 The assessment procedure outlined within the IAQM ecological guidance document (IAQM, 2020) has been used in relation to the assessment of sensitive ecological receptors and road traffic.

10.5.18 This comprises a staged screening procedure to determine the potential for a likely significant effect to occur.

STEP 1: SCREENING

10.5.19 The first stage is to consider whether any ecological designations with sensitive qualifying features are located within 200 m of a road link projected to experience the following developmental-generated vehicle movements:

- > >1,000 AADT; and/ or
- > >200 HDVs.

10.5.20 For the purposes of assessing impacts on internationally designated ecological sites, screening of Project trips has been undertaken in-combination with other projects and plans trips following recent case law outcomes (e.g. the Wealden Judgement). This is also reinforced within the Habitats Regulations. In-combination screening has also been conducted with respect to national ecological designations (SSSIs) following a review of consultation comments provided by Natural England on other projects.



- 10.5.21 The extent of relevant projects and plans considered within the in-combination screening exercise is clarified following identification of affected national and international designations (see Section 10.10). The omission of trips generated by NGET (Section 10.4) does not affect the validity of the in-combination screening exercise undertaken with respect to national and international ecological designations.
- 10.5.22 Whilst assessing impacts on local ecological designations, it is appropriate to assess developmental trips in isolation. This is reflective of the level of protection afforded to these sites.
- 10.5.23 If the above conditions are not met, then impacts on ecological designations are likely to be imperceptible, whereby resultant effects are considered to be not significant. If the conditions are met/ exceeded, then detailed assessment through dispersion modelling is required to quantify the impact on Critical Levels and/or Critical Loads.

STEP 2: DISPERSION MODELLING

- 10.5.24 Where impacts can otherwise not be screened out, dispersion modelling has been used to quantify the impact of road traffic movements on Critical Levels and/ or Critical Loads.
- 10.5.25 Changes can be classed as insignificant where they are:
- > International and national sites: <1% of the Critical Levels and/ or Critical Loads;
 - > Local sites: <100% of the Critical Levels and/ or Critical Loads;
- 10.5.26 Use of the 1% threshold for the assessment of road traffic impacts on international sites is supported by Natural England (Natural England, 2018). This guidance does not specifically cover other ecological designations. Despite this, the 1% threshold has been applied to national sites following a review of consultation comments provided by Natural England on other projects.
- 10.5.27 This risk-based approach to the assessment of road traffic impacts on different ecological designations reflects the level of protection afforded to these sites. It is also consistent with the Environment Agency approach for the assessment of ecological designations (Environment Agency, 2022).
- 10.5.28 This risk-based approach has been agreed by Natural England and Tendering District Council via the ETG process.
- 10.5.29 The extent of developments considered is consistent with the approach undertaken in Step 1: Screening.
- 10.5.30 If modelled changes are below these thresholds, then impacts on ecological designations are likely to be imperceptible, whereby resultant effects are considered to be not significant in terms of the EIA regulations.

NRMM EMISSIONS ASSESSMENT

- 10.5.31 According to the IAQM construction guidance (IAQM, 2016) experience of assessing exhaust emissions from NRMM suggests that they are unlikely to make a significant effect in terms of the EIA regulations.



10.5.32 Furthermore according to Defra's LAQM.TG(22) guidance, experience of assessing the exhaust emissions from NRMM suggests that, with suitable controls and site management, they are unlikely to make a significant impact on local air quality.

10.5.33 The likelihood for a significant effect to arise is considered qualitatively, based on the following items:

- > Duration of works and associated phasing;
- > The type and number of plant to be used, and controls to be applied (including the emissions standards of NRMM);
- > Operating hours of NRMM;
- > Proximity of receptors to NRMM working areas – and spatial extent of affected areas; and
- > Existing air quality conditions in the area and likelihood of an exceedance.

10.5.34 If the impacts are found to be not significant for the worst-case phase of NRMM activity (i.e. during construction), then they can be considered not significant for phases whereby NRMM activity is reduced (i.e. operational phase) and a separate qualitative assessment is not required.

10.5.35 As per LAQM.TG(22), qualitative consideration of NRMM emissions is likely to provide sufficient screening of impacts.

10.5.36 Full details of the assessment methodology are provided within Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment.

OFFSHORE ACTIVITIES ASSESSMENT

10.5.37 The screening criteria provided in LAQM.TG(22) has been used to determine whether further assessment of vessel movements on sensitive human and ecological receptors is required.

10.5.38 Annual vessel movements have been compared against the following screening thresholds:

- > There are more than 5,000 large ship movements per year, with relevant exposure within 250 m of berths and main areas of manoeuvring; and/ or
- > There are more than 15,000 large ship movements per year with relevant exposure within 1 km.

10.5.39 Indicative large ship movements comprise cross-channel ferries, roll on-roll off ships, bulk cargo, container ships and cruise liners.

10.5.40 If annual vessel movements generated by VE are below the LAQM.TG(22) screening thresholds, then effects are considered to be not significant in terms of the EIA regulations and can be screened out of further consideration.

10.6 UNCERTAINTY AND TECHNICAL DIFFICULTIES ENCOUNTERED

CONSTRUCTION DUST ASSESSMENT

10.6.1 The construction dust assessment is primarily a tool to identify the proportionate level of mitigation required for the various construction activities.



- 10.6.2 Resultant effects ultimately depend on the effective application of this mitigation. Therefore, there can be uncertainty on how representative the assessment procedure and associated post-mitigated outcomes would be if appropriate mitigation is not secured.
- 10.6.3 The necessary air quality control measures and mitigation; are included as part of the draft CoCP. The draft CoCP developed for the proposed onshore construction activities which adheres to construction industry good practice guidance for control measures and dust management. The CoCP will be secured as a requirement of the DCO. The construction phase control measures are outlined within Volume 5, Annex 10.5: Air Quality Mitigation Measures.
- 10.6.4 The CoCP will detail control measures to manage dust during construction works. At this stage the draft CoCP provides air quality management principles for feedback.
- 10.6.5 Furthermore, the maximum design parameters/ extents of any proposed construction area have been used for the purposes of defining potential dust sources, where not finalised. This approach will increase the opportunity for greater derived sensitivities and dust emission magnitudes. As such, there is the potential for the assessment to exaggerate the potential impacts, which could result in a higher level of mitigation being recommended than would realistically be required. This ensures that all potential scenarios and associated impacts have been assessed. Further detail is provided in Section 10.8.

ROAD TRAFFIC ASSESSMENT

CONSTRUCTION PHASE

- 10.6.6 Dispersion modelling is inherently uncertain and is principally reliant on the accuracy and representativity of its inputs. In acknowledgement of this, the ADMS-Roads dispersion model has been verified with the latest representative publicly available local monitoring data – as collected by TDC and CBC.
- 10.6.7 Following verification, all model output statistical parameters (used to evaluate model performance and uncertainty) are within LAQM.TG(22) prescribed ideal tolerances.
- 10.6.8 In addition, there is a widely acknowledged disparity between emission factors and ambient monitoring data. To help minimise any associated uncertainty when forming conclusions from the results, this assessment has utilised the latest emission factors toolkit (EFT) version 11.0 utilising COPERT 5.3 emission factors, and associated tools/ datasets published by Defra.
- 10.6.9 Further detail on how uncertainty has been addressed is provided in Volume 5, Annex 10.4: Road Traffic Dispersion Modelling Methodology.
- 10.6.10 Traffic data for the purposes of the modelling assessment is consistent with the analysis undertaken, and presented as part of Volume 3, Chapter 8: Traffic and Transport. Road traffic volumes for all potential scenarios (consistent with the Traffic and Transport analysis) have been assessed.
- 10.6.11 Furthermore, a series of conservative assumptions relating to the assessment of a MDS have been adopted to facilitate a precautionary assessment and provide greater confidence in the road traffic emissions assessment outcomes. See Section 10.8 for further information.



OPERATIONAL PHASE

- 10.6.12 For the purposes of facilitating a conservative screening exercise, peak vehicle movements generated during the operational phase have been assessed.
- 10.6.13 Use of peak vehicle movements within this context increases the confidence in the assessment outcomes. See Section 10.8 for further information.

NRMM EMISSIONS ASSESSMENT

CONSTRUCTION ASSESSMENT

- 10.6.14 A 50 m distance screening threshold in relation to NRMM emissions has been applied to the PEIR onshore RLB initially to inform the spatial extent of affected receptors (human and ecological).
- 10.6.15 Use of the PEIR onshore RLB for the purposes of informing the extent of NRMM emissions is conservative – as it relates to the maximum design parameters/ extents of any proposed construction area including design options (e.g. two landfall options). However, ensures all potential scenarios and associated impacts have been assessed.
- 10.6.16 Furthermore, use of the PEIR onshore RLB assumes that all NRMM will be operated continuously at the maximum design parameters/ extents of any proposed construction area. This is highly unlikely to be the case, as NRMM locations will vary across the active construction area and will not typically be operated continuously at the boundary.
- 10.6.17 Use of the PEIR onshore RLB in this context is likely to facilitate a conservative assessment, and therefore increases the opportunity for interactions with sensitive receptors. As per Volume 5, Annex 10.5: Air Quality Mitigation Measures, site machinery will be positioned to maximise the separation distance(s) to sensitive receptors, as far as practically possible.
- 10.6.18 The assessment will be repeated at ES stage, following the refinement of design parameters e.g. selection of a preferred landfall option, onshore ECC width reduced. In respect of this, the assessed interactions may not necessarily occur collectively – as the PEIR onshore RLB includes optionality (e.g. two landfall options).
- 10.6.19 Furthermore, there is uncertainty and/ or optionality regarding the extent of specific construction activities within 50 m of a receptor, all possible construction activities have been considered for completeness.
- 10.6.20 Further detail about how these assumptions have been used to inform a MDS is provided in Section 10.8.

OFFSHORE ACTIVITIES ASSESSMENT

- 10.6.21 Vessel movements used for the purposes of this screening assessment are consistent with the analysis undertaken, and presented within Volume 2, Chapter 1: Offshore Project Description. Vessel movements for all potential scenarios have been considered.



- 10.6.22 The LAQM.TG(22) screening criteria relates to the number of large ships movements per year. Large ship movements comprise cross-channel ferries, roll on-roll off ships, bulk cargo, container ships and cruise liners. Vessel movements generated by VE are unlikely to represent large ships, given the nature and location of works (within 1 km of the coast). For the purposes of facilitating an assessment, it has been assumed that all vessels generated by VE will be large ships.
- 10.6.23 The extent of predicted construction vessels numbers for VE provided in Volume 2, Chapter 1: Offshore Project Description relates to the total number of round trips. To derive the number of vessel movements per year for each phase, the total number of vessels movements (round trips) has been multiplied by two.
- 10.6.24 The number of predicted construction vessels movements provided in Volume 2, Chapter 1: Offshore Project Description relates to the extent of vessels generated throughout the whole construction period. The construction period is expected to be greater than 1 year (18 months for onshore ECC including landfall). To increase the confidence in the screening exercise and minimise the use of assumptions, the total number of construction vessel movements estimated to occur throughout the whole construction phase has been used. This is believed to be conservative as the screening thresholds relate to the number of vessel movements permitted to occur in an annual period. Actual annual movements are believed to be lower than those values used for screening.
- 10.6.25 Construction vessel movements have been categorised based upon their likelihood to occur within 250 m or 1 km of an onshore sensitive receptor located in proximity of construction works to be consistent with the LAQM.TG(22) screening thresholds.
- 10.6.26 Where there is uncertainty regarding whether certain vessel movements will occur within 250 m or 1 km of an onshore sensitive receptor, all vessel movements have been considered for completeness.
- 10.6.27 The LAQM.TG(22) screening thresholds applied within the assessment (Section 10.5) relate explicitly to large ship movements which comprise cross-channel ferries, roll on-roll off ships, bulk cargo, container ships and cruise liners. Vessel movements generated by VE are unlikely to represent large ships, given the nature and location of works (within 1 km of the coast). For the purposes of facilitating an assessment, it has been assumed that all vessels will comprise large ships.
- 10.6.28 Further detail about how these assumptions have been used to inform a MDS is provided in Section 10.8.

10.7 EXISTING ENVIRONMENT

- 10.7.1 The characterisation of the existing environment has been undertaken through reference to the latest available air quality datasets in the public domain, outlined in Table 10.5.

LAQM REVIEW AND ASSESSMENT

- 10.7.2 TDC and CBC, in fulfilment of statutory requirements, have conducted an on-going exercise to review and assess air quality within their administrative area, termed 'Review and Assessment'.



10.7.3 The nearest AQMA is located approximately 6.8 km west of the PEIR onshore RLB boundary within the centre of Colchester, declared for exceedances of the annual mean NO₂ AQAL.

10.7.4 The road traffic emissions assessment has given consideration to potential interactions with generated road traffic movements and surrounding AQMAs, where relevant.

REVIEW OF AIR QUALITY MONITORING

AUTOMATIC MONITORING

10.7.5 The nearest automatic monitoring is located approximately 7.2 km west of the PEIR onshore RLB in the centre of Colchester. As such, automatic monitoring locations are unlikely to be representative of baseline conditions of the receiving environment. No further consideration has therefore been given to automatic monitoring data.

NON-AUTOMATIC MONITORING

10.7.6 Passive NO₂ diffusion tube monitoring is undertaken by TDC and CBC within their administrative areas at numerous locations.

10.7.7 The details and results of the monitoring locations of relevance to this assessment are presented in Table 10.7 and Table 10.8 respectively, whilst their locations are illustrated in Figure 10.1.

10.7.8 As illustrated in Figure 10.1 these monitoring locations are all located at key roadside arterial locations – adjacent to road links where VE construction generated traffic is projected to pass). As such, use of these monitoring locations to inform baseline conditions with reference to potential road traffic effects is considered sufficient.

Table 10.7: Details of local non-automatic monitoring locations

Site ID	Site Type	X	Y	Closest Distance to Site (km)
DT14	Roadside	616062	218517	3.6
DT15	Roadside	616062	218517	3.6
DT16	Roadside	616062	218517	3.6
DT19	Roadside	613924	227789	0.8
DT20	Roadside	612619	227395	0.0
CBC131	Roadside	595025	225166	12.5
CBC132	Roadside	595106	225123	12.5

Table Note:
DT14, DT15, DT16 monitoring locations are part of a triplicate set at the same location.



Table 10.8: Results from local non-automatic monitoring locations

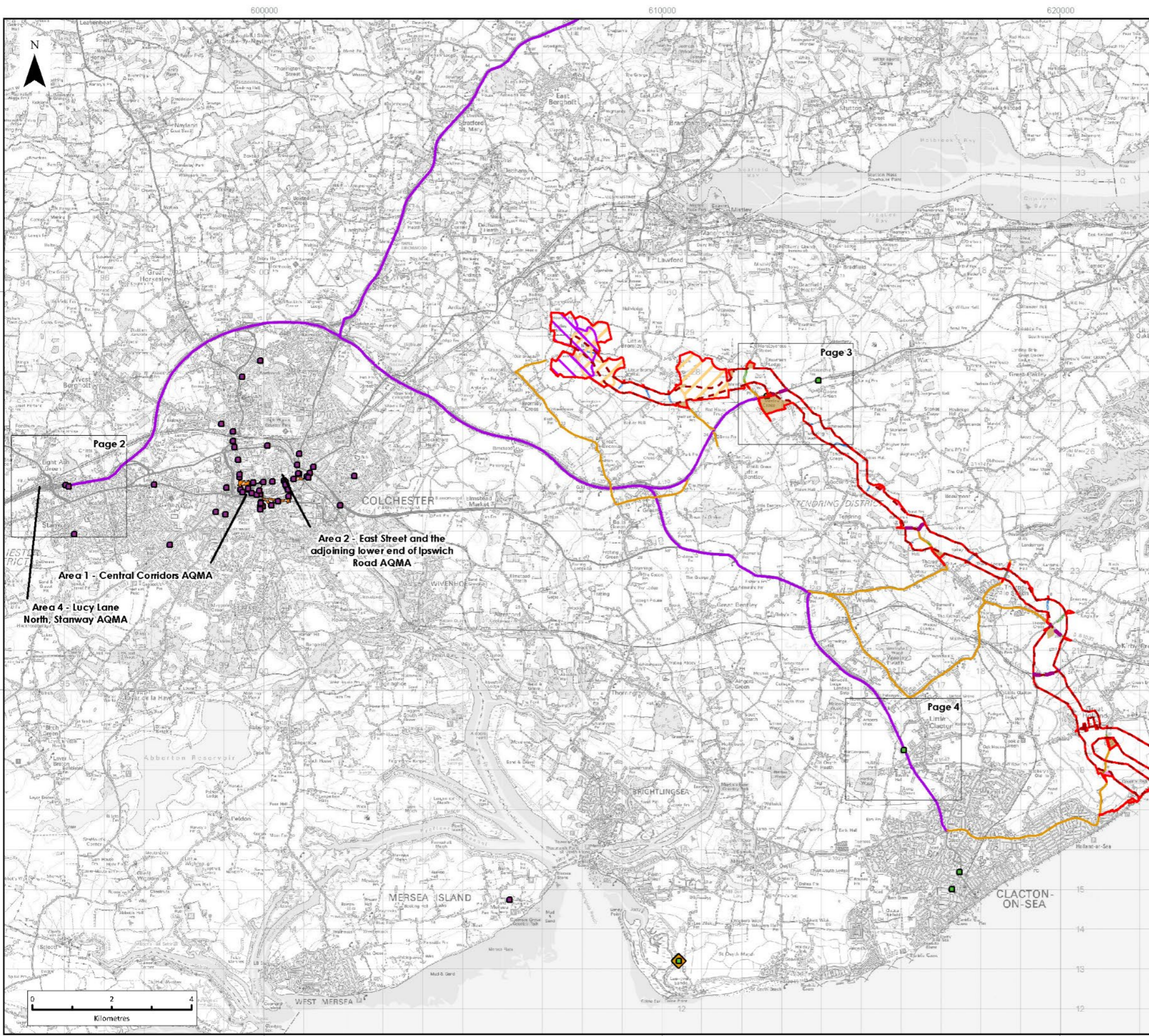
Site ID	2019 Data Capture (%)	Annual mean NO ₂ Concentration µg/m ³				
		2015	2016	2017	2018	2019
DT14	100	34.9	34.2	42.7	32.8	31.5
DT15	100	37.6	36.3	42.0	32.7	32.0
DT16	100	36.7	23.9	42.3	33.7	31.4
DT19	100	26.0	23.4	30.9	23.7	23.2
DT20	100	21.0	21.9	24.2	20.3	20.7
CBC131	100	-	-	-	-	39.9
CBC132	100	-	-	-	-	32.5

Table Note:
DT14, DT15, DT16 monitoring locations are part of a triplicate set at the same location and concentrations should be reported as a time weighted average.

- 10.7.9 For the period assessed (2015-2019), annual mean NO₂ concentrations recorded at the non-automatic monitoring locations of relevance to the onshore construction working area were below the AQAL (40 µg/m³) in all years except 2017 at the DT14/DT15/DT16 monitoring location. However, it is noted that CBC131 recorded an annual mean NO₂ concentration of 39.9 µg/m³ within 2019. All monitoring locations presented are roadside of key arterial routes. As such, annual mean NO₂ concentrations presented are worst-case relative to the wider extent of the onshore receiving environment.
- 10.7.10 DT20 is located roadside of the A120 within the extent of the RLB. The annual mean NO₂ concentration at DT20 was 'well below' the annual mean AQAL for all years assessed.
- 10.7.11 As illustrated in Figure 10.1, all monitoring locations are all located at key roadside arterial locations – adjacent to road links included within the dispersion model (i.e., where VE generated traffic is projected to pass). Overall, annual mean NO₂ concentrations recorded at these locations have either remained stable or demonstrated a slight long-term reduction for the period assessed (where data exists); except for 2017. This overall demonstrates improvements at key roadside locations – validating the application of Defra supplied projections within the road traffic dispersion modelling exercise.
- 10.7.12 CBC131 and CBC132 are located in the vicinity of the A12, an arterial road where large volumes of traffic are expected (in comparison to those in proximity of the RLB). The annual mean NO₂ concentration at CBC131 in 2019 was 39.9 µg/m³, just below the AQAL. CBC131 is located within an AQMA: Area 4 - Lucy Lane North, Stanway, declared for exceedence of NO₂ annual mean AQAL and as such elevated monitored concentrations are expected. Due consideration has been given to impacts associated with road traffic emissions upon this AQMA within the PEIR.



10.7.13 Furthermore, the empirical relationship given in LAQM.TG(22) states that exceedances of the 1 hour mean AQAL for NO₂ is unlikely to occur where annual mean concentrations are <60 µg/m³ at a location of relevant exposure. This indicates that an exceedance of the 1-hour mean AQAL is unlikely to have occurred at these sites between 2015 and 2019.



LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Core Access Route
- Local Access Route to Temporary Construction Compound
- Colchester Borough Council 2019 Monitor
- Tendring District Council 2019 Monitor
- Automatic Urban and Rural Network (AURN) Monitor
- Air Quality Management Area (AQMA)

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PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

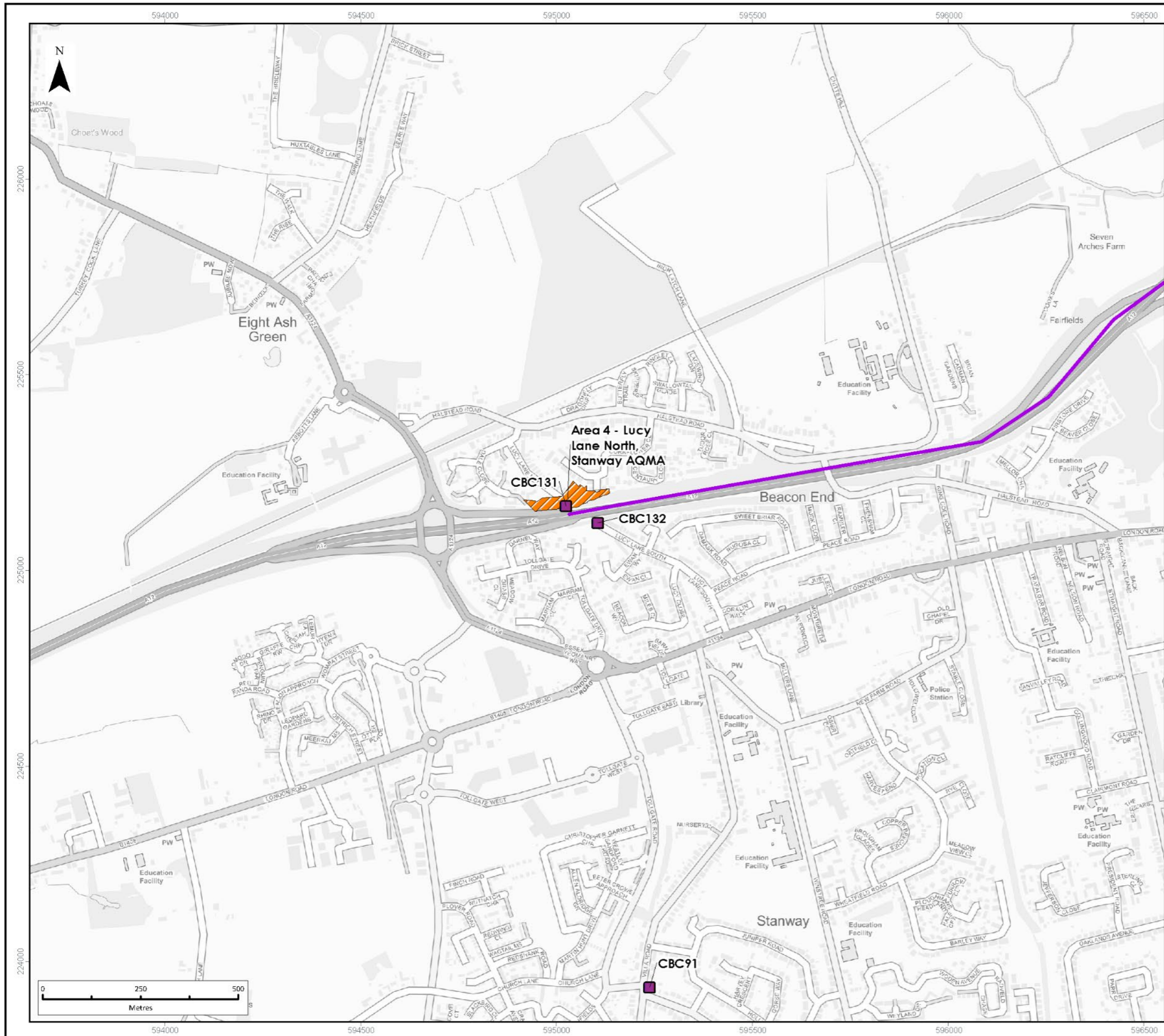
DRAWING TITLE:
 Air Quality Monitoring Locations

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:
 FIGURE 10.1
 Page 1 of 4

SCALE: 1:100,000	PLOT SIZE: A3	DATUM: OSGB 1936	COORDINATE SYSTEM: British National Grid
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LEGEND

- Core Access Route
- Colchester Borough Council 2019 Monitor
- Air Quality Management Area (AQMA)

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PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

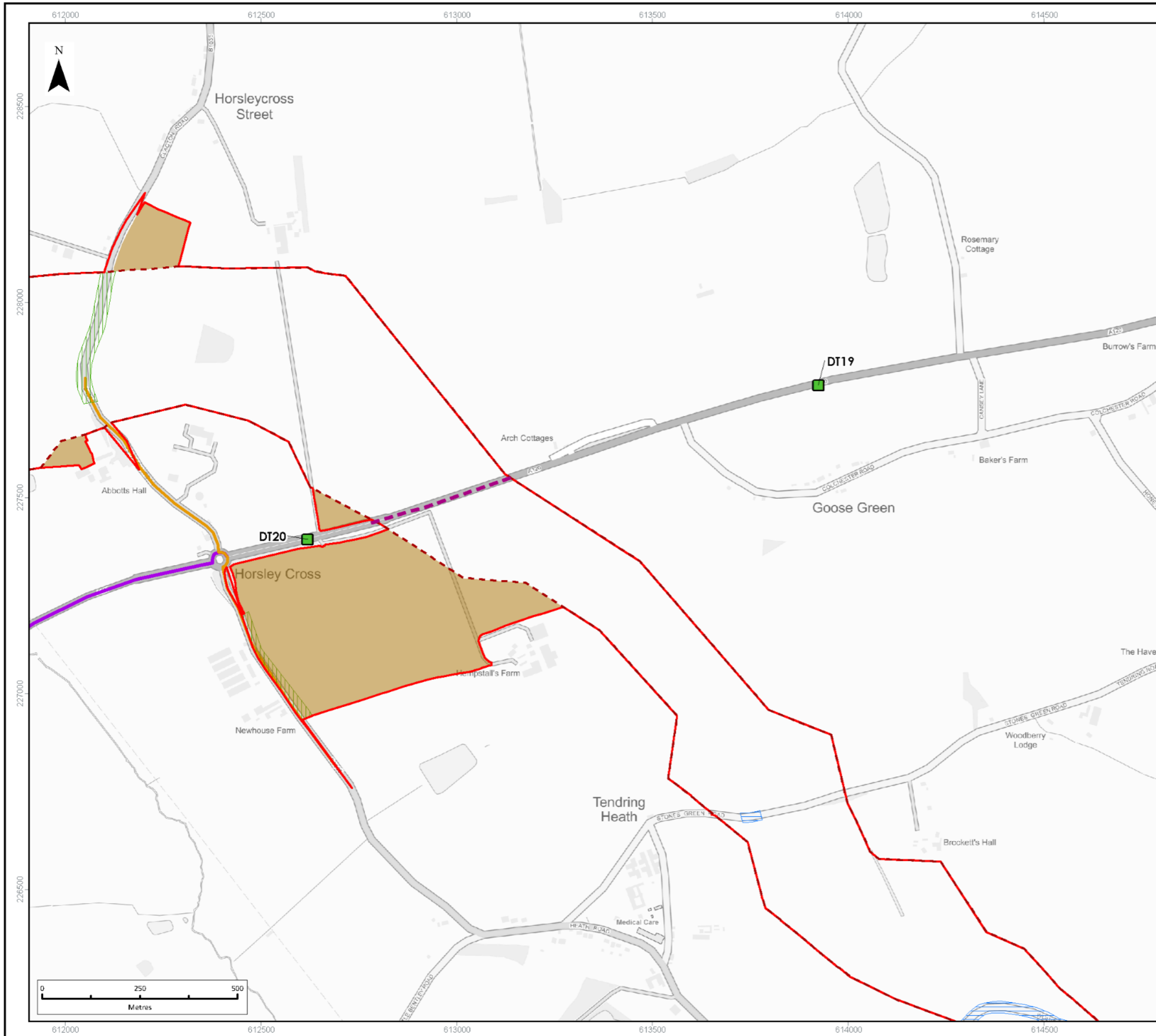
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 Air Quality Monitoring Locations

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:
 FIGURE 10.1
 Page 2 of 4

SCALE: 1:10,000 PLOT SIZE: A3 DATUM: OSGB 1936 CO-ORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access
- Core Access Route
- Local Access Route to Temporary Construction Compound
- Tending District Council 2019 Monitor

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FIVE ESTUARIES OFFSHORE WINDFARM

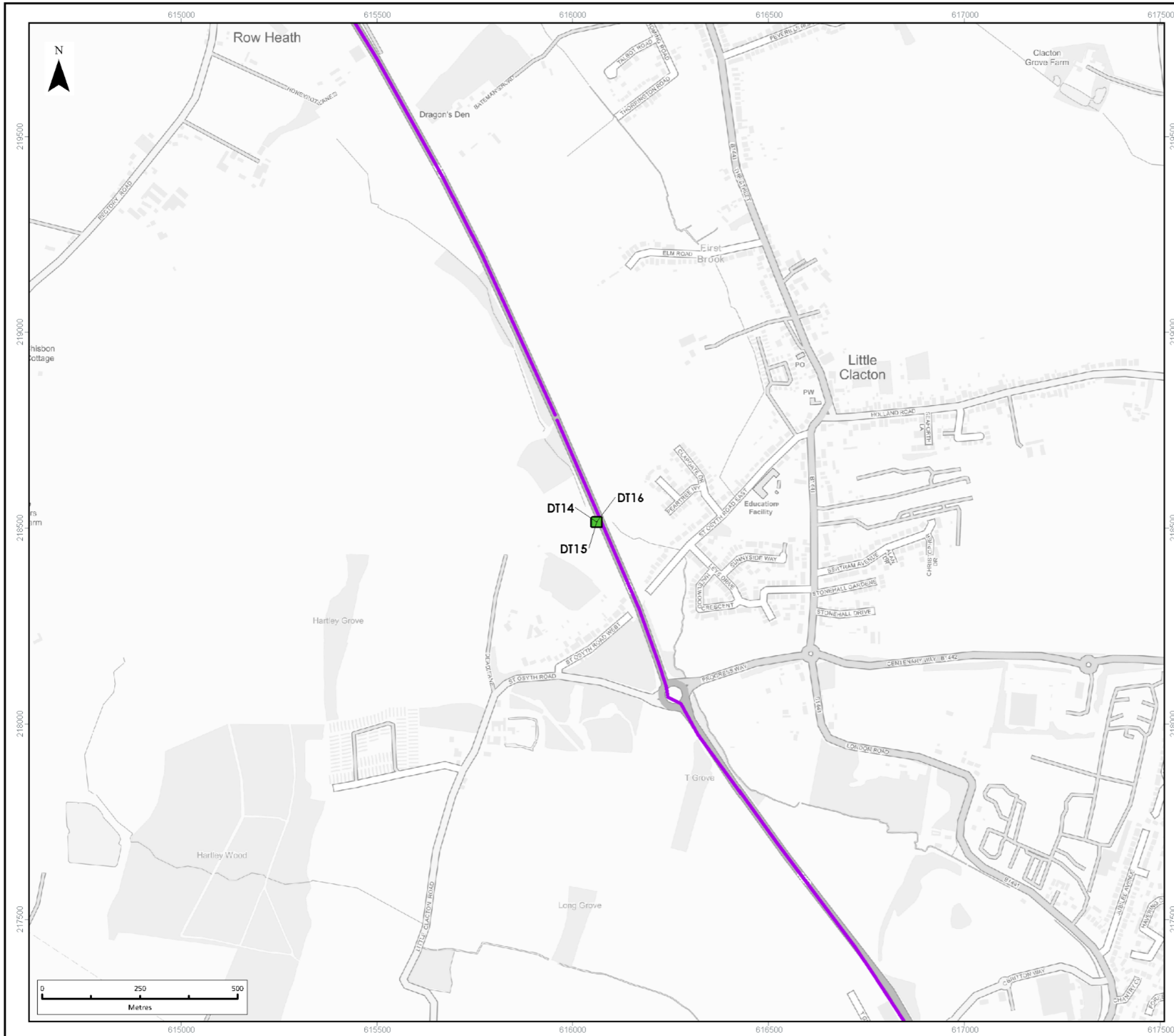
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Air Quality Monitoring Locations

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FIGURE 10.1
 Page 3 of 4

SCALE: 1:10,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Core Access Route
- Tendring District Council 2019 Monitor

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PROJECT TITLE:
FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
Air Quality Monitoring Locations

VER	DATE	REMARKS	Drawn	Checked
1	21/02/2023	PEIR Submission	JO	JS

DRAWING NUMBER:
FIGURE 10.1
 Page 4 of 4

SCALE: 1:10,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





DEFRA MAPPED BACKGROUND CONCENTRATIONS

10.7.14 Defra maintains a nationwide model of existing and future background air quality concentrations at a 1 km grid square resolution.

10.7.15 Annual mean background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} have been obtained from the Defra published background maps (projected from a 2018 reference year), based on the 1 km grid squares which cover the modelled domain (Defra, 2020).

10.7.16 The maximum Defra mapped background concentrations across the PEIR onshore RLB for the following milestone years are presented in Table 10.9:

- > 2022 – Current year;
- > 2027 – Indicative earliest construction start year; and
- > 2030 – Indicative earliest operational start year.

10.7.17 The corresponding AQAL/ Critical Levels are provided as an example.

10.7.18 The full extent of background concentrations utilised within the dispersion modeling exercise are presented within Volume 5, Annex 10.4: Road Traffic Dispersion Modelling Methodology.

Table 10.9: Maximum Defra mapped background pollutant concentrations

Year	Maximum Annual Mean Background Concentration µg/m ³			
	NO _x	NO ₂	PM ₁₀	PM _{2.5}
2022	10.2	7.9	16.0	9.2
2027	8.8	6.8	15.5	8.8
2030	8.3	6.5	15.6	8.8
AQAL/ Critical Level	30	40	40	25

10.7.19 As shown in Table 10.9, all of the mapped background concentrations are below the respective annual mean AQALs/ Critical Level.

10.8 KEY PARAMETERS FOR ASSESSMENT

10.8.1 The onshore elements of VE include optionality at PEIR stage in terms of the wide onshore export cable corridor (Onshore ECC), two Substation Search Areas (SSA West and SSA East) for the onshore substation (OnSS), and two potential landfall areas, between Holland-on-Sea and Frinton-on-Sea on the Essex coast. The Onshore ECC comprises a wider cable corridor within which the final VE cable corridor will be developed.

10.8.2 These design elements will be finalised prior to submission of the ES.



10.8.3 These potential design scenarios/ parameters can individually impact the outcomes of the air quality assessment. As such, to allow for greater flexibility and undertake precautionary assessment, a MDS has been defined and considered for each assessment individually.

10.8.4 The maximum design scenarios identified in Table 10.10 have been selected as those having the potential to result in the greatest effect on air quality. These scenarios have been selected with use of information provided in the following documents:

- > Project Description (Volume 3, Chapter 1); and
- > Traffic and Transport (Volume 3, Chapter 8)

10.8.5 Table 10.10 describes the MDS in environmental terms.



Table 10.10: Maximum design scenario

Potential Effect	Maximum Adverse Scenario Assessed	Justification
Construction		
<p>Dust/ PM₁₀ generated from temporary construction activities.</p>	<p>Maximum design parameters/ extents of any proposed construction area have been used for the purposes of defining potential dust sources, where not finalised. This has included the use of the PEIR onshore RLB to determine the extent of all potential dust sources, which includes design options (e.g. two landfill options).</p> <p>As per Volume 5, Annex 10.5: Air Quality Mitigation Measures, dust generating activities will be positioned to maximise the separation distance(s) to sensitive receptors, as far as practically possible.</p> <p>For the purposes of trackout, all draft potential construction access points and subsequent access routes have been used.</p> <p>Onshore construction areas have been assessed collectively, rather than in discrete sections. This aggregated approach will increase the opportunity for greater derived sensitivities and dust emission magnitudes, and therefore impacts.</p>	<p>This ensures that all potential scenarios and associated impacts have been assessed.</p>
<p>Temporary construction-generated road traffic volumes on human receptors.</p>	<p>Traffic data used for the purposes of the modelling exercise has been informed by analysis undertaken and presented as part of Volume 3, Chapter 8: Traffic and Transport. Road traffic volumes for all potential scenarios have been considered.</p>	<p>This ensures that all potential scenarios and associated impacts have been assessed.</p>



Potential Effect	Maximum Adverse Scenario Assessed	Justification
<p>Temporary construction-generated road traffic volumes on ecological receptors.</p>	<p>To ensure potential air quality impacts that may arise throughout the construction phase are understood, 2027 has been adopted for the purposes of dispersion modelling (i.e. earliest date of potential construction). Use of 2027 is therefore conservative in recognition of the forecast reductions in vehicle emission factors and background pollutant concentrations – following the introduction of legislative and policy initiatives, alongside low emission technologies/ fuels.</p> <p>As an input to the dispersion modelling exercise, annual average daily traffic (AADT) flows are required. To provide greater confidence in the road traffic emissions assessment outcomes, construction road traffic flows have been calculated with use of the maximum consecutive 12 month (representing annual) flows (heavy-duty vehicles (HDVs) and employees (light-duty vehicles (LDVs)) separately) across the 18 month onshore cabling construction programme. As per Volume 3, Chapter 8: Traffic and Transport, it should be noted, the anticipated construction programme for the OnSS is 24 months, but the maximum number of vehicle movements for the OnSS are taken into account on the assessment over 18 months. This ensures the highest average period of construction is captured for each section of the network. This approach is considered appropriate in comparison to averaging out road traffic values across the full onshore construction period to derive AADT flows (i.e. annualised average daily traffic flows), which would dilute the predicted datasets.</p>	



Potential Effect	Maximum Adverse Scenario Assessed	Justification
	<p>The maximum road traffic flows generated on each link across all scenarios was used to facilitate a robust assessment. This approach will likely exaggerate potential impacts as it theoretically assumes all scenarios (and their likely distribution of traffic) will occur within a single scenario. In reality, the spatial extent of traffic generated by the final design option will be smaller in comparison. However, this approach ensures that all potential scenarios and interactions have been assessed.</p> <p>The above approach assumes that the maximum consecutive 12 month vehicle flows generated throughout the whole construction phase (for all scenarios) occur under worst case air quality conditions (vehicle emission factors and background pollutant concentrations) projected for the full construction period. This is considered conservative.</p> <p>The dispersion modelling assessment has incorporated the potential maximum traffic flows that are likely to occur in the future assessment year (i.e. 2027) should VE receive consent (based upon information currently available) to facilitate a robust cumulative assessment. Vehicle movements associated with relevant developments in the assessment area include committed developments (see Volume 3, Chapter 8) and North Falls OWF.</p> <p>North Falls OWF has not received consent, but for the purposes of facilitating a robust cumulative assessment, vehicle flows generated by North Falls OWF have assumed to be equivalent to peak flows generated by VE on each road</p>	



Potential Effect	Maximum Adverse Scenario Assessed	Justification
	<p>link. This theoretically assumes that peak construction activities associated with both VE and NF will overlap and affect the same road links simultaneously – considered highly unlikely, and does not account for any efficiencies between the two schemes.</p> <p>For further information regarding the extent of road traffic movements generated by VE see Volume 3, Chapter 8: Traffic and Transport.</p>	
<p>Temporary NRMM emissions on human receptors.</p>	<p>The maximum design parameters/ extents of any proposed construction area (PEIR onshore RLB) have been used for the purposes of defining the locations of potential NRMM.</p>	<p>This ensures that all potential scenarios and associated impacts have been assessed.</p>
<p>Temporary NRMM emissions on ecological receptors.</p>	<p>Use of the PEIR onshore RLB for the purposes of informing the extent of NRMM emissions is conservative – as it relates to the maximum design parameters/ extents of any proposed construction area including design options (e.g. two landfall options). In respect of this, the assessed interactions may not necessarily occur collectively – as the PEIR onshore RLB includes optionality (e.g. two landfall options). However, ensures all potential scenarios and associated impacts have been assessed.</p> <p>Furthermore, use of the PEIR onshore RLB assumes that all NRMM will be operated continuously at the maximum design parameters/ extents of any proposed construction area. This is highly unlikely to be the case, as NRMM locations will vary across the active construction area and will not typically be operated continuously at the boundary.</p>	



Potential Effect	Maximum Adverse Scenario Assessed	Justification
	<p>Use of the PEIR onshore RLB in this context is likely to facilitate a conservative assessment, and therefore increases the opportunity for interactions with sensitive receptors. As per Volume 5, Annex 10.5: Air Quality Mitigation Measures, site machinery will be positioned to maximise the separation distance(s) to sensitive receptors, as far as practically possible.</p> <p>Furthermore, where there is uncertainty and/ or optionality regarding the extent of specific construction activities within 50 m of a receptor, all possible construction activities have been considered for completeness.</p> <p>The construction methodology for landfall activities are not currently decided. The locality has been considered to be intertidal as opposed to subtidal i.e. closer to receptors/beach as opposed to subtidal to facilitate a conservative assessment.</p> <p>Furthermore, the number of NRMM and percentage use represent maximum values associated with the activities across the construction lifecycle, and therefore the actual number of plant or its percentage use could be less than this at certain times or during certain activities.</p>	
<p>Temporary construction offshore activity emissions on human receptors.</p>	<p>Vessel movements used within this assessment derive from values provided within Volume 2, Chapter 1: Offshore Project Description. Vessel movements for all potential scenarios have been considered.</p>	<p>This ensures that all potential scenarios and associated impacts have been assessed and increases the confidence in the overall assessment outcomes.</p>



Potential Effect	Maximum Adverse Scenario Assessed	Justification
<p>Temporary construction offshore activity emissions on ecological receptors.</p>	<p>As described in the chapter, flexibility in wind turbine generator (WTG) choice is required to ensure that anticipated changes in available technology and project economics can be accommodated within the project design. Therefore, the extent of vessel movements predicted to occur in relation to both WTG scenarios have been calculated (up to 41 large, or up to 79 smaller WTGs are planned for VE). These scenarios represent the maximum and minimum realistic worst-case scenarios against which environmental effects have been assessed.</p> <p>The number of predicted construction vessels movements provided in Volume 2, Chapter 1: Offshore Project Description relates to the extent of vessels generated throughout the whole construction period. The construction period is expected to be greater than 1 year (18 months for Onshore ECC including landfall). To increase the confidence in the screening exercise and minimise the use of assumptions, the total number of construction vessel movements estimated to occur throughout the whole construction phase has been used. This is believed to be conservative as the screening thresholds relate to the number of vessel movements permitted to occur in an annual period. Actual annual movements are believed to be lower than those values used for screening.</p> <p>Construction vessel movements have been categorised based upon their likelihood to occur within 250 m or 1 km of an onshore sensitive receptor located in proximity of construction works to be consistent with the LAQM.TG(22)</p>	



Potential Effect	Maximum Adverse Scenario Assessed	Justification
	<p>screening thresholds. Where there is uncertainty regarding whether certain vessel movements will occur within 250 m or 1 km of an onshore sensitive receptor, all vessel movements have been considered for completeness.</p> <p>In recognition of the current optionality with regards to the landfall options, all scenarios and study areas have been assessed – i.e. assuming nearshore vessel movements occur within 1 km of both locations. This ensures that all potential scenarios and associated impacts have been assessed.</p> <p>The LAQM.TG(22) screening thresholds applied within the assessment (Section 10.5) relate explicitly to large ship movements which comprise cross-channel ferries, roll on-roll off ships, bulk cargo, container ships and cruise liners. Vessel movements generated by VE are unlikely to represent large ships, given the nature and location of works (within 1 km of the coast). For the purposes of facilitating an assessment, it has been assumed that all vessels will comprise large ships.</p>	
Operation		
Operational-generated road traffic volumes on human receptors.	For the purposes of facilitating a conservative screening exercise, peak vehicle movements generated during the operational phase have been assessed.	This approach increases the confidence in the overall assessment outcomes.
Operational-generated road traffic volumes on ecological receptors.		



Potential Effect	Maximum Adverse Scenario Assessed	Justification
Operational NRMM emissions on human receptors.	A description of all planned relevant operational activities has been provided.	This ensures that all potential design parameters and associated impacts have been assessed.
Operational NRMM emissions on ecological receptors.		
Operational offshore activity emissions on human receptors.	<p>Vessel movements used within this assessment derive from values provided within Volume 2, Chapter 1: Offshore Project Description. Vessel movements for all potential scenarios have been considered.</p> <p>As described in the chapter, flexibility in WTG choice is required to ensure that anticipated changes in available technology and project economics can be accommodated within the project design. Therefore, the extent of vessel movements predicted to occur in relation to both WTG scenarios have been calculated (up to 41 large, or up to 79 smaller WTGs are planned for VE). These scenarios represent the maximum and minimum realistic worst-case scenarios against which environmental effects have been assessed.</p> <p>Construction vessel movements have been categorised based upon their likelihood to occur within 250 m or 1 km of an onshore sensitive receptor located in proximity of construction works to be consistent with the LAQM.TG(22) screening thresholds. Where there is uncertainty regarding whether certain vessel movements will occur within 250 m or</p>	This ensures that all potential scenarios and associated impacts have been assessed and increases the confidence in the overall assessment outcomes.
Operational construction offshore activity emissions on ecological receptors.		



Potential Effect	Maximum Adverse Scenario Assessed	Justification
	<p>1 km of an onshore sensitive receptor, all vessel movements have been considered for completeness.</p> <p>In recognition of the current optionality with regards to the landfall options, all scenarios and study areas have been assessed – i.e. assuming nearshore vessel movements occur within 1 km of both locations. This ensures that all potential scenarios and associated impacts have been assessed.</p> <p>The LAQM.TG(22) screening thresholds applied within the assessment (Section 10.5) relate explicitly to large ship movements which comprise cross-channel ferries, roll on-roll off ships, bulk cargo, container ships and cruise liners. Vessel movements generated by VE are unlikely to represent large ships, given the nature and location of works (within 1 km of the coast). For the purposes of facilitating an assessment, it has been assumed that all vessels will comprise large ships.</p>	
Decommissioning		
Likely air quality impacts associated with decommissioning activities.	<p>Details surrounding the decommissioning phase are not fully known, however, decommissioning activities are not anticipated to exceed the construction phase worst case criteria assessed, given forecast improvements to air quality and the potential for the cables to remain <i>in situ</i>.</p> <p>It was therefore agreed to assume that impacts associated with decommissioning activities will be similar/ lesser in comparison to those established for the construction phase.</p>	



10.9 EMBEDDED MITIGATION

- 10.9.1 The embedded mitigation contained in Table 10.11 are mitigation measures or commitments that have been identified and adopted as part of the evolution of the project design of relevance to the topic, these include project design measures, compliance with elements of good practice and use of standard protocols.
- 10.9.2 The mitigation includes embedded measures such as design changes and applied mitigation, the requirement for which is embedded in VE but the implementation of which is subject to further study or approval of details; these include avoidance measures that will be informed by pre-construction surveys, and necessary additional consents where relevant. The composite of embedded and applied mitigation measures apply to all parts of the VE development works, including pre-construction, construction, O&M and decommissioning. No additional mitigation is considered to be required on the basis of the current project information.

Table 10.11: Embedded mitigation relating to air quality

Parameter	Mitigation Measures Embedded into VE OWFL Design
Construction	
Best practice construction measures	Construction works would be undertaken in accordance with best practice measures that are proportional to the likely impacts.
CoCP	Development of, and adherence to, a CoCP that sets out management measures, commitments and working standards proposed to be adopted and implemented throughout the construction process.
Decommissioning	
Best practice construction measures	Decommissioning works would be undertaken in accordance with best practice measures that are proportional to the likely impacts.

10.10 ENVIRONMENTAL ASSESSMENT: CONSTRUCTION PHASE

CONSTRUCTION DUST ASSESSMENT

10.10.1 Where figures relating to area or volume of the PEIR onshore RLB, approximate number of construction vehicles or distances to receptors are given, these relate to thresholds as defined in the IAQM construction guidance (IAQM, 2016). The principal purpose of these figures is to assist the assessor in the definition of the dust emissions magnitude and sensitivity of the area.

ASSESSMENT SCREENING

10.10.2 There are both human and ecological receptors within the relevant screening distances outlined in Section 10.5. Therefore, an assessment of construction dust on both human and ecological receptors has been undertaken.

10.10.3 Furthermore, onshore construction areas have been assessed collectively, rather than in discrete sections. This aggregated approach will increase the opportunity for greater derived sensitivities and dust emission magnitudes, and therefore impacts.



POTENTIAL DUST EMISSION MAGNITUDE

- 10.10.4 No major demolition activities are proposed as part of the onshore construction works. Some minor demolition activities comprising the removal of derelict structures within SSA West may be required – assumed to be negligible. However, demolition activities are dependent on the preferred substation option. Demolition activities will be re-assessed for the ES once a preferred substation option has been chosen.
- 10.10.5 As such, impacts associated with demolition activities have therefore not been considered further and are screened out.
- 10.10.6 The total area where earthworks are required is greater than 10,000 m² across the whole PEIR onshore RLB. The aggregated total of material exported/ excavated is >100,000 tonnes. In addition, >10 heavy earth moving vehicles will be active at any worst-case time. Therefore, with reference to the methodology described in Volume 5, Annex 10.1: Construction Dust Assessment Methodology, the dust emission magnitude for earthworks is considered to be large.
- 10.10.7 Indicative building dimensions have been provided to inform the total building volume (~50,000 m³) for the whole onshore construction works. Therefore, the dust emission magnitude for construction is considered to be medium.
- 10.10.8 The number of outward HDV movements in any worst-case day is greater than 50. In addition, unpaved road lengths are likely to be greater than 100 m. Therefore, the dust emission magnitude for trackout is considered to be large.
- 10.10.9 Table 10.12 presents a summary of the assigned dust emission magnitude for each activity.

Table 10.12: Summary of consultation relating to air quality

Activity	Dust Emission Magnitude
Demolition	N/A
Earthworks	Large
Construction	Medium
Trackout	Large

SENSITIVITY OF THE AREA

HUMAN RECEPTORS

- 10.10.10 Overall, there are anticipated to be >10 existing residential properties (highly sensitive receptors) within 20 m of any worst-case working area of potential dust generation.
- 10.10.11 There are >10 high sensitivity receptors located within 20 m from road links within 500 m of any construction access point (commensurate of a large site).
- 10.10.12 Therefore, with reference to the methodology described in Volume 5, Annex 10.1: Construction Dust Assessment Methodology, sensitivity of the area with respect to dust soiling impacts on people and property is considered to be high in relation to earthworks, construction, and trackout.



- 10.10.13 The sensitivity of the area with regards to human health impacts from PM₁₀ concentrations is defined using the matrix outlined in Table 1-4 presented in Volume 5, Annex 10.1: Construction Dust Assessment Methodology, taken from the IAQM construction guidance. To characterise sensitivity, a local annual mean background PM₁₀ concentration needs to be defined in conjunction with the number, sensitivity and proximity of receptors with distances from potential dust sources.
- 10.10.14 As discussed in Section 10.7, no local background PM₁₀ monitoring exists within proximity of the onshore elements of VE. For the purposes of characterising the local PM₁₀ background concentration, the latest iteration of the Defra supplied background maps (2018 reference year) has been used – in accordance with the recommendations contained within the IAQM construction guidance.
- 10.10.15 The maximum 2019 mapped background PM₁₀ concentration (projected from the 2018 reference year) for the 1 km² grid squares covering any potential onshore construction works is estimated to be 16.7 µg/m³ (i.e. falls into the <24 µg/m³ class). This value relates to 2019 – the baseline year, and as such is believed to be conservative, given that it does not take into account any forecast improvements to air quality that may occur in the interim period until 2027 (expected start of construction works).
- 10.10.16 Given the number of highly sensitive receptors within 20 m of any potential construction works, and within 20 m of potential trackout routes, the sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is therefore considered to be low.

ECOLOGICAL RECEPTORS

- 10.10.17 With respect to ecological designations, areas of SSSI (Holland Haven Marshes), Local Nature Reserve (LNR) (Holland Haven Marshes), Planted Ancient Woodland Site (PAWS) (Simon’s Wood), and Local Wildlife Site (LoWS) (Simon’s Wood, Great Holland Pits and Thorpe Green) are found within 20 m of the PEIR onshore RLB and potential trackout routes.
- 10.10.18 For the purposes of defining a risk of dust impact, it has been conservatively assumed that the ecological designations contain dust sensitive features. Furthermore, the highest sensitivity across all the receptors has been applied. This relates to the SSSI which is considered a medium sensitivity receptor (Table 1-2 of Volume 5, Annex 10.1: Construction Dust Assessment Methodology).
- 10.10.19 The sensitivity of the area with respect to ecological impacts in relation to earthworks, construction and trackout activities is therefore considered to be medium.
- 10.10.20 A summary of the sensitivity of the surrounding area is detailed in Table 10.13.

Table 10.13: Sensitivity of the area

Potential Impact	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High



Potential Impact	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout
Human Health	Low	Low	Low
Ecological	Medium	Medium	Medium

RISK OF IMPACTS

10.10.21 The outcome of the assessment of the potential magnitude of dust emissions, and the sensitivity of the area are combined in Table 10.14 below to determine the risk of impact.

10.10.22 The defined level of risk is then used to inform the selection of appropriate mitigation.

10.10.23 The IAQM construction dust assessment methodology does not include the consideration of embedded mitigation measures when determining the potential risk of dust impacts.

Table 10.14: Risk of dust impacts

Potential Impact	Earthworks	Construction	Trackout
Dust Soiling	High Risk	Medium Risk	High Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	Medium Risk	Medium Risk	Medium Risk

10.10.24 Following the construction dust assessment, potential worst-case onshore construction works are found to be:

- > High risk in relation to dust soiling impacts on people and property;
- > Low risk in relation to human health impacts; and
- > Medium risk in relation to ecological impacts.

10.10.25 Potential dust effects during the construction phase are considered to be temporary and short-term (approximately 24 months for the OnSS construction and 18 months for Onshore ECC) and may only arise at particular times (i.e. certain activities and/ or meteorological conditions).

10.10.26 Nonetheless, commensurate with the above assessment of dust risk, mitigation measures, as identified by the IAQM construction guidance (IAQM, 2016) are required to ensure that any potential impacts arising from any onshore construction works are minimised and, where possible, completely removed.

10.10.27 A list of these measures is provided in Volume 5, Annex 10.5: Air Quality Mitigation Measures. These measures are included within the CoCP developed to set procedural standards for proposed onshore construction activities. Implementation of the CoCP will be secured as a requirement of the DCO, therefore ensuring their effective application.



10.10.28 As such, in accordance with the IAQM construction guidance and with reference to the methodology described in Volume 5, Annex 10.1: Construction Dust Assessment Methodology, construction dust impacts are considered to be removed or minimised. As such, residual effects are concluded to be **not significant** in terms of the EIA Regulations.

ROAD TRAFFIC ASSESSMENT

HUMAN RECEPTORS

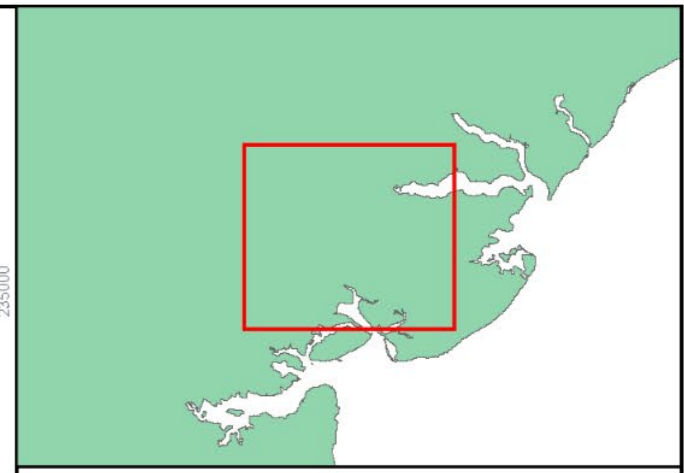
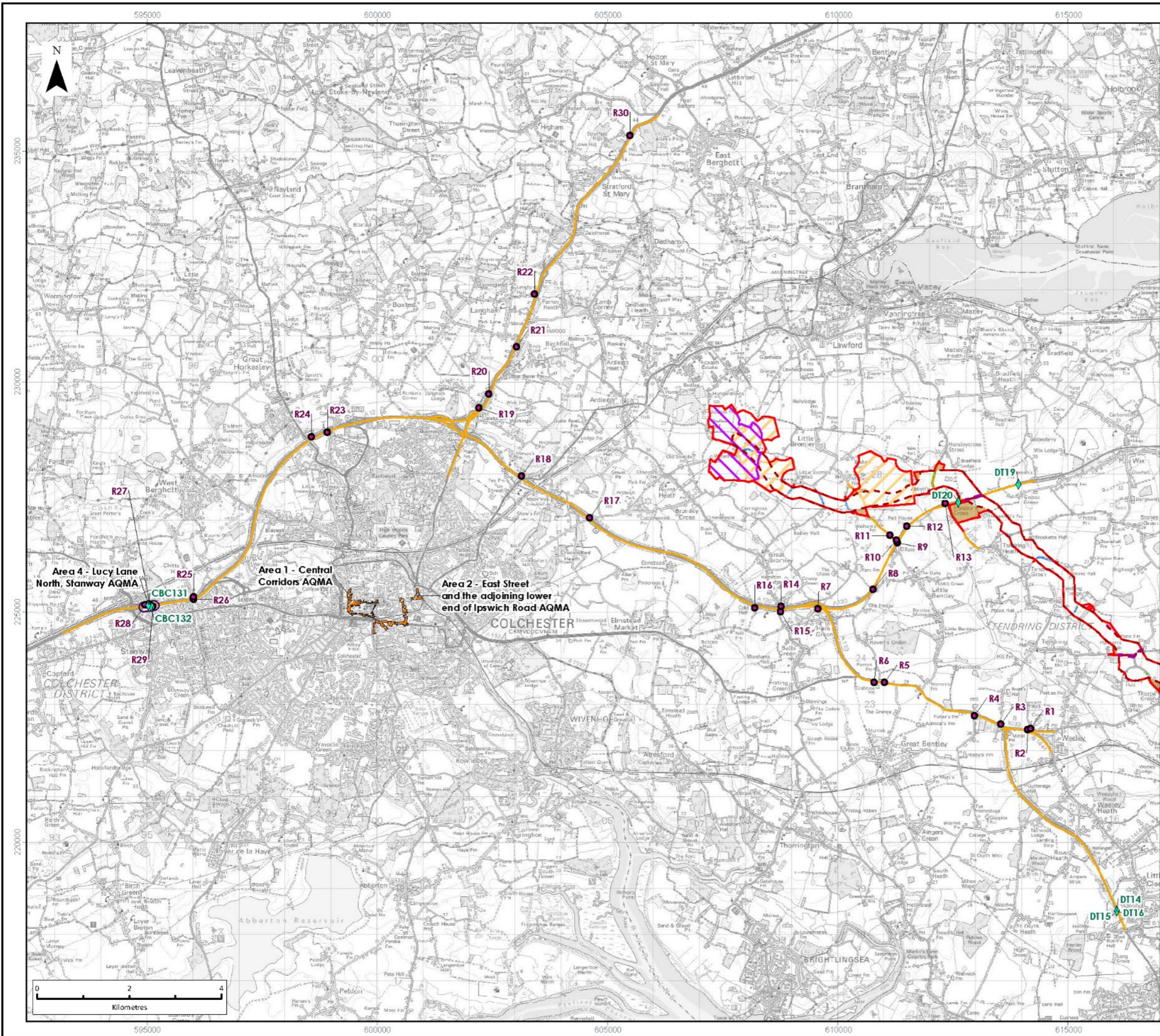
10.10.29 Consistent with the assessment criteria outlined in Section 10.5, road traffic flows generated by VE on the local road network have been compared against the EPUK and IAQM prescribed screening thresholds.

10.10.30 Table 10.15 outlines the extent of road links where road traffic movements cannot be screened out (affected road network).

Table 10.15: Construction-generated road traffic flows above screening criteria

Road Link	AADT	
	HDV	LDVs
<i>Outside an AQMA</i>		
A12 north of A120	184	253
A12 south of A120	184	253
A120 between A12 and A133	367	506
A120 between the A133 and Harwich Road	173	173
A120 between Harwich Road and Bentley Road	139	115
A120 between Bentley Road and B1035	139	125
A133 between A120 and B1033 Colchester Road	194	333
B1033 Colchester Road between A133 and B1441 Weeley Bypass	124	238
Bentley Road	108	78
<i>Within or Adjacent to an AQMA</i>		
A12 south of A120	184	253

Dispersion modelling has therefore been undertaken for these links. The spatial extent of the modelled domain (modelled road links and human receptors considered) is illustrated in Figure 10.2.



LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Modelled Road Network
- Modelled Human Receptor
- Verification Monitoring Location
- Verification Zone A
- Air Quality Management Area (AQMA)

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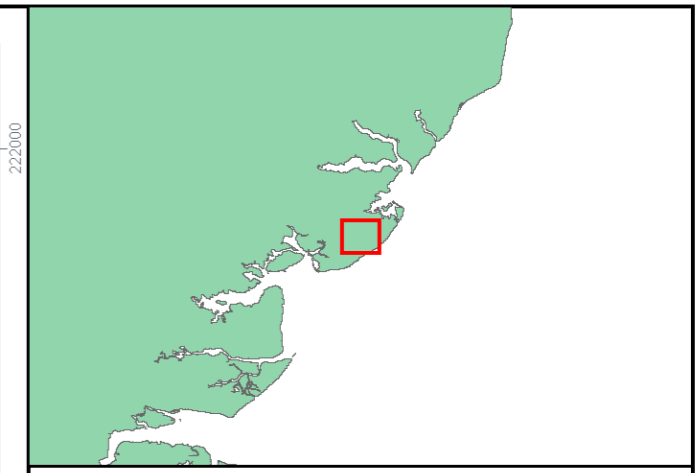
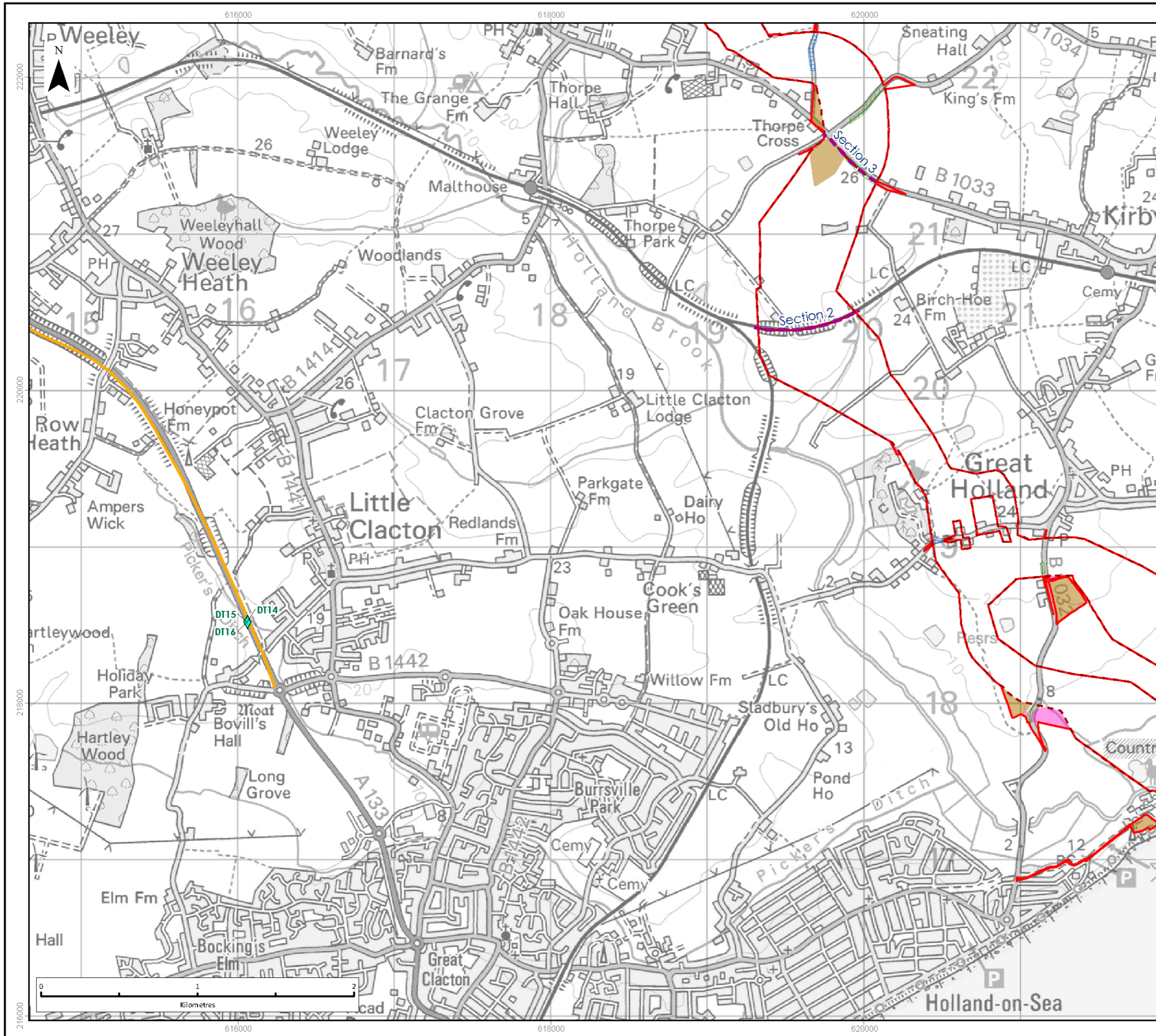
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 FIGURE 10.2
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SCALE: 1:85,000 PLOT SIZE: A3 DATUM: OSGB 1936 CO-ORDINATE SYSTEM: British National Grid





LEGEND

- ▭ Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Modelled Road Network
- ◆ Verification Monitoring Location

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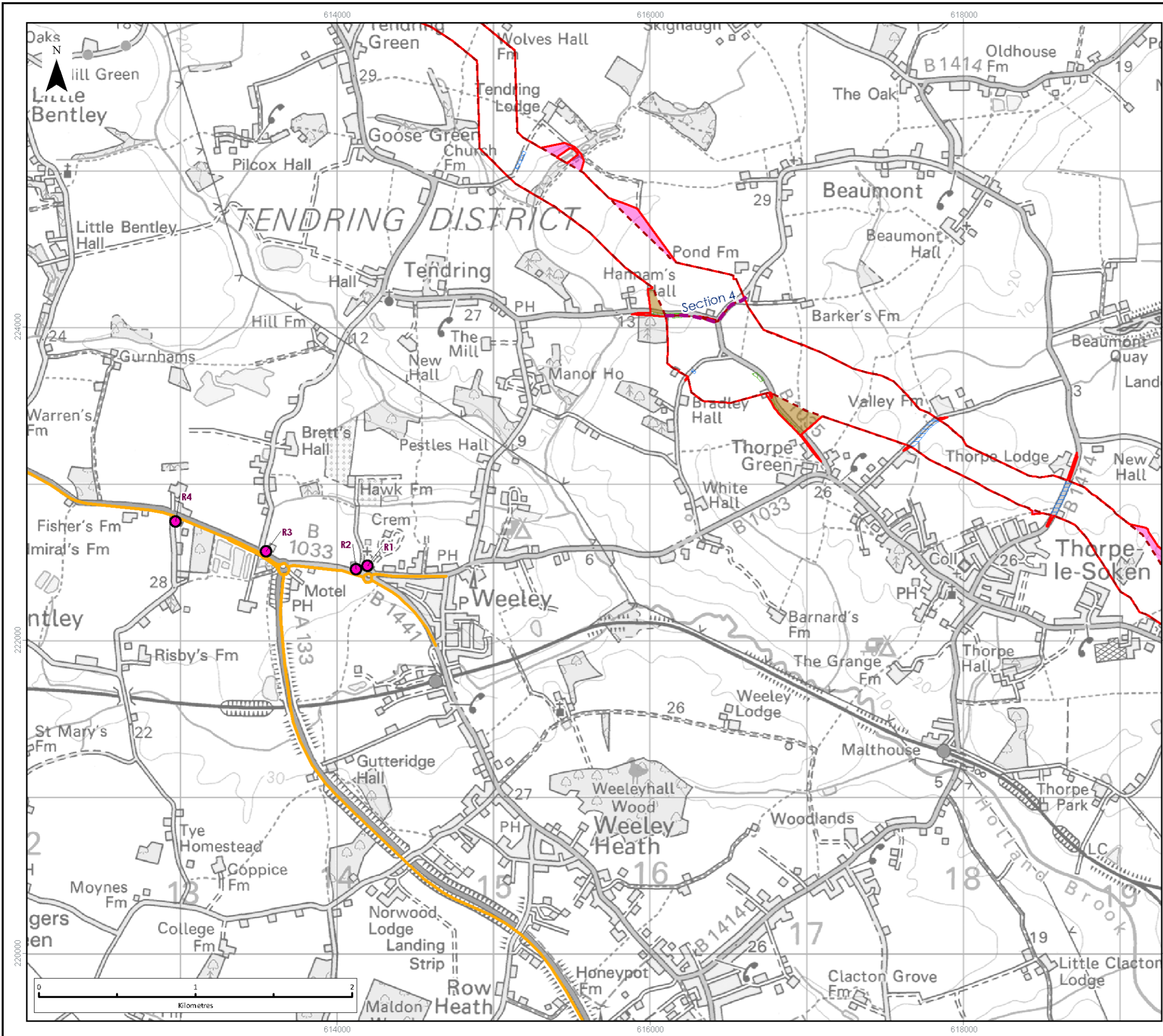
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 FIGURE 10.2
 Page 2 of 8

SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- ▭ Onshore Red Line Boundary
- - - Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- ▭ Temporary Construction Compounds
- ▭ Works Access Required
- ▨ Haul Road Crossings
- ▨ Haul Road Access
- Modelled Road Network
- Modelled Human Receptor

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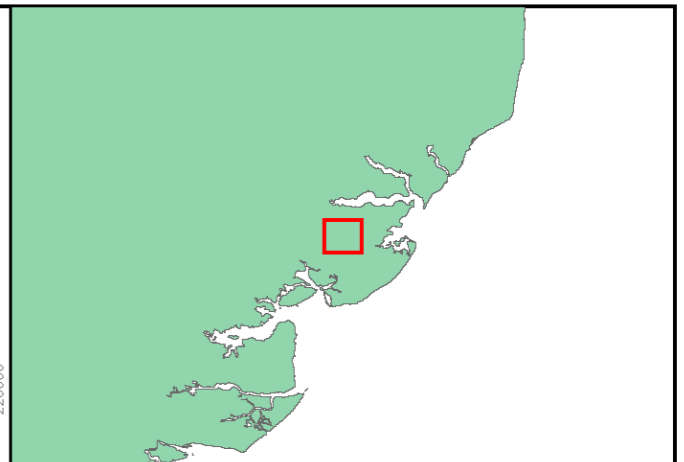
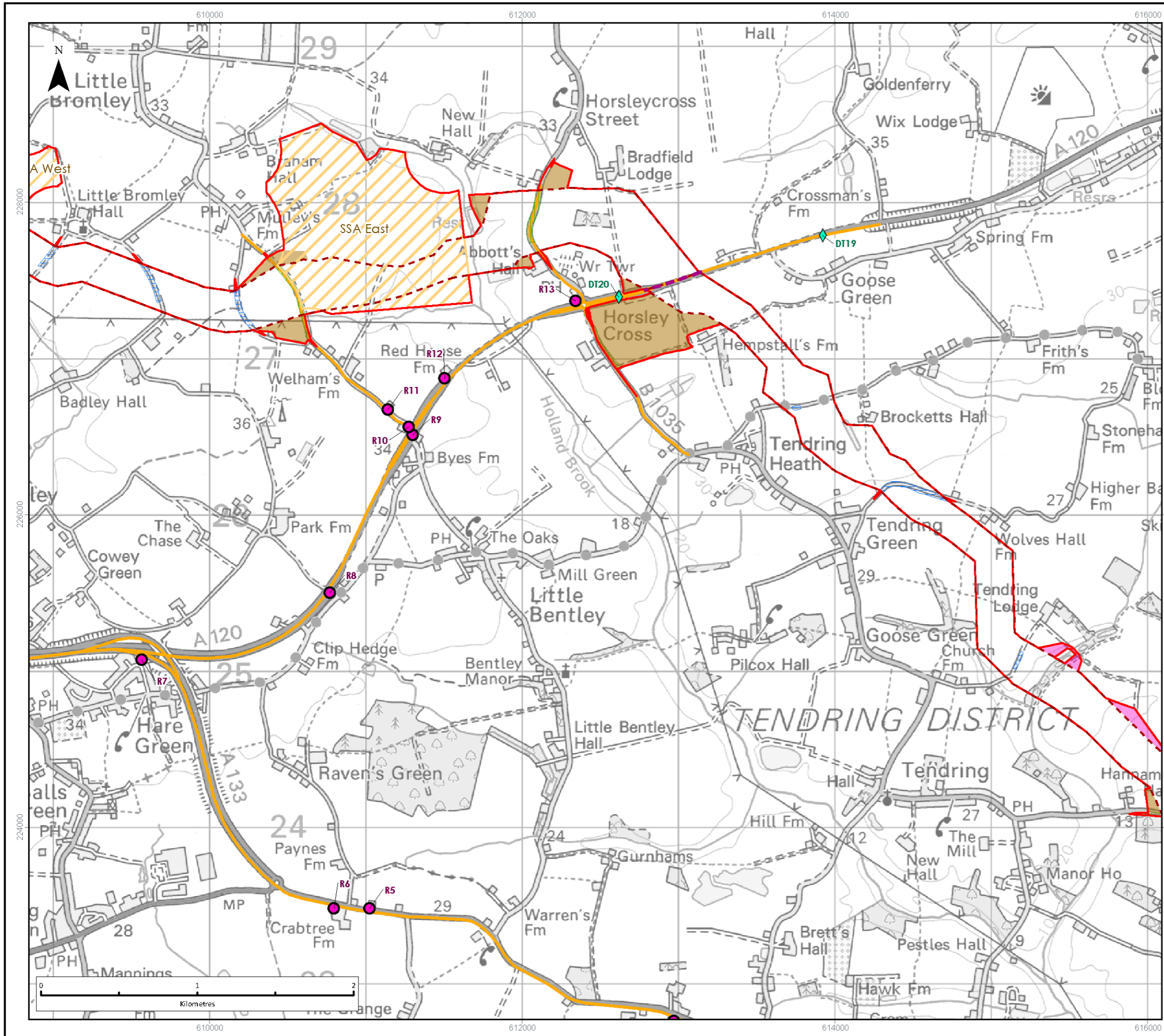
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 FIGURE 10.2
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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- Onshore Cable Route Section Division
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Modelled Road Network
- Modelled Human Receptor
- ◆ Verification Monitoring Location

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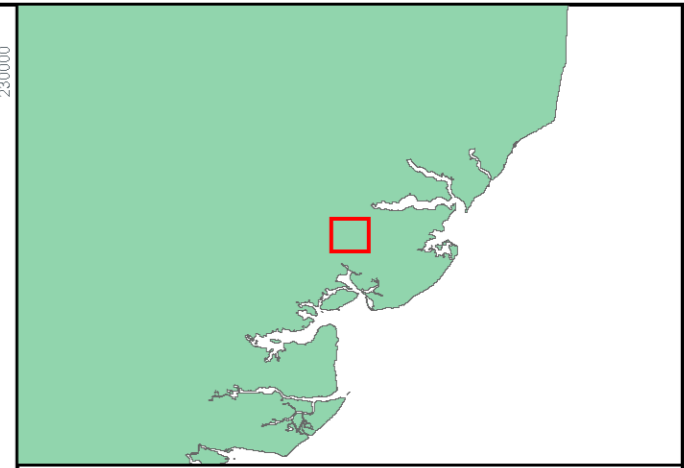
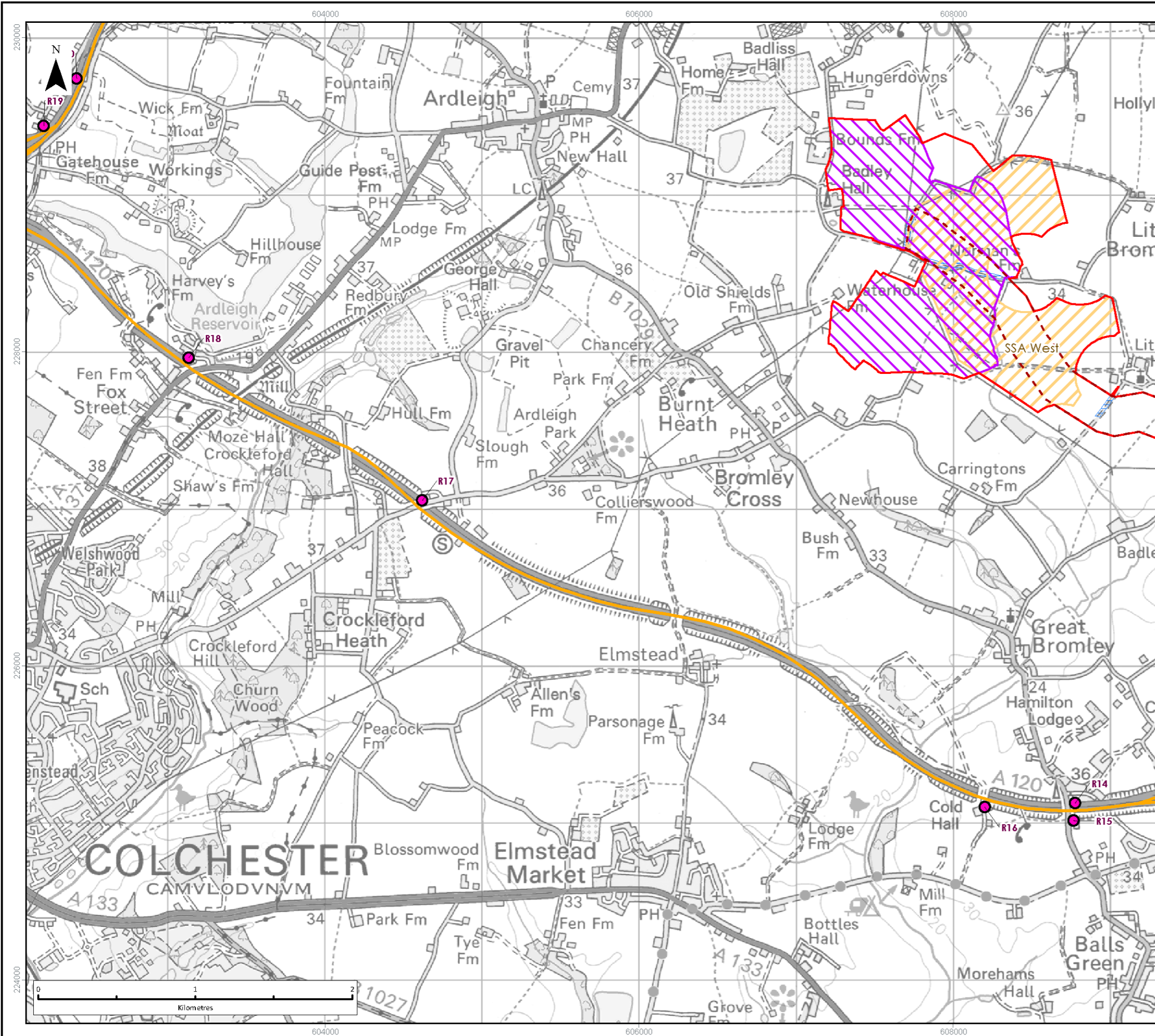
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 FIGURE 10.2
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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Haul Road Crossings
- Modelled Road Network
- Modelled Human Receptor

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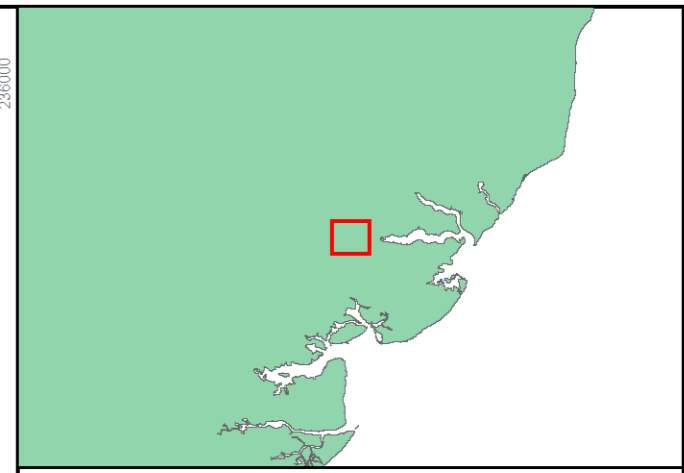
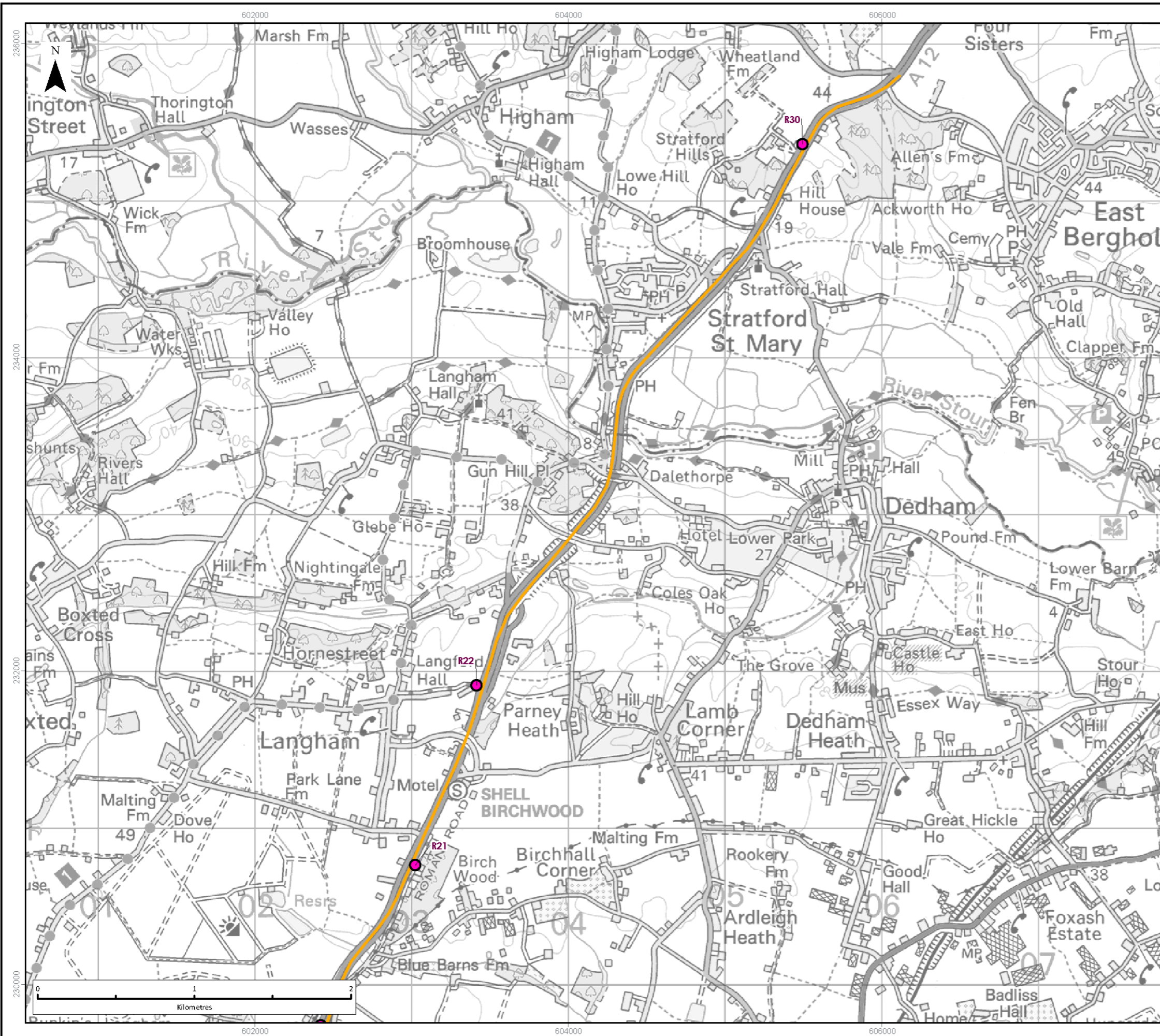
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 FIGURE 10.2

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LEGEND

- Modelled Road Network
- Modelled Human Receptor

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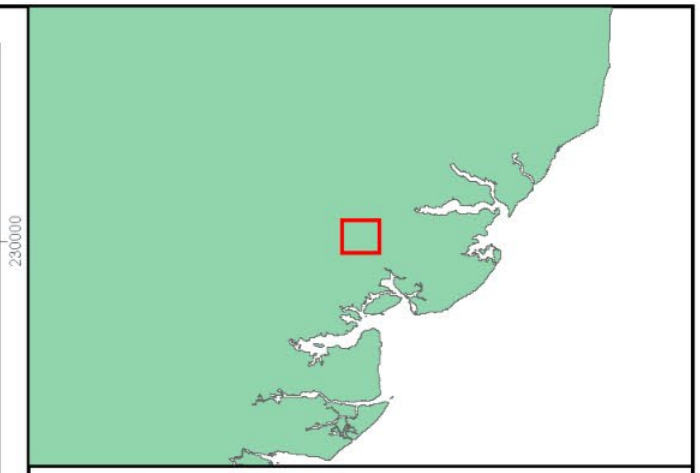
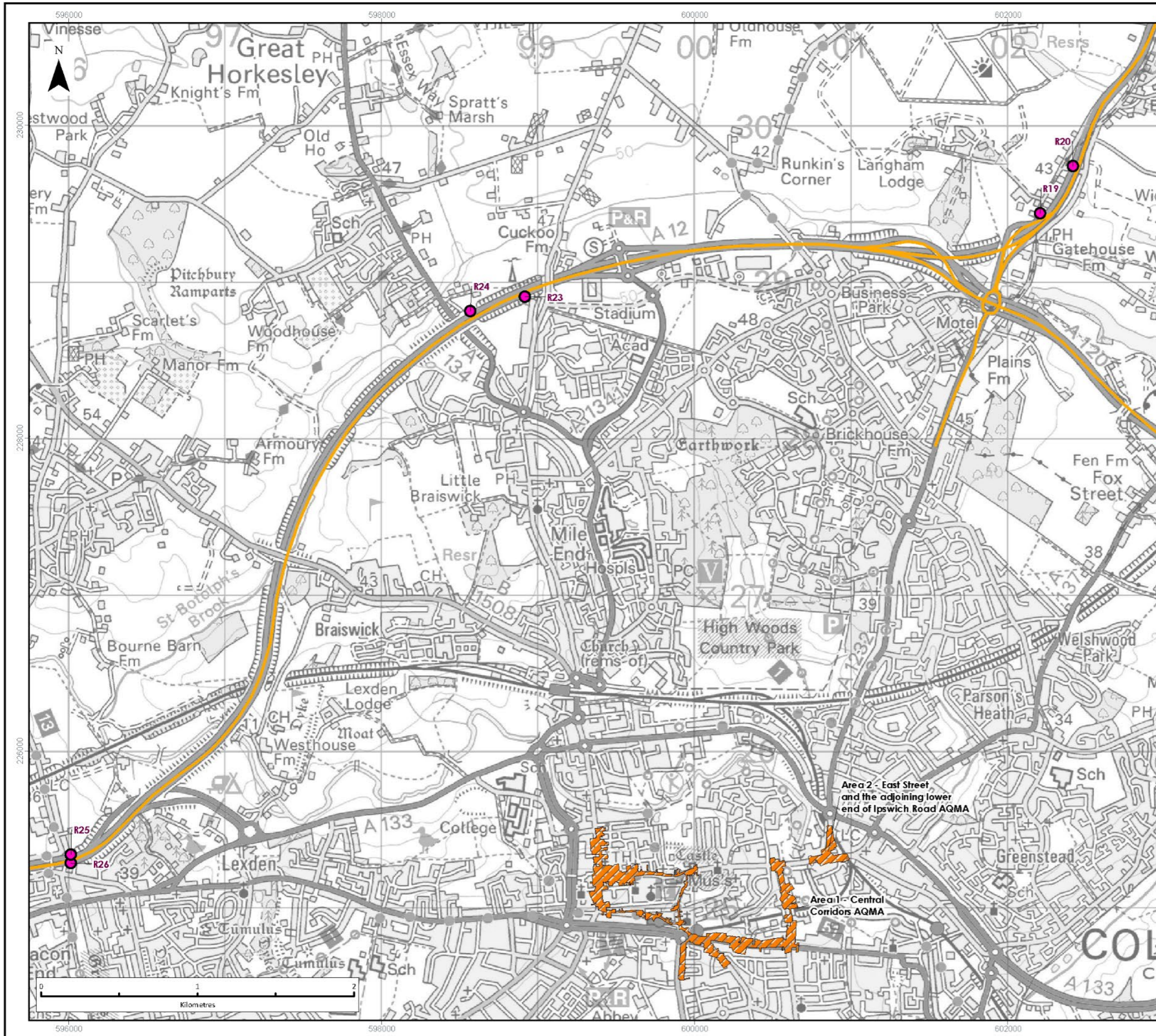
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 FIGURE 10.2
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SCALE: 1:25,000	PLOT SIZE: A3	DATUM: OSGB 1936	COORDINATE SYSTEM: British National Grid
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LEGEND

- Modelled Road Network
- Modelled Human Receptor
- Air Quality Management Area (AQMA)

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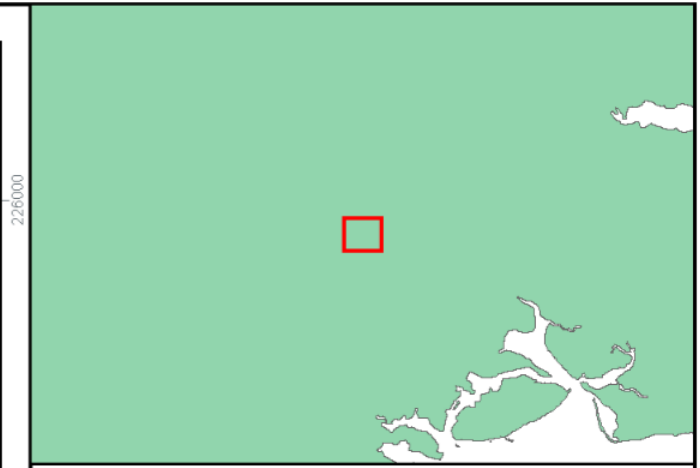
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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid



- LEGEND**
- Modelled Road Network
 - Modelled Human Receptor
 - ◆ Verification Monitoring Location
 - Verification Zone A
 - Air Quality Management Area (AQMA)

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 FIGURE 10.2
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10.10.31 A summary of modelled results is provided below. Exhaustive results are presented in Volume 5, Annex 10.4: Road Traffic Dispersion Modelling Methodology.

NO₂ MODELLING RESULTS

10.10.32 The maximum predicted annual mean NO₂ concentration at all existing receptors during the 2019 BC scenario was at R26 with a predicted concentration of 47.8 µg/m³; this represents 119.5% of the AQAL. Receptor R26 is located on the façade of a residential property, set back approximately 5 m from the A12.

10.10.33 There is no monitoring to calibrate modelled concentrations at Receptor R26. However there is monitoring undertaken by CBC approximately 1 km to the west (CBC131 and CBC132) within the Area 4 AQMA. A zonal verification factor was applied here given the presence of an AQMA (a known area of concern in relation to elevated annual mean NO₂ concentrations) to the north of the A12. However the zonal verification factor from outside of the AQMA was applied to R26 as was higher in comparison to the within the AQMA factor, adding a level of conservatism. See Volume 5, Annex 10.4: Road Traffic Dispersion Modelling Methodology for further details.

10.10.34 It is acknowledged that dispersion model concentrations in A road settings are susceptible to overprediction. This is due to the pathway not being fully represented within the dispersion model, where in reality a series of roadside barriers (e.g. fences, hedges) are in place. Presence of these barriers are likely to minimise exposure to vehicular emissions associated with these high-capacity roads, resulting in consequential and beneficial reductions in air quality.

10.10.35 The maximum predicted annual mean NO₂ concentration at existing receptors (inclusive of committed developments) during the planned construction phase (2027 DS) was at Receptor R26 with a predicted concentration of 25.8 µg/m³; this represents 64.5% of the AQAL (i.e. 'well-below'). The change in the annual mean NO₂ concentrations at this location, during the construction of the onshore elements of VE (2027 DS vs. 2027 DM) relative to the AQAL was 0.2%.

10.10.36 The maximum observed increase in annual mean NO₂ concentrations at all existing receptors as a result of the construction of the onshore elements of VE was 0.3% at receptors R5, R14, R17 and R18. These receptors are located at the façade of a residential property roadside of the A133 Colchester Road and A120.

10.10.37 In accordance with EPUK & IAQM guidance, the impact of the construction phase of VE on annual mean NO₂ concentrations at all relevant existing receptors is considered to be 'negligible'. Given the marginal increase in annual mean NO₂ concentrations associated with the construction phase of the onshore elements of VE, and that there are no predicted exceedances of the annual mean NO₂ AQAL, unmitigated effects associated with annual mean NO₂ concentrations at all assessed receptor locations are therefore considered to be not significant in terms of the EIA regulations.



10.10.38 The empirical relationship given in LAQM.TG(22) states that exceedances of the 1-hour mean NO₂ AQAL are unlikely to occur where annual mean concentrations are <60 µg/m³. Annual mean NO₂ concentrations predicted at all receptor locations are well below this limit. Therefore, it is unlikely that an exceedance of the 1-hour mean AQAL will occur. Effects associated with likely 1-hour mean NO₂ concentrations at all assessed receptor locations (including those on site) are therefore considered to be **not significant** in terms of the EIA regulations.

PM₁₀ MODELLING RESULTS

10.10.39 The maximum predicted annual mean PM₁₀ concentration at all existing receptors during the 2019 BC was at receptor R26 with a predicted concentration of 21.7 µg/m³, this represents 54.3% of the AQAL.

10.10.40 The maximum predicted annual mean PM₁₀ concentration at existing receptors (inclusive of committed developments) during the planned construction phase (2027 DS) was at Receptor R26 with a predicted concentration of 20.5 µg/m³; this represents 51.3% of the AQAL (i.e. 'well-below'). The change in the annual mean PM₁₀ concentrations at this location, during the construction of the onshore elements of VE (2027 DS vs. 2027 DM) relative to the AQAL was <0.1%.

10.10.41 The maximum observed increase in annual mean PM₁₀ concentrations at all existing receptors as a result of the construction of the onshore elements of VE was 0.2% at R10. R10 is located at the façade of a residential dwelling at the junction of Bentley Road and the A120.

10.10.42 In accordance with EPUK & IAQM guidance, the impact of the development on annual mean PM₁₀ concentrations at all relevant existing receptors is considered to be 'negligible'. Given the marginal increase in annual mean PM₁₀ concentrations associated with the construction phase of the onshore elements of VE, and that there are no predicted exceedances of the annual mean PM₁₀ AQAL, unmitigated effects associated with annual mean PM₁₀ concentrations at all assessed receptor locations are therefore considered to be not significant in terms of the EIA regulations.

10.10.43 Based upon the maximum predicted annual mean PM₁₀ concentration of 20.5 µg/m³ (predicted at R26 - 2027 DS), this equates to 4 days where 24-hour mean PM₁₀ concentrations are predicted to be greater than 50 µg/m³. This is well below the 35 permitted exceedances, and therefore the number of maximum exceedances is in compliance with the 24-hour mean AQAL. Effects associated with likely 24-hour mean PM₁₀ concentrations at all assessed receptor locations are therefore considered to be not significant in terms of the EIA regulations.

PM_{2.5} MODELLING RESULTS

10.10.44 The maximum predicted annual mean PM_{2.5} concentration at all existing receptors during the 2019 BC was at receptor R30 with a predicted concentration of 12.3 µg/m³, this represents 49.2% of the AQAL. Receptor R30 is located at the façade of a residential dwelling roadside of the A12.



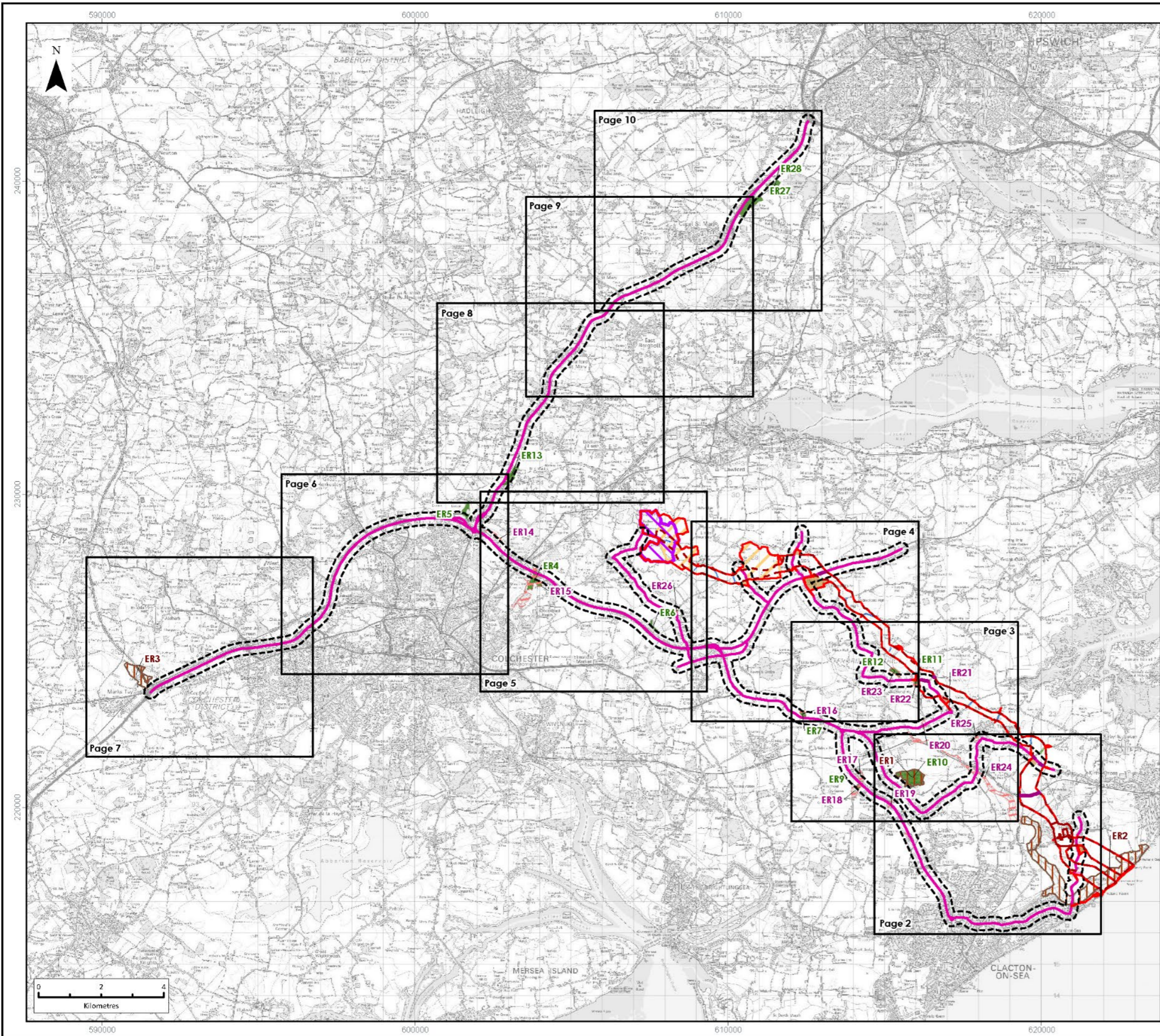
- 10.10.45 The maximum predicted annual mean PM_{2.5} concentration at existing receptors (inclusive of committed developments) during the planned construction phase (2027 DS) was at Receptor R26 with a predicted concentration of 12.6 µg/m³; this represents 50.4% of the AQAL (i.e. 'well-below'). The change in the annual mean PM_{2.5} concentrations at this location, during the construction of the onshore elements of VE (2027 DS vs. 2027 DM) relative to the AQAL was <0.1%.
- 10.10.46 The maximum observed increase in annual mean PM_{2.5} concentrations at all existing receptors as a result of the construction of the onshore elements of VE was 0.2% at R10.
- 10.10.47 In accordance with EPUK & IAQM guidance, the impact of the development on annual mean PM_{2.5} concentrations at all relevant existing receptors is considered to be 'negligible'. Given the marginal increase in annual mean PM_{2.5} concentrations associated with the construction phase of the onshore elements of VE, and that there are no predicted exceedences of the annual mean PM_{2.5} AQAL, unmitigated effects associated with annual mean PM_{2.5} concentrations at all assessed receptor locations are therefore considered to be not significant in terms of the EIA regulations.

SUMMARY

- 10.10.48 Road traffic effects from the construction phase on NO₂, PM₁₀ and PM_{2.5} are found to be not significant in terms of the EIA regulations.
- 10.10.49 Furthermore, onshore construction works are expected to last up to approximately 24 months and as such, any consequential impacts onto local road traffic flows are believed to be temporary, with no long-term deterioration of conditions. Implementation of road traffic air quality mitigation measures is therefore not required.

ECOLOGICAL RECEPTORS

- 10.10.50 Figure 10.3 provides an illustration of the proposed main public road network routing arrangements (referred to as Ecological Road Traffic Screening Routes), along with 200 m buffers from these roads for initial screening.
- 10.10.51 It should be noted that the Ecological Road Traffic Screening Routes are based on the Core and Local Access Routes established as part of Volume 3, Chapter 8: Traffic and Transport. The spatial extent of these links have been extended to ensure all possible interactions with nearby sensitive ecological designations have been assessed. This is likely to represent a conservative assessment, as assumes there is no reduction in vehicle movements generated by onshore activities with distance from the Core and Local Access Routes.
- 10.10.52 It should be noted that these links capture all potential construction scenarios assessed as part of Volume 3, Chapter 8: Traffic and Transport, and therefore provides a conservative outlook, whereby the anticipated footprint is expected to be smaller.



LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Ecological Road Traffic Screening Routes
- Ecological Road Traffic Screening Routes 200m Buffer
- Affected Site of Special Scientific Interest (SSSI)
- Affected Local Wildlife Site (LWS)
- Affected Ancient Woodland (AW)

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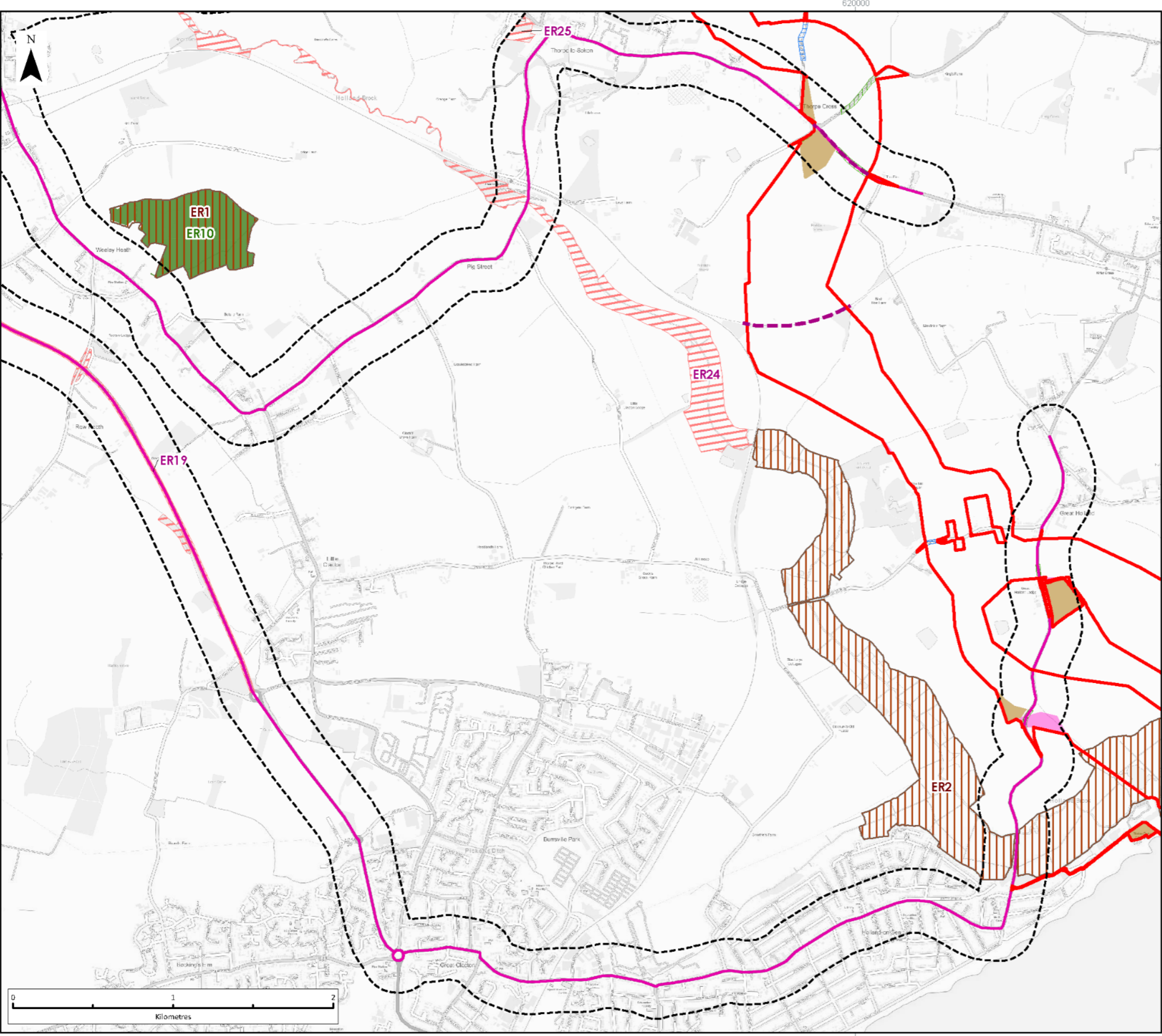
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 FIGURE 10.3
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SCALE: 1:125,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Ecological Road Traffic Screening Routes
- Ecological Road Traffic Screening Routes 200m Buffer
- Affected Site of Special Scientific Interest (SSSI)
- Affected Local Wildlife Site (LWS)
- Affected Ancient Woodland (AW)

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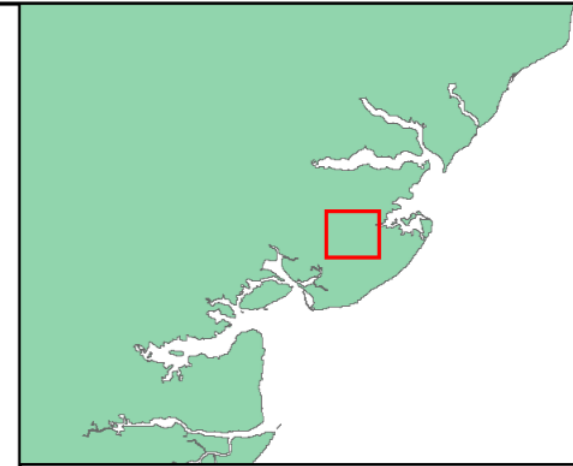
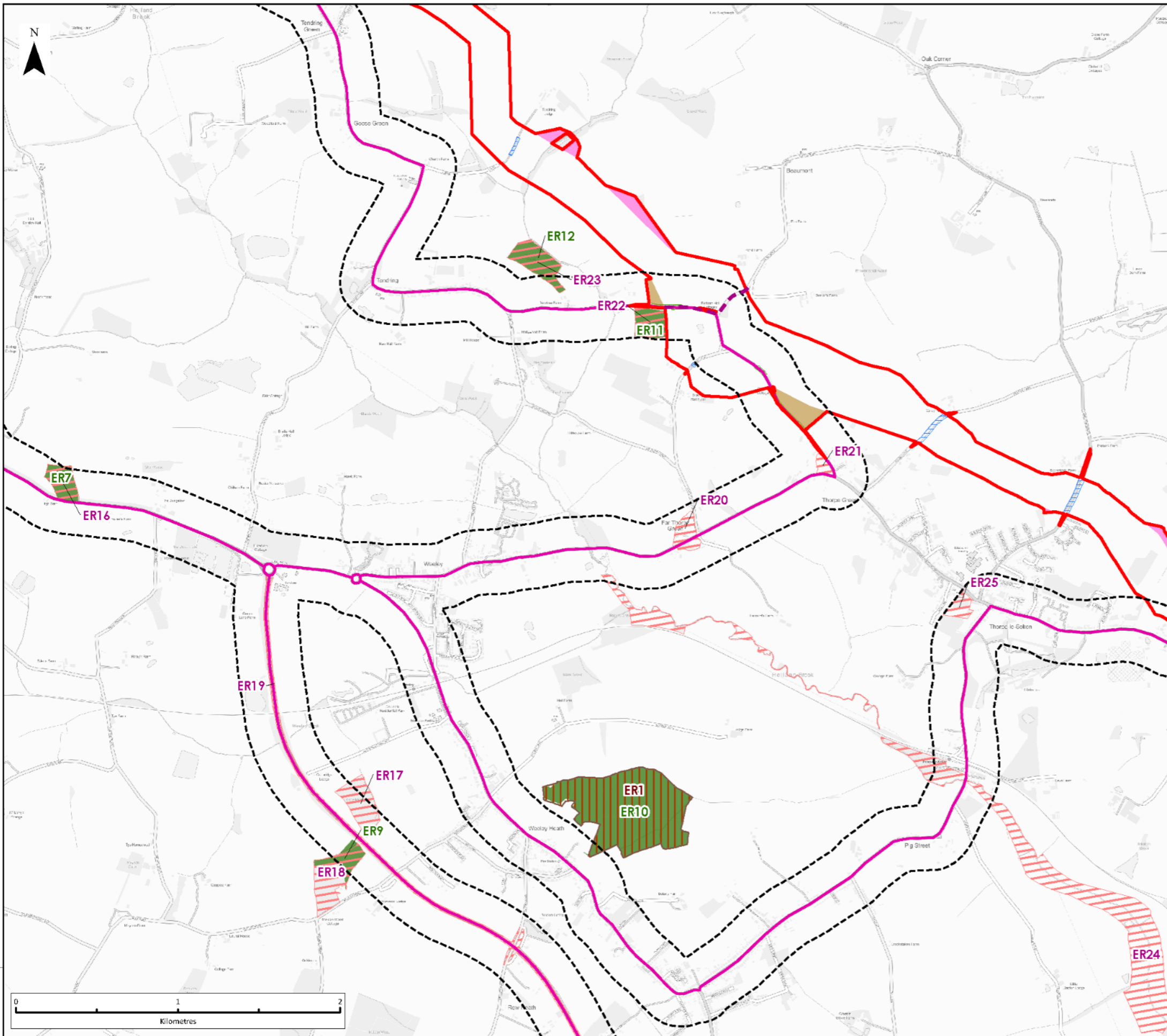
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 FIGURE 10.3
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- LEGEND**
- Onshore Red Line Boundary
 - Onshore Cable Route Section Division
 - Temporary Construction Compounds
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 - Haul Road Crossings
 - Haul Road Access
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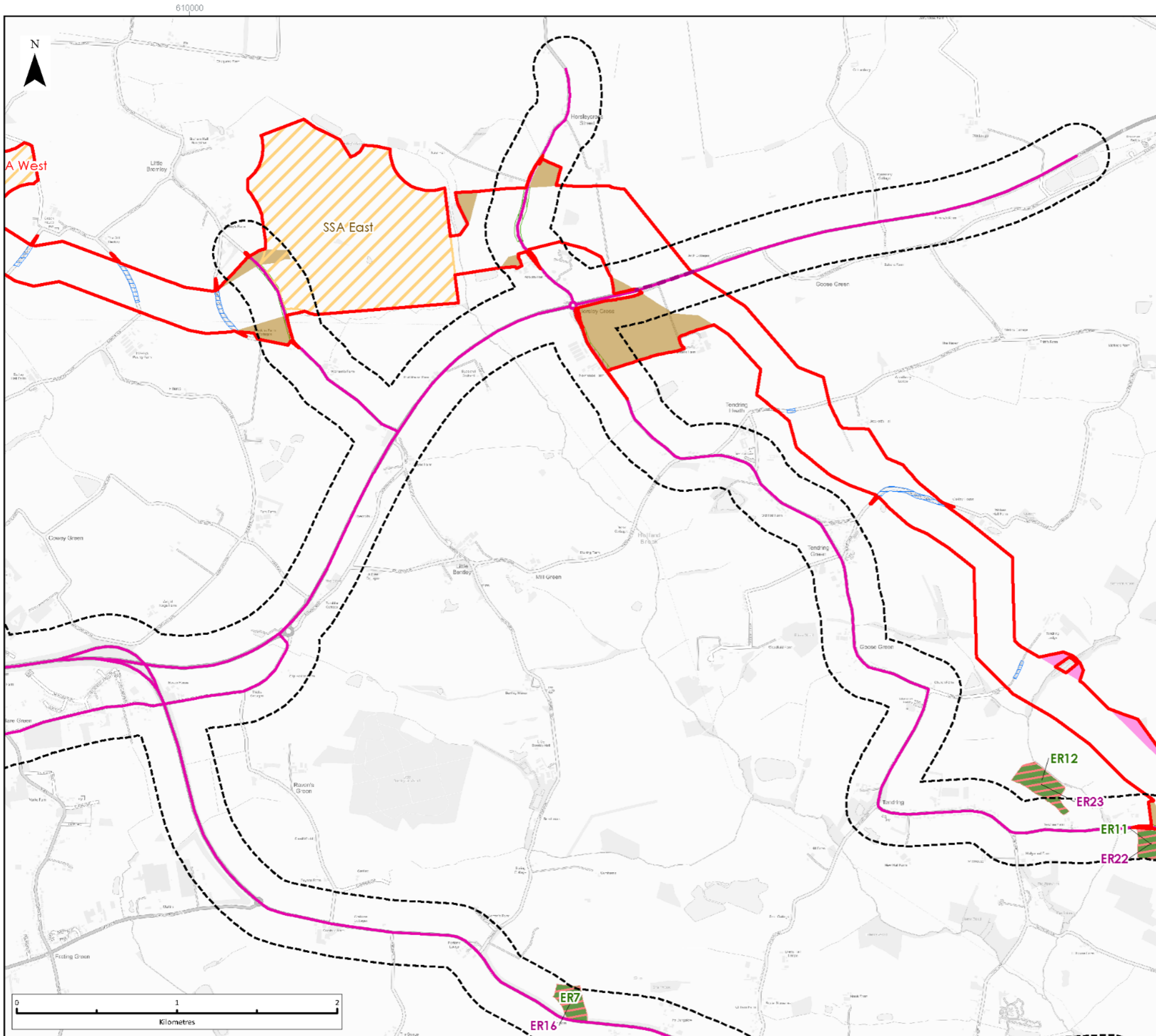
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- LEGEND**
- Onshore Red Line Boundary
 - Onshore Cable Route Section Division
 - Onshore Substation Areas of Search
 - Temporary Construction Compounds
 - Works Access Required
 - Haul Road Crossings
 - Haul Road Access
 - Ecological Road Traffic Screening Routes
 - Ecological Road Traffic Screening Routes 200m Buffer
 - Affected Local Wildlife Site (LWS)
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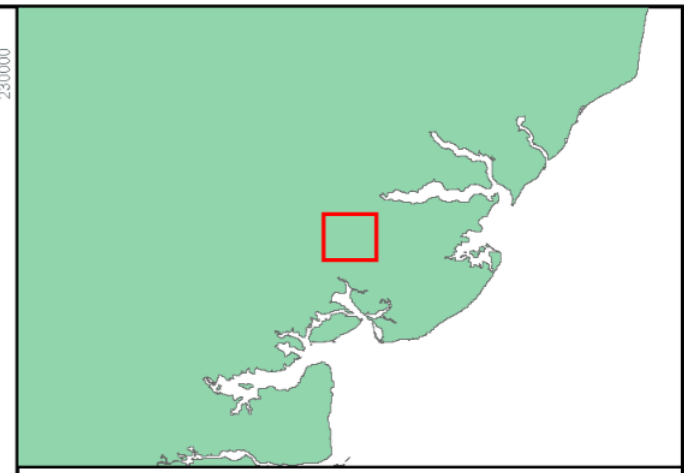
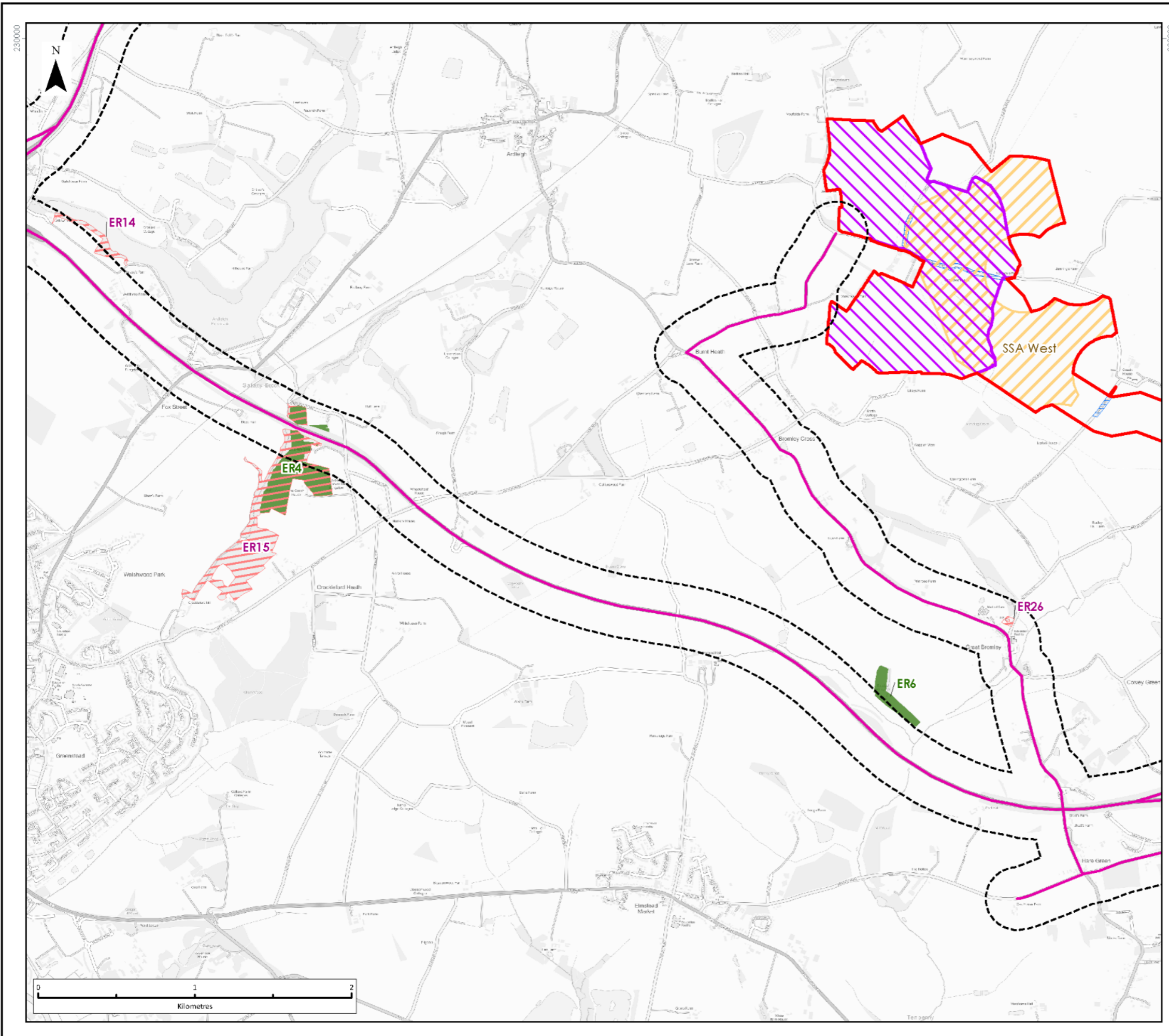
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LEGEND

- Onshore Red Line Boundary
- National Grid Area of Search
- Onshore Substation Areas of Search
- Haul Road Crossings
- Ecological Road Traffic Screening Routes
- Ecological Road Traffic Screening Routes 200m Buffer
- Affected Local Wildlife Site (LWS)
- Affected Ancient Woodland (AW)

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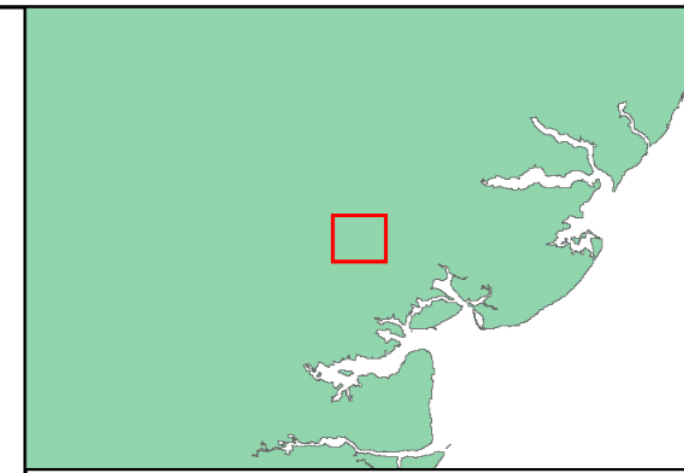
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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 CO-ORDINATE SYSTEM: British National Grid





- LEGEND**
- Ecological Road Traffic Screening Routes
 - Ecological Road Traffic Screening Routes 200m Buffer
 - Affected Site of Special Scientific Interest (SSSI)

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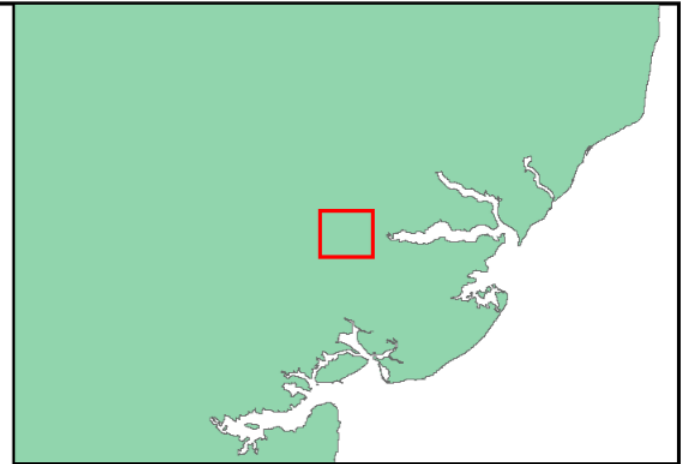
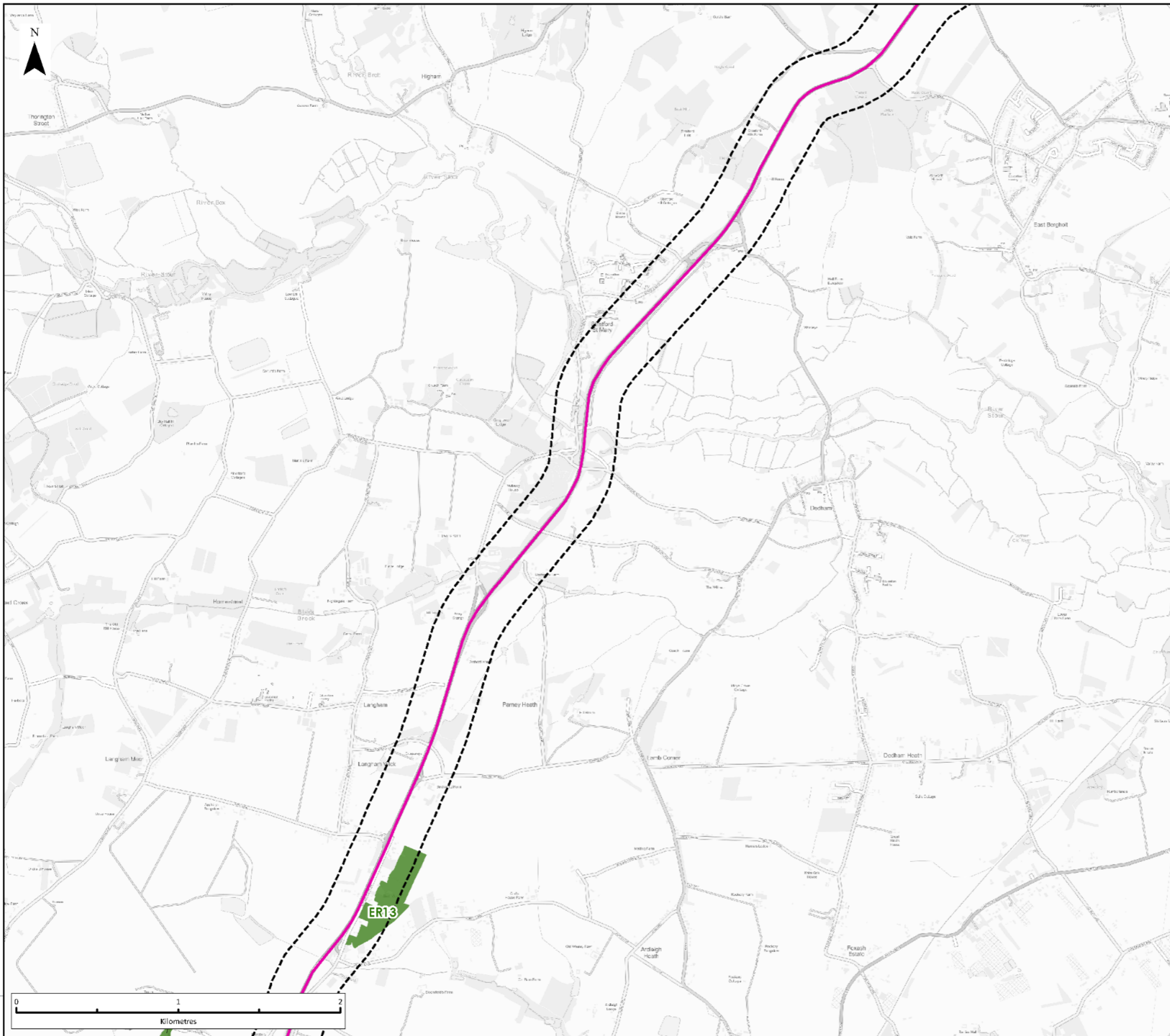
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FIGURE 10.3
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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





- LEGEND**
- Ecological Road Traffic Screening Routes
 - Ecological Road Traffic Screening Routes 200m Buffer
 - Affected Ancient Woodland (AW)

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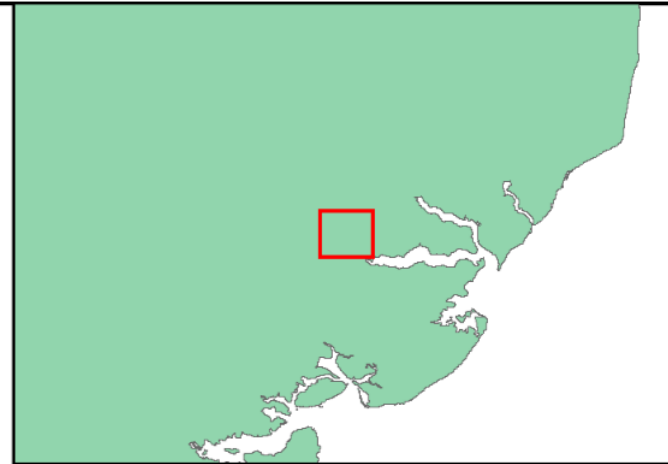
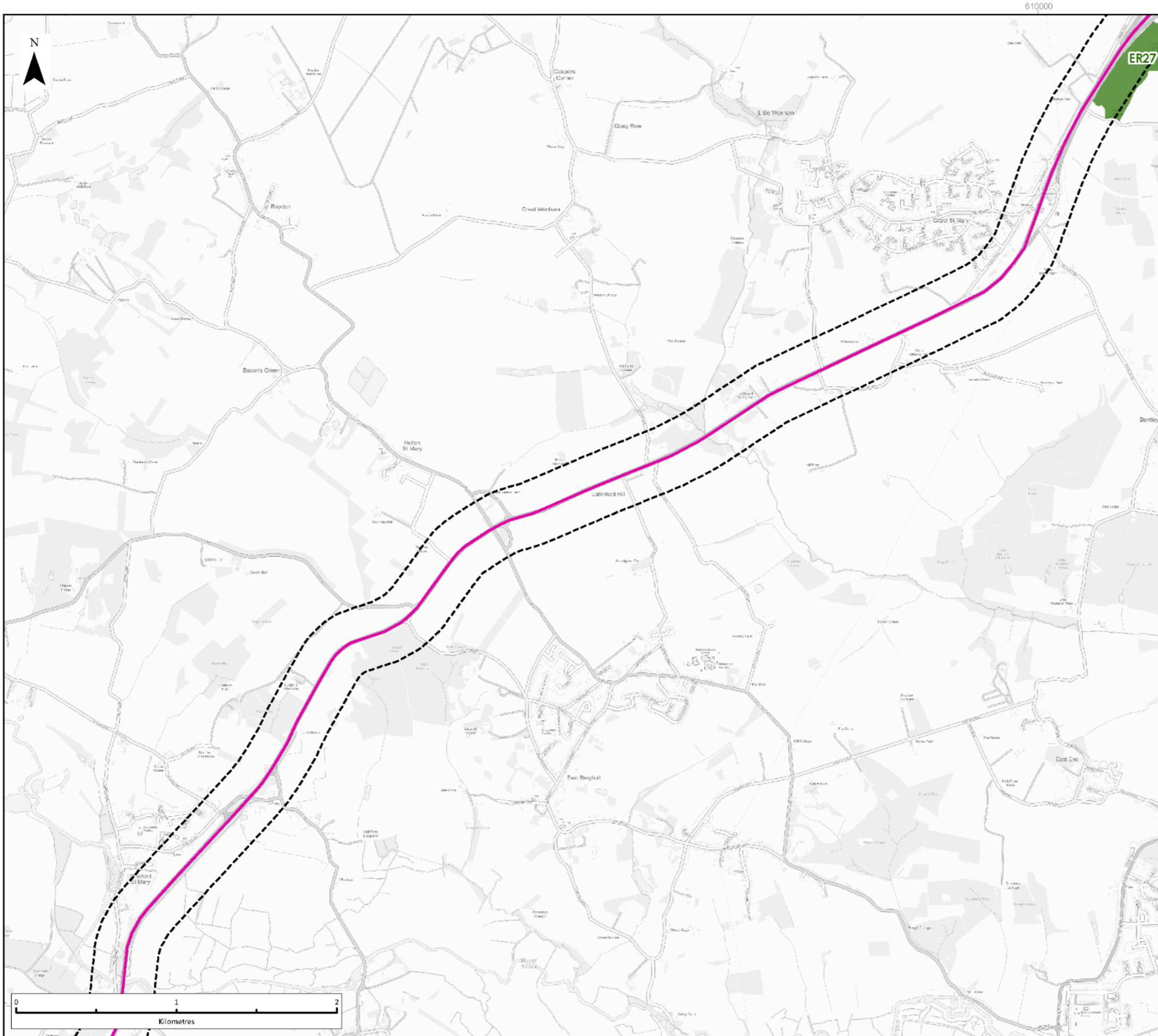
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FIGURE 10.3
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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





- LEGEND**
- Ecological Road Traffic Screening Routes
 - Ecological Road Traffic Screening Routes 200m Buffer
 - Affected Ancient Woodland (AW)

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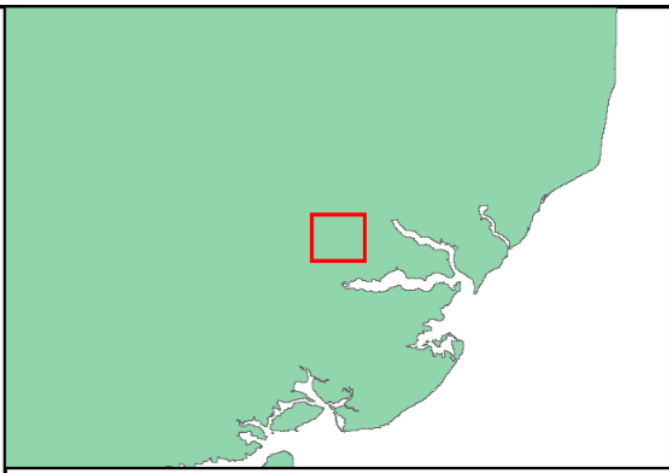
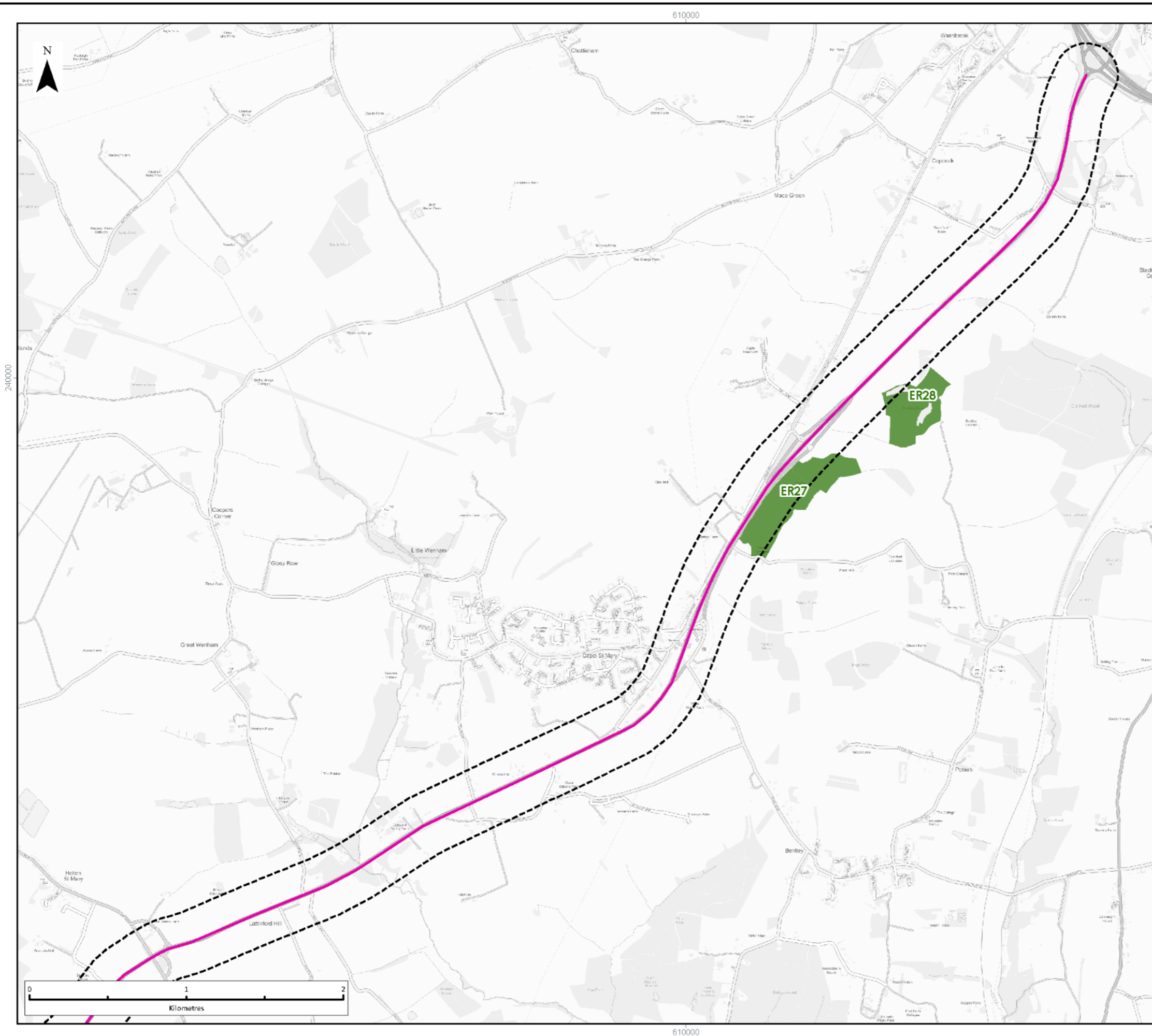
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FIGURE 10.3
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 SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Ecological Road Traffic Screening Routes
- Ecological Road Traffic Screening Routes 200m Buffer
- Affected Ancient Woodland (AW)

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 FIGURE 10.3
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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





- 10.10.53 No international ecological designations are found within 200 m of the road links expected to witness a change in vehicular flows as a result of construction activities. Impacts on international ecological sites can therefore be considered insignificant.
- 10.10.54 Three SSSIs are found within 200 m of the road links expected to witness a change in vehicular flows as a result of construction activities. Given the nature of these designations, an in-combination screening assessment of road traffic flows has been undertaken in comparison to the IAQM prescribed screening criteria (IAQM, 2020).
- 10.10.55 The extent of relevant projects and plans that have the potential to generate road traffic flows within 200 m of the three SSSIs (in-combination with VE OWFL) include:
- > Relevant committed developments (see Volume 3, Chapter 8: Traffic and Transport); and
 - > North Falls OWF (yet to receive development consent (trips conservatively assumed to be equivalent to VE)).
- 10.10.56 The in-combination assessment represents a conservative approach (i.e. assuming peak construction activities associated with both VE and NF will overlap and affect the same road links simultaneously).
- 10.10.57 Consideration of road traffic volumes associated with the NGET substation have not been considered, based upon the unavailability of information (see Volume 3, Chapter 8: Traffic and Transport).
- 10.10.58 Notwithstanding this, based upon initial analysis, trips generated by NGET are likely to impact the A12, A120 and access routes north of A120. These road links are not located within 200 m of the three identified SSSIs. Therefore, the omission of NGET does not affect the validity of the in-combination screening exercise.
- 10.10.59 Trips associated with NGET will be considered within the ES Traffic and Transport assessment and the in-combination exercise will be repeated.
- 10.10.60 Various Ancient Woodland (comprising PAWS and ASNW) and LoWS designations are found within 200 m of the road links expected to witness a change in vehicular flows as a result of construction activities. Given the nature of these of designations, screening of road traffic flows can be undertaken in isolation directly with the IAQM prescribed screening criteria (IAQM, 2020), without consideration of in-combination impacts.
- 10.10.61 Table 10.16 details the extent of ecological designations located within 200 m of a road link expected to witness a change in vehicular flow as a result of VE.



Table 10.16: Ecological designations within 200 m of an affected link

ID	Site	Designation	Project Alone		In-Combination	
			Total AADT	HDV	Total	HDV
ER1	Weeleyhall Wood	SSSI	120	25	640	87
ER2	Holland Haven Marshes	SSSI	165	70	330	160
ER3	Marks Tey Brickpit	SSSI	<i>Not Sensitive</i>			
ER4	Walls Wood	ASNW	874	367	-	-
ER5	Kiln Wood	ASNW & PAWS	437	184	-	-
ER6	Unnamed (4830)	ASNW	874	367	-	-
ER7	High Barn Wood	ASNW	527	194	-	-
ER8	Guttridgehill Wood	ASNW	165	70	-	-
ER9	Unnamed (4811)	ASNW	165	70	-	-
ER10	Weeleyhall Wood	ASNW	120	25	-	-
ER11	Simons Wood	PAWS	78	31	-	-
ER12	Tendring Grove	ASNW	78	31	-	-
ER13	Birch Wood	ASNW	437	184	-	-
ER14	Ardleigh Reservoir Wood	LoWS	874	367	-	-
ER15	Walls Wood	LoWS	874	367	-	-
ER16	High Barn Wood	LoWS	527	194	-	-
ER17	Guttridge Wood	LoWS	165	70	-	-
ER18	Oakhurst Wood	LoWS	165	70	-	-
ER19	Weeley Bypass	LoWS	165	70	-	-
ER20	Far Thorpe Green	LoWS	242	99	-	-
ER21	Thorpe Green	LoWS	484	198	-	-
ER22	Simons Wood	LoWS	78	31	-	-
ER23	Tendring Grove	LoWS	78	31	-	-
ER24	Upper Holland Brook	LoWS	362	124	-	-

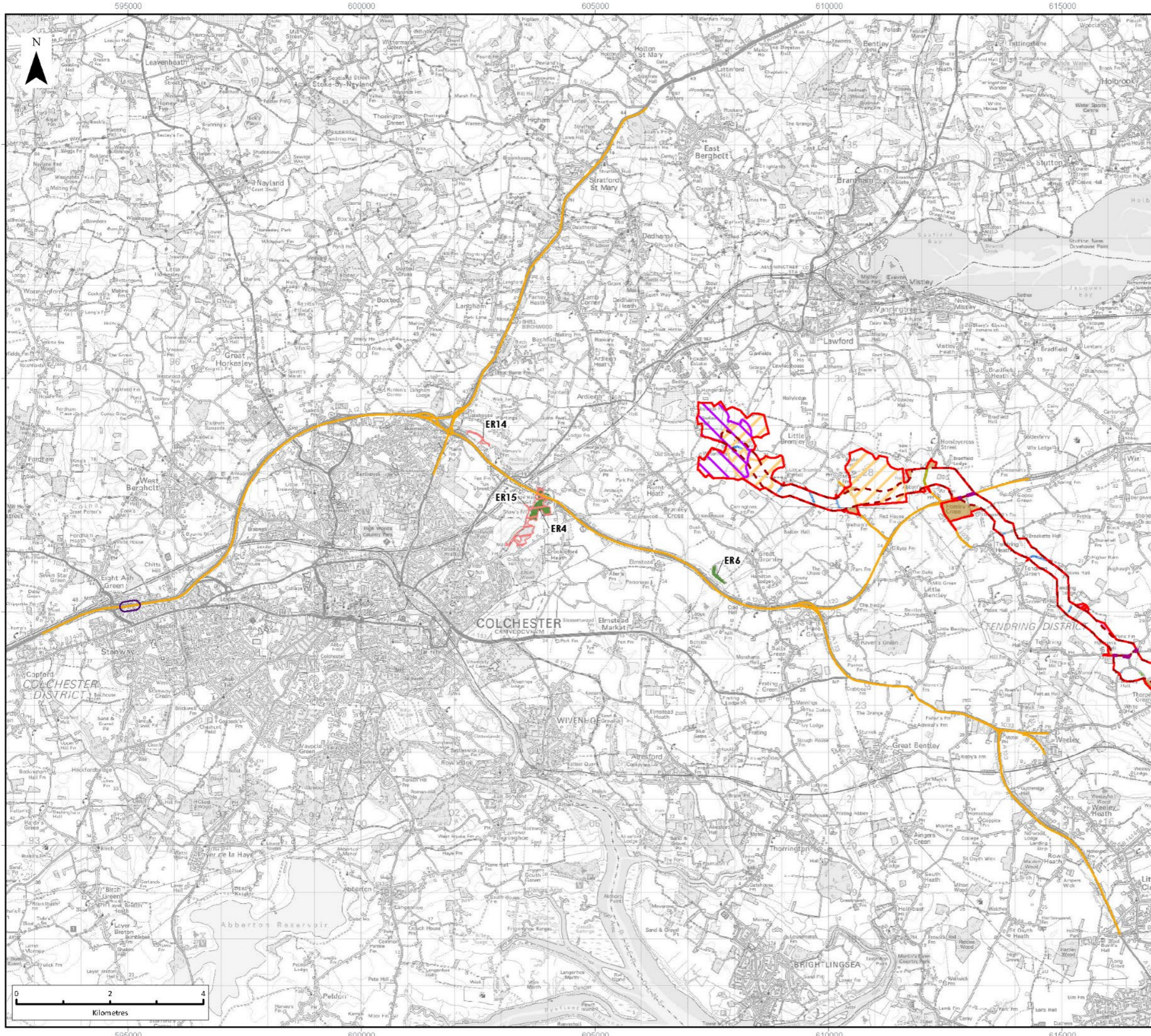


ID	Site	Designation	Project Alone		In-Combination	
			Total AADT	HDV	Total	HDV
ER25	St Michaels Churchyard	LoWS	241	50	-	-
ER26	Great Bromley Churchyard	LoWS	103	73	-	-
ER27	Bentley Long Wood	ASNW	437	184	-	-
ER28	Brockley Wood	ASNW	437	184	-	-
IAQM Screening Thresholds			1,000	200	1,000	200

10.10.62 Construction road traffic flows generated by VE (in-combination with other relevant plans/ projects) are below the IAQM prescribed screening criteria on road links within 200 m of all SSSIs. Impacts can therefore be considered insignificant.

10.10.63 Two ASNWs and two LoWSs are located within 200 m of road links expected to witness a change in vehicular flows above the IAQM prescribed screening criteria. Impacts can therefore not be screened out.

10.10.64 Consistent with the staged screening procedure outlined within Section 10.5, further assessment with the use of dispersion modelling to quantify the effect on Critical Loads/ Levels has therefore been undertaken for these ecological sites. The spatial extent of the modelled domain is illustrated in Figure 10.4.



- LEGEND**
- Onshore Red Line Boundary
 - Onshore Export Cable Corridor
 - Onshore Cable Route Section Division
 - National Grid Area of Search
 - Onshore Substation Areas of Search
 - Temporary Construction Compounds
 - Works Access Required
 - Haul Road Crossings
 - Haul Road Access
 - Modelled Road Network
 - Verification Zone A
 - Modelled Ancient Woodland (AW)
 - Modelled Local Wildlife Site (LWS)

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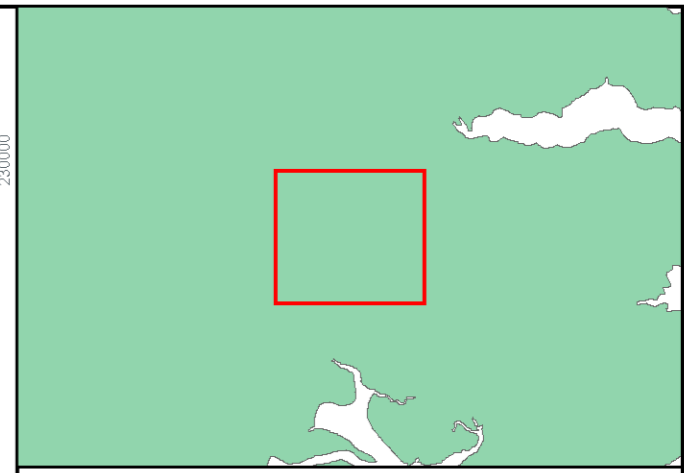
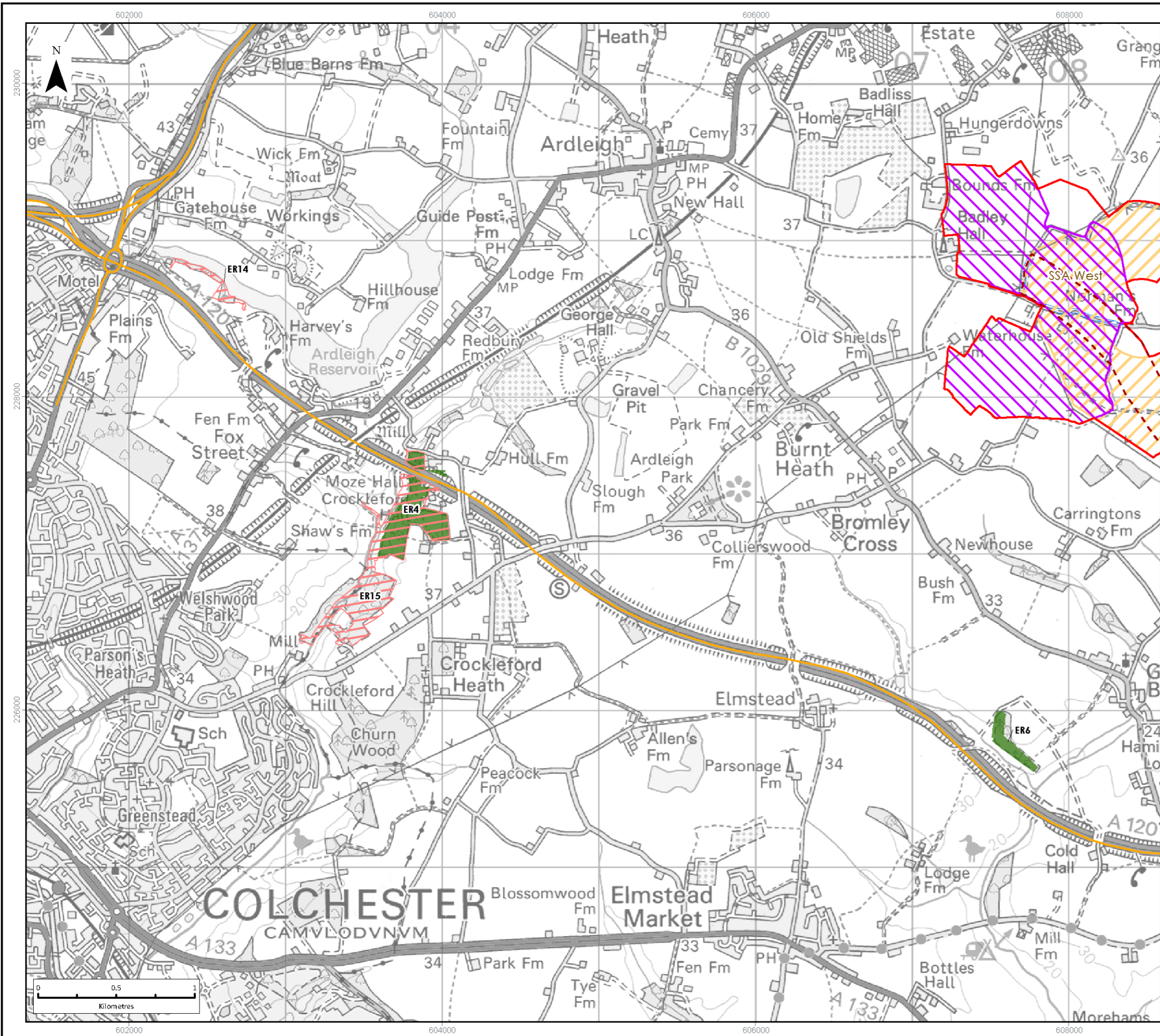
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 FIGURE 10.4
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SCALE: 1:85,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Corridor
- National Grid Area of Search
- Onshore Substation Areas of Search
- Haul Road Crossings
- Modelled Road Network
- Modelled Ancient Woodland (AW)
- Modelled Local Wildlife Site (LWS)

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SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid



10.10.65 Impacts on all other ecological designations can therefore be considered insignificant.

10.10.66 Results presented herein relate to the maximum modelled impact of each individual ecological designation requiring assessment (i.e. where impacts cannot be screened out), and as such, represents a conservative outlook.

10.10.67 Table 10.17 presents the maximum modelled 2027 annual mean NO_x Critical Level (30 µg/m³) impacts as a result of VE at all applicable ecological receptor locations for initial screening.

Table 10.17: Maximum predicted 2027 NO_x critical level impacts

ID	Site	Designation	Maximum Modelled Impact	
			µg/m ³	% of Critical Level
ER4	Walls Wood	ASNW	0.6	1.9
ER6	4830	ASNW	0.1	0.2
ER14	Ardleigh RW	LoWS	0.1	0.3
ER15	Walls Wood	LoWS	0.6	1.9

10.10.68 Increases in NO_x annual mean concentrations as a result of VE alone are <100% of the Critical Level at each assessed ecological designation. Impacts associated with annual mean NO_x concentrations on sensitive ecological designations are therefore considered insignificant.

10.10.69 Table 10.18 presents the maximum modelled 2027 nutrient nitrogen impacts as a result of VE at all applicable ecological receptor locations for initial screening.

Table 10.18: Maximum predicted 2027 nutrient nitrogen impacts

ID	Site	Designation	Critical Load Min – Max (Kg N/ha/yr)	Maximum Modelled Impact	
				Kg N/ha/yr	% of Min Critical Load
ER4	Walls Wood	ASNW	10 - 20	0.1	0.8
ER6	4830	ASNW	10 - 20	0.0	0.1
ER14	Ardleigh RW	LoWS	10 - 20	0.0	0.2
ER15	Walls Wood	LoWS	10 - 20	0.1	0.8

10.10.70 Increases in nutrient nitrogen deposition as a result of VE alone are <100% of the Critical Load at each assessed ecological designation. Impacts associated with nutrient nitrogen on sensitive ecological designations are therefore considered insignificant.



10.10.71 Table 10.19 presents the maximum modelled 2027 acidification impacts as a result of VE at all applicable ecological receptor locations for initial screening.

Table 10.19: Maximum predicted 2027 acidification impacts

ID	Site	Designation	MaxN Critical Load (keq/ha/yr)	Maximum Modelled Impact	
				Keq/ha/yr	% of MaxN Critical Load
ER4	Walls Wood	ASNW	1.683	0.006	0.3
ER6	4830	ASNW	1.710	0.001	0.0
ER14	Ardleigh RW	LoWS	1.685	0.001	0.1
ER15	Walls Wood	LoWS	1.683	0.006	0.3

10.10.72 Increases in acidification deposition as a result of VE alone are <100% of the Critical Load at each assessed ecological designation. Impacts associated with acidification deposition on sensitive ecological designations are therefore considered insignificant.

10.10.73 In consideration of the above outcomes, road traffic impacts on all ecological designations can be considered insignificant. Effects are concluded to be **not significant** in terms of the EIA Regulations. No further assessment is therefore required.

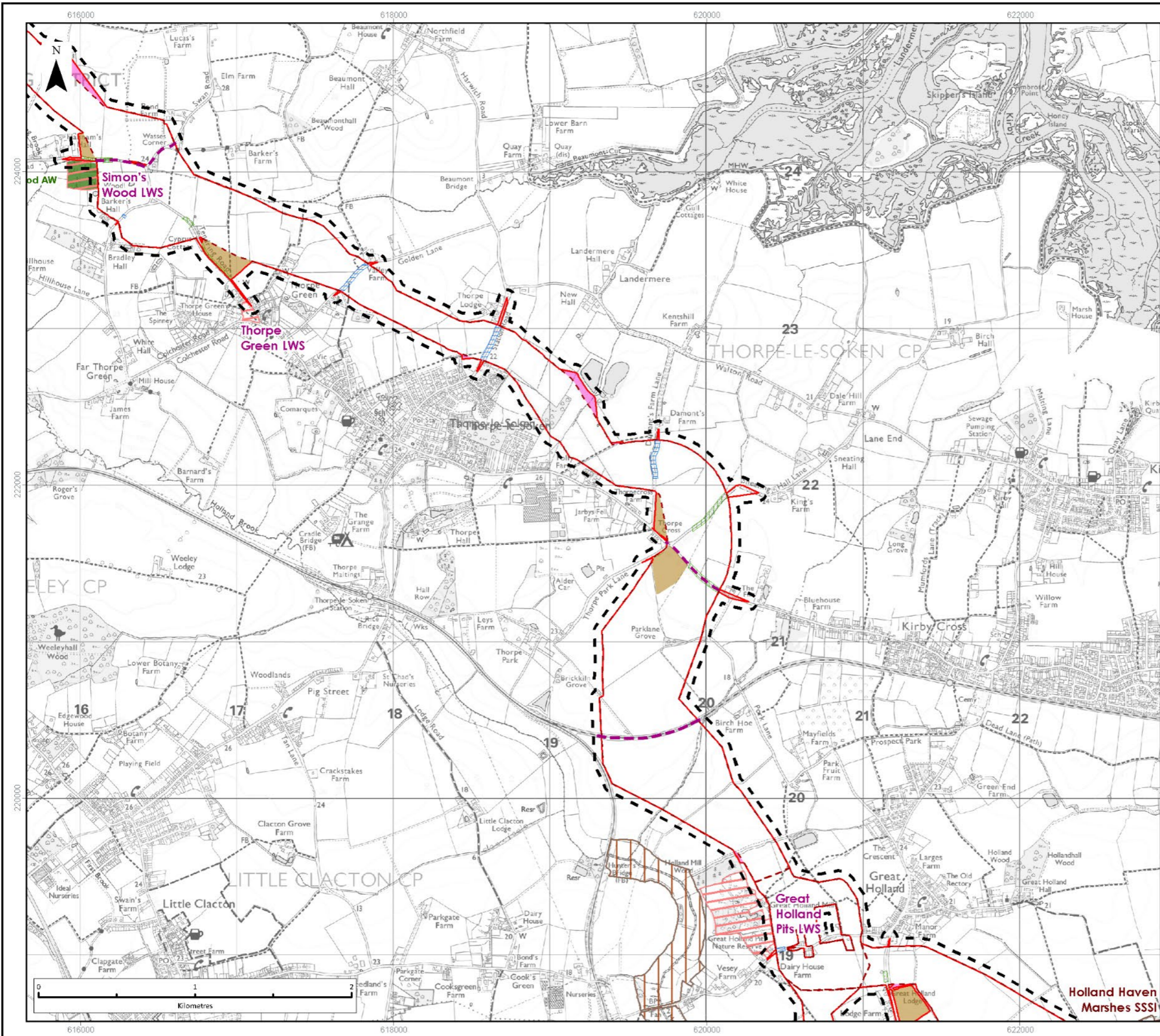
NRMM EMISSIONS ASSESSMENT

10.10.74 Given the implementation of the controls provided in Volume 5, Annex 10.5: Air Quality Mitigation Measures secured as part of a CoCP, it is considered impacts associated with construction phase generated NRMM emissions are not likely to be significant as per LAQM.TG(22) and IAQM construction guidance.

10.10.75 Essex County Council (on behalf of TDC) agreed NRMM emissions could be scoped out following the implementation and enforcement of suitable mitigation measures.

10.10.76 Notwithstanding the above, a qualitative assessment of NRMM emissions has been undertaken to inform the likelihood of a significant effect arising – Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment. A summary of the assessment outcomes is provided below.

10.10.77 The spatial extent of the NRMM emissions assessment study area is illustrated in Figure 10.5.



LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 50 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Affected Local Wildlife Site (LWS)
- Affected Site of Special Scientific Interest (SSSI)
- Affected Ancient Woodland (AW)

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PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

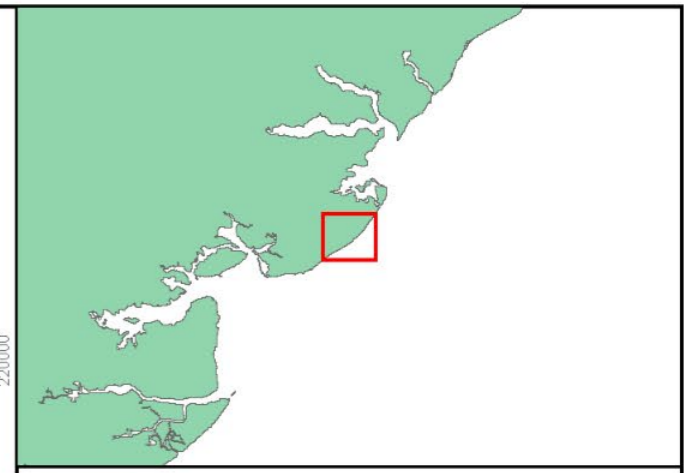
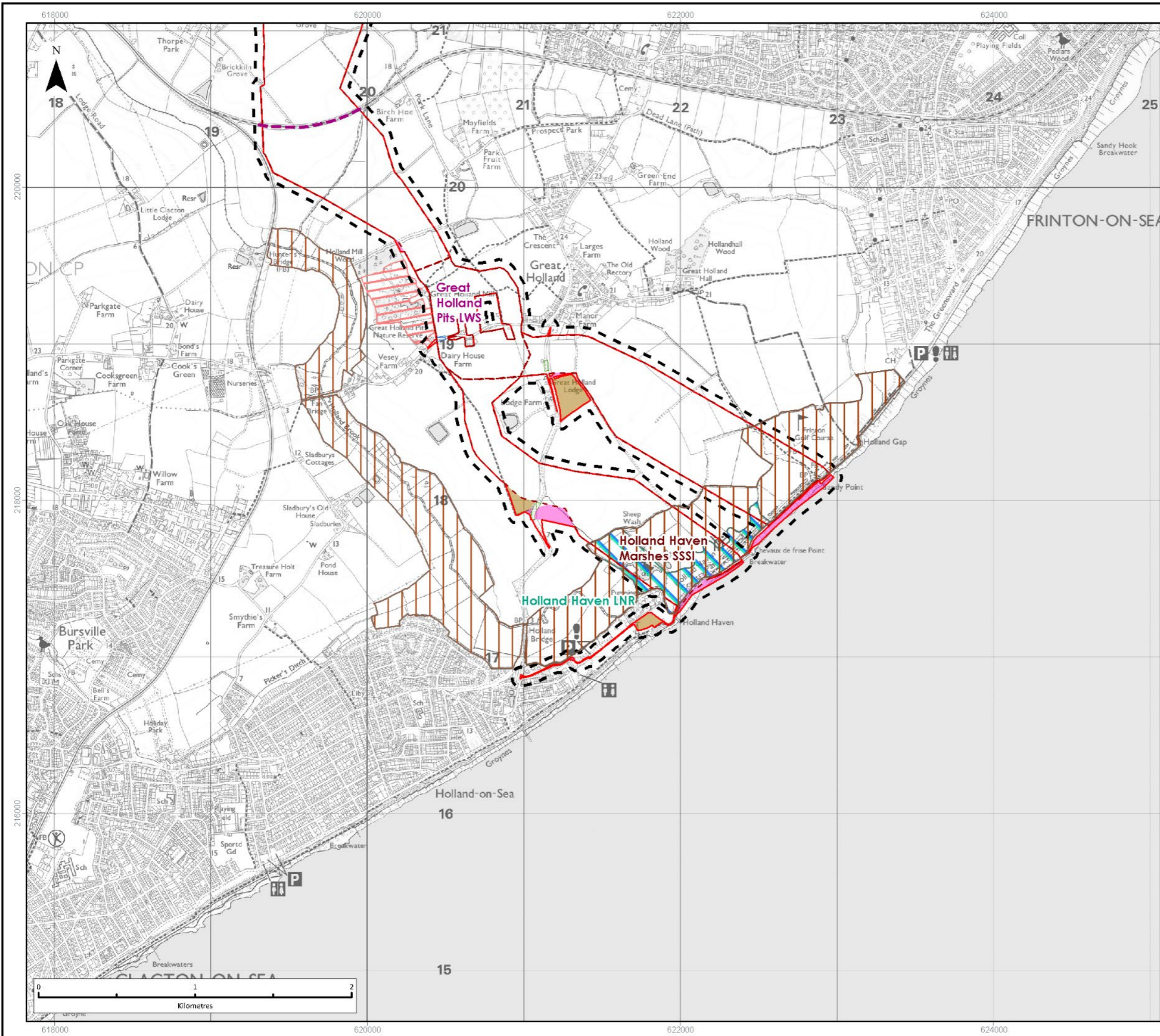
DRAWING TITLE:
 Non-Road Mobile Machinery Emissions Affected Areas

VER	DATE	REMARKS	Drawn	Checked
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DRAWING NUMBER:
 FIGURE 10.5
 Page 3 of 6

SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 50 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Affected Local Wildlife Site (LWS)
- Affected Site of Special Scientific Interest (SSSI)
- Affected Local Nature Reserve (LNR)

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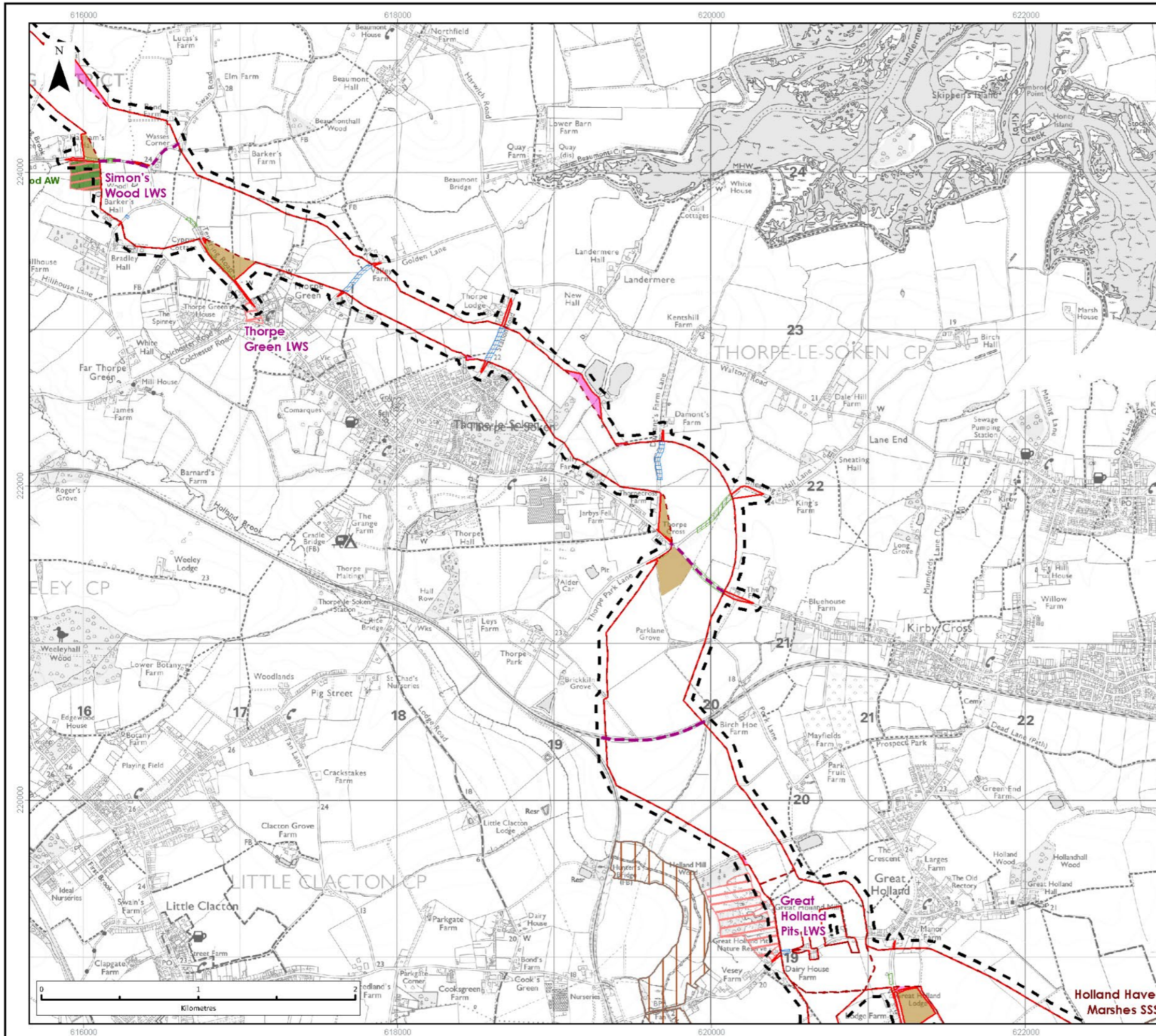
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DRAWING NUMBER:
 FIGURE 10.5
 Page 2 of 6

SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 50 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Affected Local Wildlife Site (LWS)
- Affected Site of Special Scientific Interest (SSSI)
- Affected Ancient Woodland (AW)

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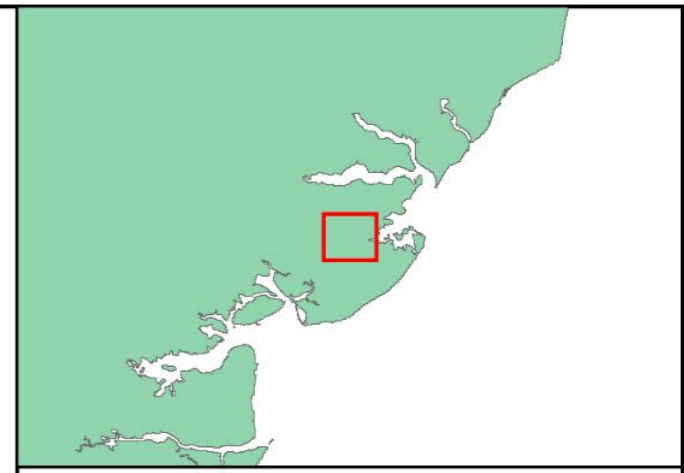
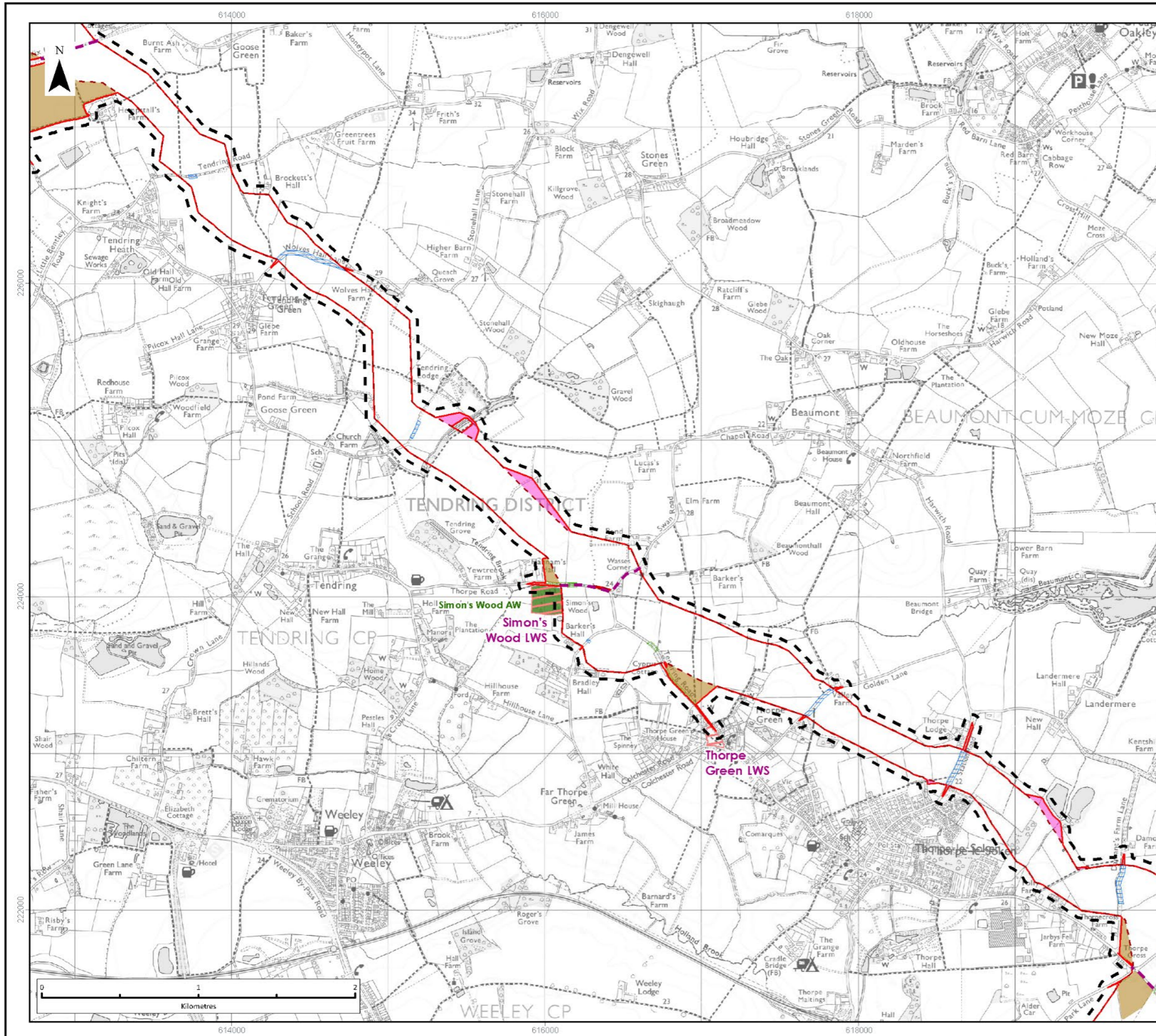
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 Non-Road Mobile Machinery Emissions Affected Areas

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 FIGURE 10.5
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SCALE: 1:25,000	PLOT SIZE: A3	DATUM: OSGB 1936	COORDINATE SYSTEM: British National Grid
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LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 50 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Affected Local Wildlife Site (LWS)
- Affected Ancient Woodland (AW)

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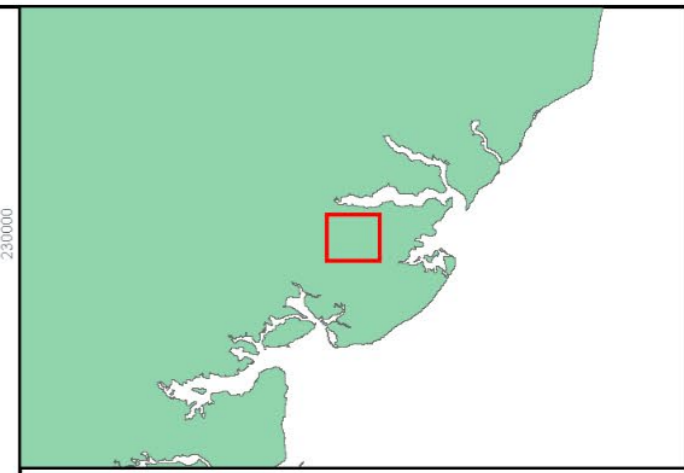
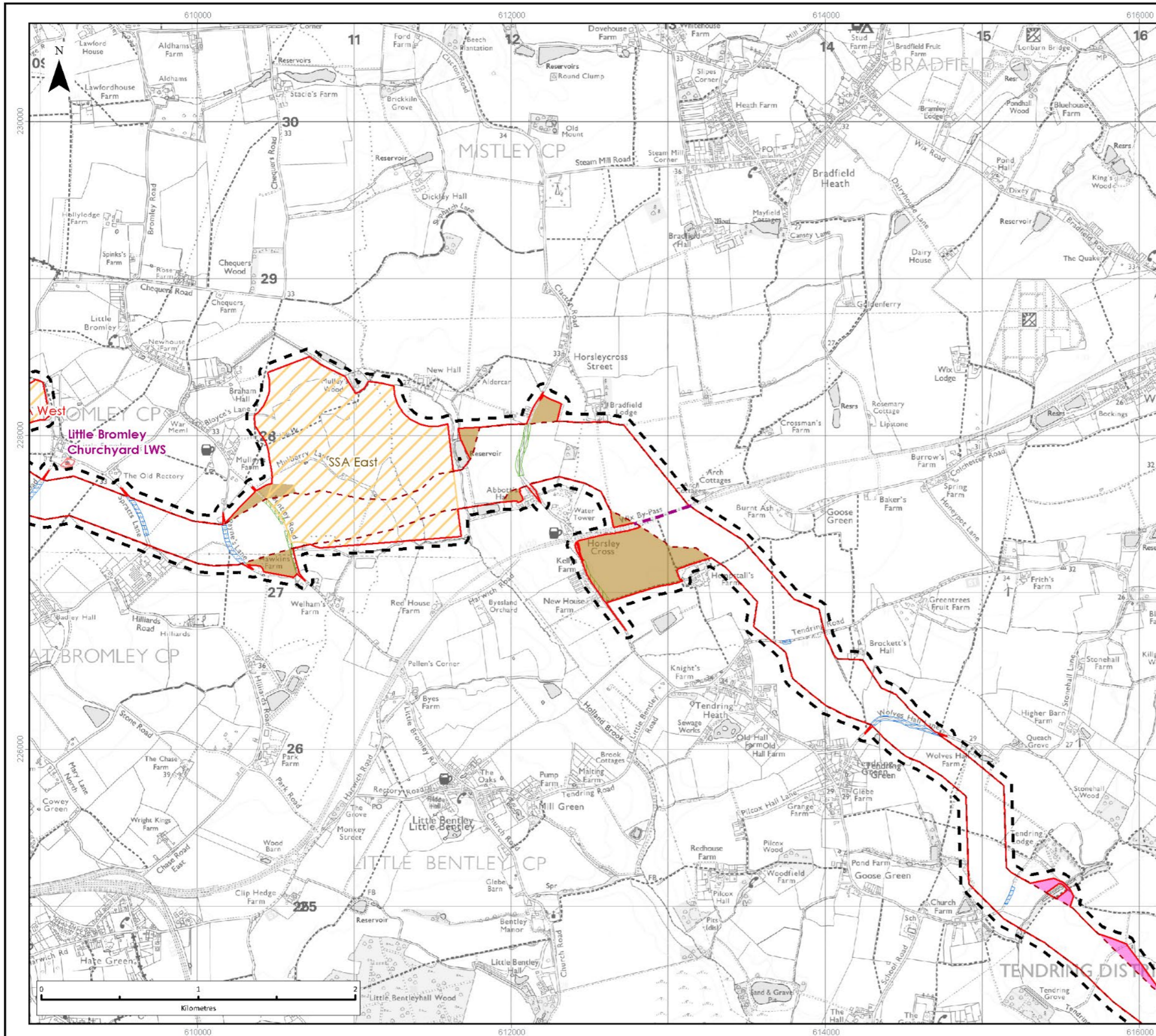
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 Non-Road Mobile Machinery Emissions Affected Areas

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 FIGURE 10.5
 Page 4 of 6

SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 CO-ORDINATE SYSTEM: British National Grid





LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 50 m Buffer
- Onshore Export Cable Route
- Onshore Cable Route Section Division
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- Affected Local Wildlife Site (LWS)

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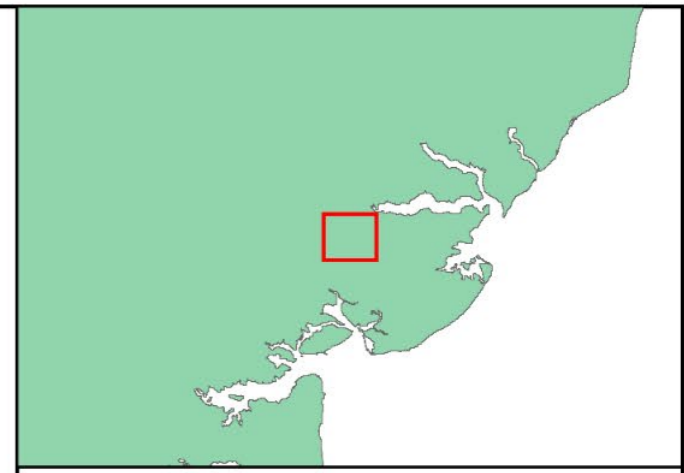
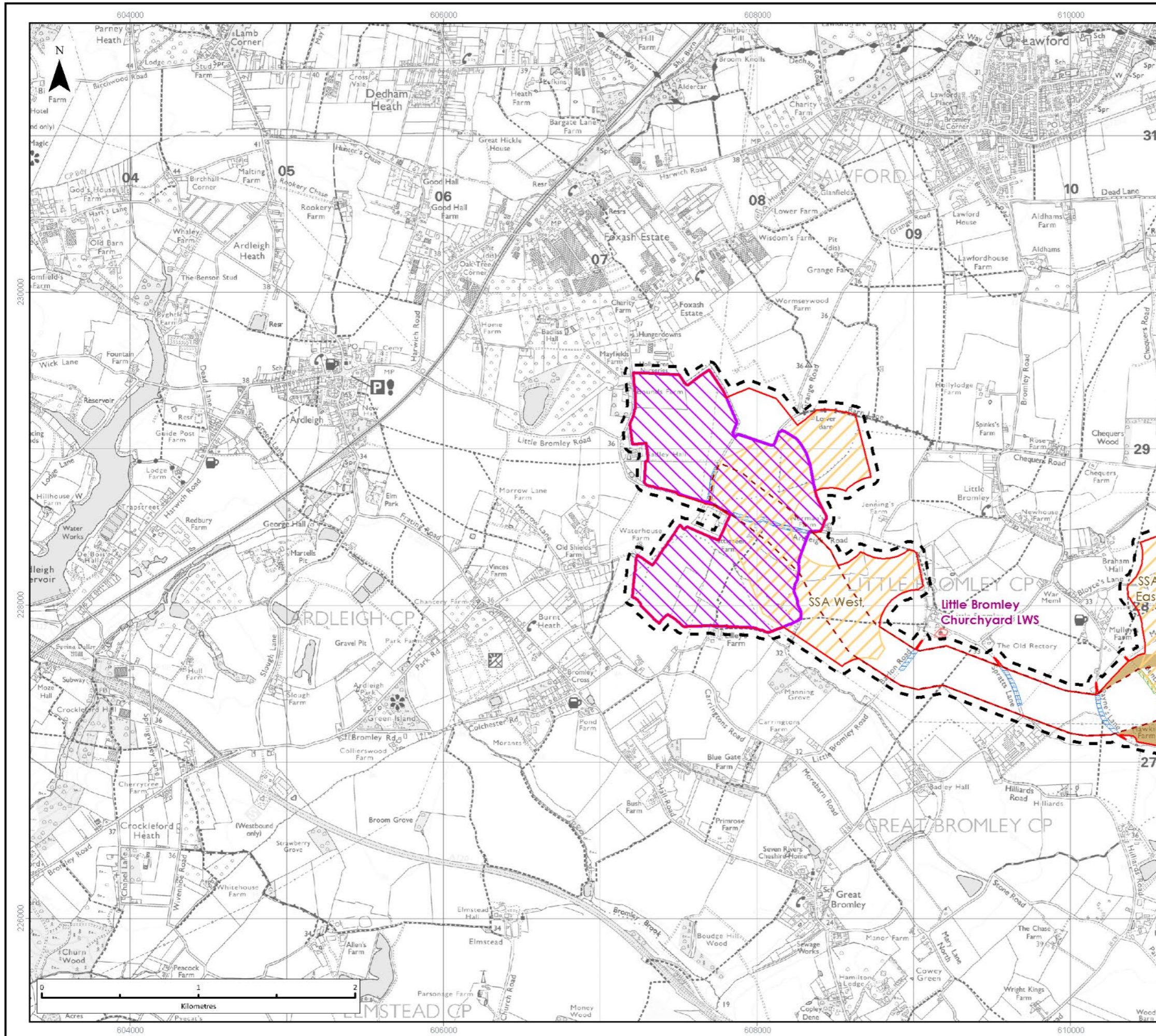
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 Non-Road Mobile Machinery
 Emissions Affected Areas

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 FIGURE 10.5
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SCALE: 1:25,000	PLOT SIZE: A3	DATUM: OSGB 1936	COORDINATE SYSTEM: British National Grid
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LEGEND

- Onshore Red Line Boundary
- Onshore Red Line Boundary 50 m Buffer
- Onshore Export Cable Route
- National Grid Area of Search
- Onshore Substation Areas of Search
- Temporary Construction Compounds
- Haul Road Crossings
- Haul Road Access
- Affected Local Wildlife Site (LWS)

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 Non-Road Mobile Machinery Emissions Affected Areas

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DRAWING NUMBER:
 FIGURE 10.5
 Page 6 of 6

SCALE: 1:25,000 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid



10.10.78 A significant effect is not considered likely to occur following qualitative assessment due to the following:

- > The construction period is considered short-term and temporary (i.e. up to 18 months at locations of exposure), and working hours within this are further limited (normal hours are 07:00 to 19:00 Monday to Saturday);
- > Discrete construction activities are unlikely to occur concurrently in the same location;
- > For the purposes of defining the extent of NRMM activities the maximum design parameters/ extents of any proposed construction area have been used (i.e. PEIR onshore RLB). The assessment will be repeated at ES stage whereby design parameters may be more refined. In addition, it assumes that all NRMM will be operated at the extents of the RLB, which is highly unlikely to be the case, as NRMM locations will vary across the active construction area and will not typically be operated continuously at the boundary. This approach is likely to facilitate a conservative assessment, and therefore increases the opportunity for interactions with sensitive receptors;
- > There are no sensitive human or ecological receptors within 50 m of potential OnSS construction – the construction activity with the highest emission magnitude potential, given the fixed location of work, extent of NRMM activity and extended length of construction (approximately 24 months);
- > Construction activities will be temporary/ mobile, and plant will not be fixed for the full duration of works. By way of example, construction activities along the Onshore ECC construction area will spatially vary as construction progresses. Exposure to NRMM emissions (in the majority of cases) will be transient;
- > Where NRMM equipment will be operational within a fixed area (e.g. compounds) and exposure pathways to surrounding receptors are considered to be constant, the extent of NRMM equipment proposed is considered small in comparison to other activities. Furthermore, exposure pathways to nearby receptors are largely considered to be ineffective (i.e. receptors located upwind);
- > A series of construction phase control measures to minimise potential NRMM impacts are outlined within Volume 5, Annex 10.5: Air Quality Mitigation Measures. This includes the requirement for all NRMM to comply with Stage V emission standards, as a minimum. According to Defra guidance, following implementation of these controls, effects are considered not significant. These measures are included within the CoCP, secured as a requirement of the DCO; and
- > The maximum annual mean background concentrations across all potential construction areas are 'well below' the relevant AQALs or Critical Level. Concentrations across the full extent of the RLB are expected to vary and be lower relative to the maximum reported. The likelihood of NRMM causing an exceedance (whilst considering the above points e.g. transient nature, type, quantum and emission standards) is therefore low.

10.10.79 Whilst taking into account the extent of NRMM proposed to be used (type, quantum and emission standards), associated control measures, the transient/phased nature of the construction works, proximity to receptors and pollutant concentrations across the construction study area, the likelihood for significant effects to occur are low.

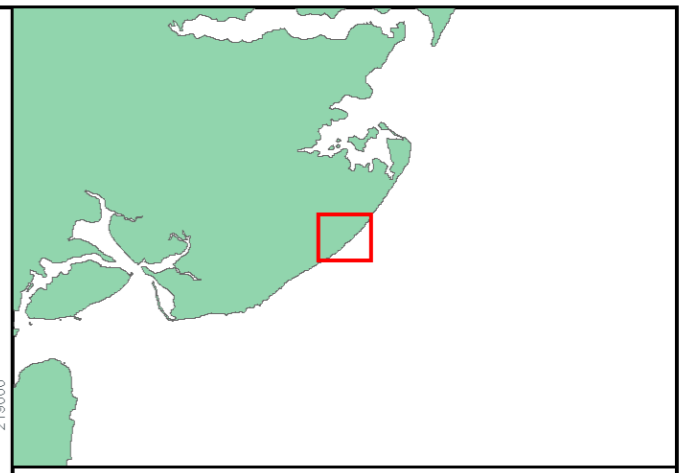
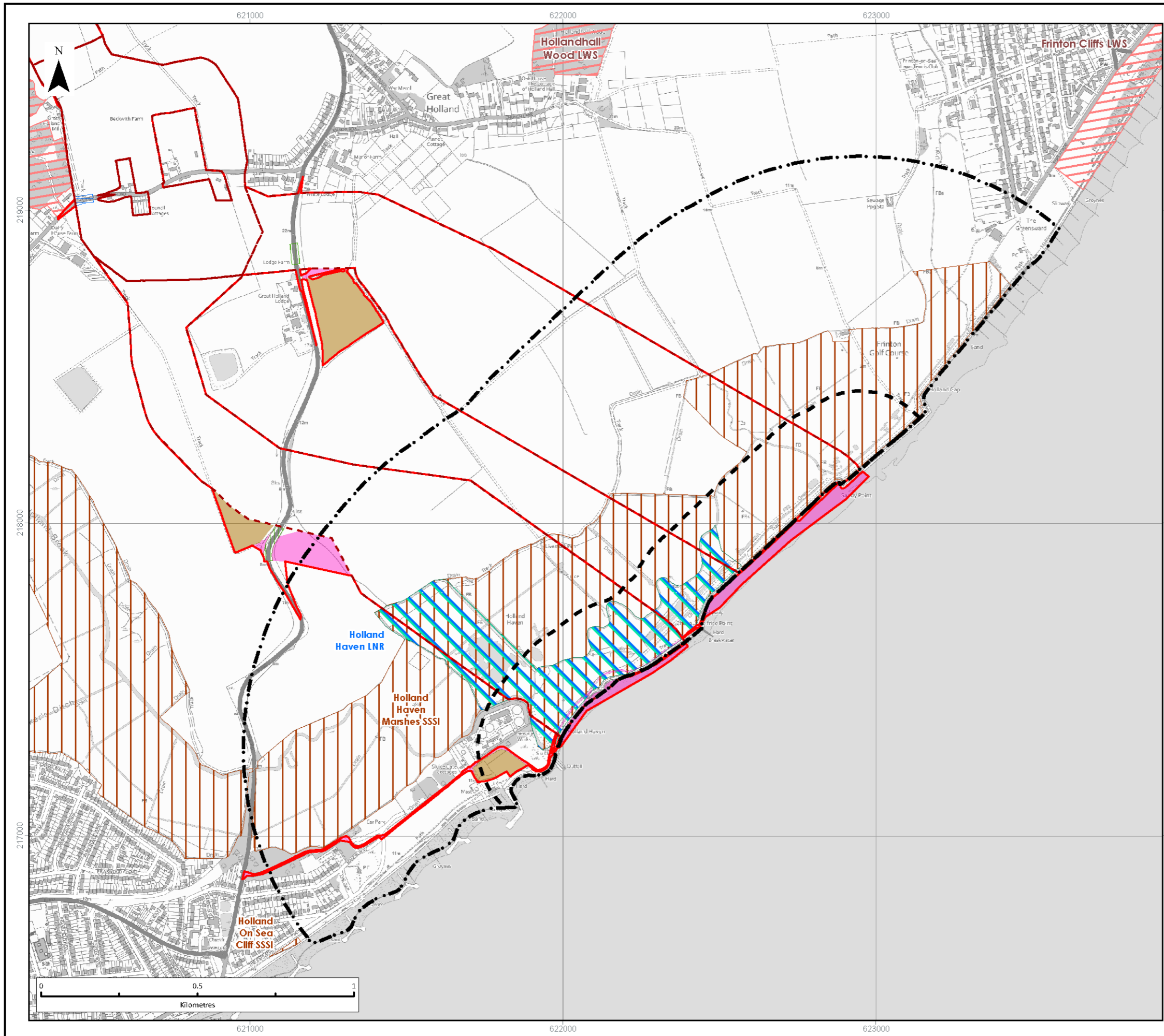
10.10.80 Potential impacts from NRMM emissions would therefore be considered negligible, direct and short-term/ temporary, with the resultant effect **not significant** in terms of the EIA regulations.



OFFSHORE ACTIVITIES ASSESSMENT

10.10.81 An assessment of emissions generated by construction offshore activities is provided in Volume 5, Annex 10.3: Offshore Activities Assessment. A summary of the assessment outcomes is provided below.

The spatial extent of the offshore activities assessment study area with respect to vessel emissions is illustrated in Figure 10.6



LEGEND

- Onshore Red Line Boundary
- Onshore Export Cable Route
- Temporary Construction Compounds
- Works Access Required
- Haul Road Crossings
- Haul Road Access
- 250 m Study Area
- 1 km Study Area
- Affected Local Nature Reserve (LNR)
- Affected Site of Special Scientific Interest (SSSI)
- Affected Local Wildlife Site (LWS)

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PROJECT TITLE:
 FIVE ESTUARIES OFFSHORE WINDFARM

DRAWING TITLE:
 Vessel Emissions Affected Areas

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 FIGURE 10.6

SCALE: 1:12,500 PLOT SIZE: A3 DATUM: OSGB 1936 COORDINATE SYSTEM: British National Grid





- 10.10.82 Offshore vessel movements associated with VE would represent a small number of overall vessel traffic in the North Sea (particularly smaller vessels) and therefore accounts for a small proportion of total North Sea emissions. Further information is provided within Volume 2, Chapter 10: Shipping and Navigation.
- 10.10.83 Furthermore, vessel emissions within the North Sea are regulated by legislation. The North Sea is a designated Emissions Control Area under International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI, which applies strict pollutant emission limits. Vessel emission restrictions are expected to tighten in future years, following the availability and introduction of cleaner technologies and fuels, alongside policy such as the Maritime 2050 and Clean Maritime Plan. These policies provide a strategy for the transition to zero emission shipping within the UK. Therefore, emission contributions from vessel emissions are expected to reduce even further.
- 10.10.84 In consideration of anticipated baseline conditions anticipated during the construction phase, the maximum background concentrations reported for the onshore locations likely to be affected by nearshore vessels are below the corresponding AQALs and Critical Levels.
- 10.10.85 Export cable vessels and landfall cable installation vessels will be used to facilitate the installation of cabling infrastructure at landfall. It is therefore assumed that these vessel movements will occur within 250 m and/ or 1 km of the onshore works and therefore potential sensitive onshore human and ecological receptors.
- 10.10.86 All other vessels will predominantly be used to facilitate the construction of offshore infrastructure. The offshore wind farm array is located at 37 km off the coast at the closest point. It is highly unlikely that vessel movements used for the construction of the offshore array will therefore occur within 250 m and/ or 1 km of the onshore works.
- 10.10.87 The total number of vessel movements estimated to occur throughout the construction phase within 250 m and/ or 1 km of onshore works (assumed to be large ships – considered unlikely) (2,153 total number of movements) are below the LAQM.TG(22) screening thresholds presented in Section 10.5, despite the overly conservative assessment methodology applied. Actual annual movements are believed to be lower than those values used for screening.
- 10.10.88 Landfall operations (vessels within 1 km of the shore) are expected to last up to 18 months and as such impacts are believed to be temporary, with no long-term deterioration of conditions.
- 10.10.89 Whilst taking the above into account, and in conjunction with baseline conditions, emissions from vessels associated with the construction phase are concluded to be **not significant** in terms of the EIA Regulations.

10.11 ENVIRONMENTAL ASSESSMENT: OPERATIONAL PHASE

- 10.11.1 Once operational, activities will be limited to maintenance activities. These are expected to be intermittent/ infrequent in comparison to the assessed construction activities.



10.11.2 Effects associated with all construction phase assessment were considered to be not significant. For these reasons, operational activities are not anticipated to exceed the construction phase worst-case criteria assessed and impacts are likely to be not significant in terms of the EIA Regulations.

ROAD TRAFFIC ASSESSMENT

10.11.3 In relation to likely operational vehicle movements, it is anticipated that at a maximum, there would be approximately 4-8 traffic movements per day – however these would be limited to a 2-week period for annual testing. Outside of this period, there are likely to be approximately 4-8 traffic movements per week. In addition, there is expected to be 1 visit to each cable joint pit per year.

10.11.4 As such, based on the above information, operational road traffic impacts screen below the EPUK & IAQM criteria outlined in Section 10.5 as requested by PINS as part of their Scoping Opinion (PINS, 2021). The effects are considered to be **not significant** in terms of the EIA Regulations and no further assessment is required.

NRMM EMISSIONS ASSESSMENT

10.11.5 An assessment of emissions generated by operational NRMM activities is provided in Volume 5, Annex 10.2: Non Road Mobile Machinery Emissions Assessment. A summary of the assessment outcomes is provided below.

10.11.6 The spatial extent of the NRMM emissions assessment study area is illustrated in Figure 10.5

10.11.7 Onshore operational activities limited to maintenance are expected to be intermittent/infrequent in comparison to the assessed construction activities.

10.11.8 To give an indication of the extent of operational activities, planned maintenance to the OnSS would comprise 1 visit per week, which may increase to daily for a 2 week period per year during annual maintenance. In relation to the onshore cable route, planned maintenance may involve 1 visit to each cable joint pit per year. NRMM may not be utilised during the full extent of these maintenance activities.

10.11.9 As such, based on the above information, NRMM activities can be screened out from requiring further assessment with regards to human and ecological receptors and are considered to be **not significant** in terms of the EIA Regulations.

OFFSHORE ACTIVITIES ASSESSMENT

10.11.10 An assessment of emissions generated by operational offshore activities is provided in Volume 5, Annex 10.3: Offshore Activities Assessment. A summary of the assessment outcomes is provided below.

10.11.11 The spatial extent of the offshore activities assessment study area with respect to vessel emissions is illustrated in Figure 10.6.

10.11.12 In consideration of anticipated baseline conditions anticipated during the operational phase, the maximum background concentrations reported for the onshore locations likely to be affected by nearshore vessel are below the corresponding AQALs and Critical Levels.



- 10.11.13 Vessels will mainly be used for the maintenance of the offshore wind farm array – located 37 km off the coast, at its closest point. Cable maintenance vessels and auxiliary vessels (where used to support the cable maintenance vessels) have the potential to occur close to the shore. No extensive (planned) nearshore activities are expected to be required in the operational phase.
- 10.11.14 Estimated vessels movements likely to occur within 250 m and/ or 1 km of assessed onshore sensitive receptors (at locations of the offshore vs. onshore interface), are below the criteria outlined in Section 10.5 (i.e. 130 movements). The effects are considered to be insignificant, and no further assessment is required.
- 10.11.15 Whilst taking the above into account (alongside the extent of current and future regulation already discussed in Section 10.10) emissions from vessel emissions associated with the O&M phase are considered to be **not significant** in terms of the EIA regulations. Further assessment is therefore not required.
- 10.11.16 During the operational phase, helicopters will only be used for crew transfer during unplanned maintenance where crew transfer vessel (CTV) access is not possible. Up to 125 two-way movements (250 return) helicopter trips per year may be required
- 10.11.17 Helicopters will use an existing onshore base/ helipad; all movements will be compliant/ in line with the relevant helipads operational constraints and management plans. The increased number of helicopter movements at the existing helipad will still likely be under the maximum assessed capacity of the existing onshore base/ helipad.
- 10.11.18 Based on the above, the likelihood for potential effects to occur is considered unlikely given the frequency of helicopter use, and as such effects can be screened out from further consideration. Effects are concluded to be **not significant** in terms of the EIA regulations.

10.12 ENVIRONMENTAL ASSESSMENT: DECOMMISSIONING PHASE

- 10.12.1 Details surrounding the decommissioning phase are yet to be fully clarified. In addition, it is also recognised that policy, legislation and local sensitivities evolve, which will limit the relevance of undertaking an assessment at this stage.
- 10.12.2 Decommissioning activities are expected to occur for up to 3 years – however this will be driven primarily by offshore works. Decommissioning activities are not anticipated to exceed the construction phase worst case criteria assessed, given the following:
- > Landfall infrastructure is expected to be left in situ where appropriate, to abate potential future impacts and minimise the extent of decommissioning activities;
 - > Emission restrictions are expected to tighten in future years and in the interim before decommissioning activities occur (>25 years). This forecast is based on the introduction and availability of cleaner technologies and fuels, alongside legislation. Therefore, emission contributions from potential future sources (e.g., vehicles, vessels and NRMM) generated during the decommissioning phase are expected to be lower in comparison to current levels; and/ or
 - > Air quality is expected to improve in future years, and in the interim before decommissioning activities occur (>25 years). This forecast is based on the introduction of policy and legislation, and availability of cleaner technologies.



10.12.3 These elements (alone and/ or in combination) would result in a reduction in the level of significance in comparison to the assessment of construction effects. The outcomes of the construction phase assessment indicate that all impacts assessed are not significant. Further assessment in relation to the decommissioning phase is therefore not required – and effects are believed to be not significant.

10.12.4 Nonetheless, the decommissioning methodology would be finalised nearer to the end of the lifetime of VE, to be in line with current guidance, policy and legislation. Any such methodology would be agreed with the relevant authorities and statutory consultees. Furthermore, the DCO includes a requirement to submit a written scheme of decommissioning 6 months before decommissioning starts.

10.13 ENVIRONMENTAL ASSESSMENT: CUMULATIVE EFFECTS

CONSTRUCTION PHASE

CONSTRUCTION DUST ASSESSMENT

10.13.1 Cumulative dust effects arising from construction activities could be experienced where construction activities from more than one scheme overlap at an affected receptor, dependent on the impact (e.g. dust soiling, human health and ecological).

10.13.2 However, all schemes which are considered to pose a risk of cumulative effects will have had to undertake a construction dust assessment separately relating to their own site activities and associated risks, with the recommendation of best practice mitigation to remedy residual effects as not significant in terms of the EIA regulations.

10.13.3 These measures would be integrated into a Construction Environmental Management Plan or similar, to be adhered to during construction, as part of their own environmental responsibilities and commitment.

10.13.4 IAQM construction guidance states that, with the implementation of the recommended mitigation, effects will be not significant. As such, it is not anticipated that there would be significant cumulative effects associated with construction phase dust emissions.

10.13.5 Given that all other assessment considerations have been screened out in isolation as per the IAQM construction guidance, no further assessment in relation to cumulative effects is therefore required.

ROAD TRAFFIC ASSESSMENT

10.13.6 In consideration of the likely changes in road traffic flows that may occur on the local highway network as a result of VE, consideration has been given to the potential maximum traffic flows that could occur in the future assessment year (i.e. 2027), (based upon information currently available).

10.13.7 The traffic flows used for the assessment includes vehicle movements associated with:

- > Relevant committed developments in the assessment area (see Volume 3, Chapter 8: Traffic and Transport); and
- > North Falls OWF (assuming equivalent to VE flows and assuming peak construction activities overlap in the same year to facilitate a robust assessment).



- 10.13.8 This theoretically assumes that peak construction activities associated with both VE and North Falls OWF will overlap and affect the same road links simultaneously – considered highly unlikely, and does not account for any efficiencies between the two schemes.
- 10.13.9 As such, the dispersion modelling results are inherently cumulative in nature (based upon information currently available). The cumulative effect of VE is therefore considered to be **not significant** in terms of the EIA regulations.
- 10.13.10 Traffic flows associated with NGET will be considered within the ES assessment.

NRMM EMISSIONS ASSESSMENT

- 10.13.11 According to the IAQM construction guidance and LAQM.TG(22), experience of assessing the exhaust emissions from on-site plant and site traffic suggests that, with suitable controls and site management, they are unlikely to make a significant impact on local air quality.
- 10.13.12 A series of construction phase control measures to minimise potential NRMM impacts are outlined within Volume 5, Annex 10.5: Air Quality Mitigation Measures. These measures are included within the CoCP, secured as a requirement of the DCO.
- 10.13.13 Similarly, NRMM emissions at other surrounding construction sites (e.g. North Falls OWF) would be controlled and minimised to remedy residual effects as not significant in terms of the EIA regulations. These controls would be integrated into a Construction Environmental Management Plan or similar, to be adhered to during construction, as part of their own environmental responsibilities and commitment.
- 10.13.14 As such, it is not anticipated that there would be significant cumulative effects associated with construction phase NRMM emissions.
- 10.13.15 With respect to the NRMM assessment outcomes, resultant effects are considered not significant – validating Defra’s and the IAQM’s position. This was based on the extent of NRMM proposed to be used (type, quantum and emission standards), associated control measures, the transient/ phased nature of the construction works, proximity to receptors and pollutant concentrations across the construction study area. Cumulative effects are therefore not likely.
- 10.13.16 There is very low likelihood of NRMM activities from other developments to simultaneously overlap within 50 m of a sensitive receptor at any one time, given the spatial extent and temporal limitations of likely activities.
- 10.13.17 Construction activities will be temporary/ mobile, and plant will not be fixed for the full duration of works. By way of example, construction activities along the Onshore ECC construction area will spatially vary as construction progresses. Exposure to NRMM emissions (in the majority of cases) will be transient. Therefore, in the event that construction activities did overlap, exposure would be temporary and not cause a long-term persistent deterioration of conditions.
- 10.13.18 Furthermore, given that the maximum pollutant background concentrations across the Onshore ECC study area are well-below the AQALs/ Critical Levels, localised NRMM emissions are highly unlikely to contribute to a significant effect on any identified receptor, from VE alone or cumulatively with other schemes.



10.13.19 In consideration of the above, the cumulative effect of VE is therefore considered to be **not significant** in terms of the EIA regulations.

OFFSHORE ACTIVITIES ASSESSMENT

10.13.20 Potential large vessel movements that are simultaneously generated by other developments within 1 km of landfall (i.e. where VE vessels will interact with onshore receptors) during the three year construction period have the potential to cause cumulative effects.

10.13.21 From review of committed developments in the area (outlined within Volume 1, Annex 3.1: Cumulative Effects Assessment Methodology), the majority of these developments are unlikely to generate large vessel movements within 1 km of landfall during the three year construction period (i.e. where cumulative effects are likely).

10.13.22 Vessel movements generated by North Falls OWF could cause a potential cumulative effect, as could simultaneously generate vessel movements within 1 km of the same onshore sensitive receptor and during the construction period.

10.13.23 Despite not yet receiving consent, potential vessel movements associated with North Falls OWF have been considered in more detail given the potential to occur within 1 km of VE landfall.

10.13.24 Vessels within 1 km of landfall associated with the construction of NF have assumed to be equivalent to peak VE construction numbers, in lieu of further information.

10.13.25 This approach is considered conservative as these values relate to peak movements (assumed to be large ships). Furthermore, this approach theoretically assumes that peak construction activities associated with both VE and North Falls OWF will occur concurrently – considered highly unlikely, and does not account for any efficiencies between the two schemes. Actual large annual vessel numbers would likely be lower in reality.

10.13.26 Predicted cumulative vessel movements are presented in Table 10.20.

Table 10.20: Estimated maximum number of construction vessel movements that may occur within proximity of an onshore receptor (cumulative)

Vessel Type	VE Vessel Movements		Cumulative Vessel Movements	
	Small WTG	Large WTG	Small WTG	Large WTG
Export Cable Vessels	64	64	128	128
Export Cable Rock Berm Vessels	2,089	2,089	4,178	4,178
Total	2,153	2,153	4,306	4,306
LAQM.TG(22) Screening Criteria	Exposure Within 250 m		5,000	
	Exposure Within 1 km		15,000	



- 10.13.27 Cumulative vessel movements are therefore below the LAQM.TG(22) screening criteria despite the overly conservative assessment methodology applied.
- 10.13.28 The maximum background concentrations across the onshore areas likely to be affected by nearshore vessel emissions are below the corresponding AQALs and Critical Levels.
- 10.13.29 Vessel emissions within the North Sea are regulated by legislation. Vessel emission restrictions are expected to tighten in future years, following the availability and introduction of cleaner technologies and fuels, alongside policy. Therefore, emission contributions from vessel emissions are expected to reduce even further.
- 10.13.30 In consideration of the above (and overly conservative assessment methodology applied), cumulative effects associated with offshore activities on onshore receptors during construction are considered **not significant** in terms of the EIA regulations.

OPERATIONAL PHASE

ROAD TRAFFIC ASSESSMENT

- 10.13.31 Consistent with PINS (PINS, 2021) recommendation, road traffic flows generated by operational activities have been compared against criteria outlined within the EPUK & IAQM guidance document (Section 10.5). Operational road traffic flows screen below the EPUK & IAQM criteria and effects are considered to be **not significant** in terms of the EIA Regulations and no further assessment is required.
- 10.13.32 Consistent with applied guidance prescribed by the EPUK & IAQM, screening of projected road traffic vehicle movements has been undertaken in isolation and are considered insignificant. No further assessment in relation to cumulative effects is therefore required.
- 10.13.33 Notwithstanding, operational phase impacts are not likely to exceed the construction phase for which a full cumulative assessment was undertaken and concluded that there are no significant effects.
- 10.13.34 Cumulative effects associated with operational road traffic flows are considered **not significant** in terms of the EIA regulations.

NRMM EMISSIONS ASSESSMENT

- 10.13.35 The extent of NRMM proposed to be used during the operational phase will not be greater in comparison to the construction phase; for which a full cumulative assessment was undertaken and concluded that there are no significant effects.
- 10.13.36 Cumulative impacts are likely to be lesser in comparison and resultant cumulative effects can be concluded as being **not significant** in terms of the EIA regulations.

OFFSHORE ACTIVITIES ASSESSMENT

- 10.13.37 Potential large vessel movements that are simultaneously generated by other developments within 1 km of landfall (i.e. where VE vessels will interact with onshore receptors) during the operational period have the potential to cause cumulative effects.



- 10.13.38 From review of committed developments in the area (outlined within Volume 1, Annex 3.1: Cumulative Effects Assessment Methodology), the majority of these developments are unlikely to generate large vessel movements within 1 km of landfall during the operational period.
- 10.13.39 Vessel movements generated by North Falls OWF could cause a potential cumulative effect, as could simultaneously generate vessel movements within 1 km of the same onshore sensitive receptor and during the operational period.
- 10.13.40 Despite not yet receiving consent, potential vessel movements associated with NF have been considered in more detail given the potential to occur within 1 km of VE landfall.
- 10.13.41 Vessels within 1 km of landfall associated with the operation of North Falls OWF have assumed to be equivalent to peak VE operation numbers, in lieu of further information.
- 10.13.42 This approach is considered conservative as these values relate to peak movements (assumed to be large ships). Furthermore, this approach theoretically assumes that peak operational activities associated with both VE and North Falls OWF will occur concurrently – considered highly unlikely, and does not account for any possible efficiencies between the two schemes. Actual large annual vessel numbers would likely be lower in reality.

Table 10.21: Estimated maximum number of operational vessel movements that may to occur within proximity of an onshore receptor (cumulative)

Vessel Type	VE Vessel Movements		Cumulative Vessel Movements	
	Small WTG	Large WTG	Small WTG	Large WTG
Export Cable Vessels	2	2	4	4
Auxiliary Vessel	128	128	256	256
Total	130	130	260	260
LAQM.TG(22) Screening Criteria	Exposure Within 250 m		5,000	
	Exposure Within 1 km		15,000	

- 10.13.43 Cumulative vessel movements are therefore below the LAQM.TG(22) screening criteria despite the overly conservative assessment methodology applied.
- 10.13.44 The maximum background concentrations across the onshore areas likely to be affected by nearshore vessel emissions are below the corresponding AQALs and Critical Levels.
- 10.13.45 Vessel emissions within the North Sea are regulated by legislation. Vessel emission restrictions are expected to tighten in future years, following the availability and introduction of cleaner technologies and fuels, alongside policy. Therefore, emission contributions from vessel emissions are expected to reduce even further.



10.13.46 In consideration of the above (and overly conservative assessment methodology applied), cumulative effects associated with operational vessel movements on onshore receptors are considered **not significant** in terms of the EIA regulations.

10.13.47 Helicopters will use an existing onshore base/ helipad; all movements will be compliant/ in line with the relevant helipads operational constraints and management plans. The increased number of helicopter movements at the existing helipad will still likely be under the maximum assessed capacity of the existing onshore base/ helipad.

10.13.48 Cumulative effects associated with offshore activities are considered **not significant** in terms of the EIA regulations.

10.14 INTER-RELATIONSHIPS

10.14.1 The inter-related effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and decommissioning of VE on the same receptor, or group of receptors. Such inter-related effects include both:

- > project lifetime effects: i.e. those arising throughout more than one phase of the project (construction, operation, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation; and
- > receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

10.14.2 A description of the likely inter-related effects arising from VE on air quality is provided in Volume 2, Chapter 14: Interrelationships-Related Effects. In summary, effects on air quality are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual project phase.

10.14.3 The operational phase dispersion modelling assessment is based on traffic flows presented in Volume 3, Chapter 8: Traffic and Transport.

10.14.4 It is acknowledged that noise, visual effects and air quality effects could overlap at a sensitive human receptor location. Furthermore, ecological designations could experience noise and air quality effects, in-combination.

10.14.5 However, given that all air quality effects established as part of this assessment are considered to be not significant in terms of the EIA regulations, the likelihood of a cumulative intra-project effect occurring as a result of air quality is low. No further assessment is therefore required.

10.14.6 It is generally anticipated that climate change will lead to more frequent and extreme localised weather events including within Essex. There is an increased potential for some events to create a worsening of air pollution. However, these events would be considered at the regional scale and as such they are not currently modelled as a standard industry approach within air quality. It is also considered that local air quality would also improve irrespective of potential localised meteorological events. Potential interactions of climate change with air quality effects are therefore considered to be negligible.



10.14.7 Air quality effects on climate change associated with VE itself are considered to be negligible. The main effects are associated with the construction phase and are not significant in terms of the EIA regulations, short term and temporary.

10.15 TRANSBOUNDARY EFFECTS

10.15.1 Further assessment has been scoped out consistent with PINS recommendation (PINS, 2021) as outlined in Table 10.4.

10.16 SUMMARY OF EFFECTS

10.16.1 This assessment has considered the potential air quality effects on onshore receptors arising from activities associated with VE. Consideration has been given to potential worst-case effects arising from construction, operational and decommissioning activities based upon available information. Worst-case parameters have been adopted to provide a robust assessment.

10.16.2 The approach undertaken was based upon:

- > PINS Scoping Opinion (PINS, 2021); and
- > VE Evidence Plan (Air Quality ETG) process, comprising Natural England, Essex County Council and TDC.

10.16.3 A Technical Note was issued to relevant Air Quality ETG members detailing the extent of the methodology proposed for the PEIR. Natural England and TDC (on behalf of Essex County Council) both agreed to the proposed approach via email. The air quality assessment has been prepared on the basis of these agreed principles.

10.16.4 A summary of the above assessment outcomes is provided in Table 10.21.

CONSTRUCTION PHASE

CONSTRUCTION DUST ASSESSMENT

10.16.5 A qualitative assessment of the potential dust effects associated with worst-case construction activities has been undertaken following IAQM construction guidance.

10.16.6 Following the construction dust assessment, the onshore construction activities are found to be at worst high risk in relation to dust soiling impacts on people and property, medium risk in relation to ecological designations, and low risk in relation to human health impacts.

10.16.7 Effects will be temporary and are only likely to materialise if certain activities and/ or meteorological conditions coincide.

10.16.8 Providing effective mitigation measures are implemented, as outlined in Volume 5, Annex 10.5: Air Quality Mitigation Measures, residual effects are considered to be **not significant** in terms of the EIA regulations. These measures are included within the CoCP, secured as a requirement of the DCO.

ROAD TRAFFIC ASSESSMENT

10.16.9 Impacts associated with temporary increases in road traffic flows on the local road network, generated by construction activities on sensitive human and ecological receptors have been assessed.



- 10.16.10 For the assessment of construction phase road traffic emissions on ecological and human receptors, an initial screening exercise has been conducted to determine whether detailed modelling is required.
- 10.16.11 With respect to human receptors, road traffic flows were initially compared against screening thresholds prescribed within the EPUK & IAQM guidance document (EPUK & IAQM, 2017).
- 10.16.12 The assessment procedure outlined within the IAQM ecological guidance document (IAQM, 2020) has been used in relation to the assessment of sensitive ecological receptors and road traffic. An in-combination screening assessment was conducted for international and national ecological designations. This assessment considered relevant projects/ plans (committed developments and NF).
- 10.16.13 No international ecological designations are found within 200 m of road links expected to witness a change in vehicular flows as a result of construction activities. Two sensitive (non-geological) SSSIs are found within 200 m of road links expected to witness a change in vehicular flows as a result of construction activities. However, road traffic volumes generated by VE (in-combination with other relevant plans/projects) within proximity to SSSIs are below the IAQM prescribed screening criteria. Impacts on national and international sites can therefore be considered insignificant.
- 10.16.14 Where road traffic movements cannot be screened, road traffic impacts generated by VE on human and ecological receptors have been quantified and assessed with use of the CERC ADMS-Roads v5 dispersion model.
- 10.16.15 Predicted pollutant concentration changes at existing human receptor locations as a result of the peak construction activities were assessed using the EPUK & IAQM significance criteria. Impacts at all assessed existing receptor locations are considered to be 'negligible'. Effects on sensitive human receptors are therefore considered not significant in terms of the EIA regulations.
- 10.16.16 Two ASNWs and two LoWSs are located within 200 m of road links expected to witness a change in vehicular flows above the IAQM prescribed screening criteria. Despite this, maximum (VE alone) predicted pollutant impacts on Critical Loads/ Levels at these locations can be considered insignificant. Effects are concluded to be not significant in terms of the EIA Regulations. No further assessment is therefore required.
- 10.16.17 In consideration of the above outcomes, road traffic impacts associated with construction activities on human and ecological receptors are concluded to be **not significant** in terms of the EIA Regulations. Furthermore, onshore construction works are expected to last approximately 24 months in one location and as such, any consequential impacts onto local road traffic flows are believed to be temporary, with no long-term deterioration of conditions.

NRMM EMISSIONS ASSESSMENT

- 10.16.18 Following qualitative assessment, it is considered unlikely that significant effects on onshore sensitive human and ecological receptors will arise due to NRMM emissions generated during the construction phase of VE.



10.16.19 A series of construction phase control measures are outlined within Volume 5, Annex 10.5: Air Quality Mitigation Measures. These will help control any potential NRMM emissions and minimise potential impacts. These measures are included within the CoCP, secured as a requirement of the DCO.

10.16.20 Potential impacts from NRMM emissions would therefore be considered negligible, direct and short-term/ temporary, with the resultant effects being **not significant** in terms of the EIA regulations.

OFFSHORE ACTIVITIES ASSESSMENT

10.16.21 Estimated vessels movements likely to occur within 250 m and/ or 1 km of onshore works, are below the LAQM.TG(22) screening thresholds, despite the overly conservative assessment methodology applied. In conjunction with baseline conditions, emissions from vessel emissions associated with the construction phase is considered to be **not significant** in terms of the EIA regulations. No further assessment is required.

OPERATIONAL PHASE

ROAD TRAFFIC ASSESSMENT

10.16.22 Operational road traffic impacts screen below the EPUK & IAQM criteria outlined in Section 10.5 as requested by PINS explicit request (PINS, 2021). The effects are considered to be **not significant** in terms of the EIA regulations, and no further assessment is required.

NRMM EMISSIONS ASSESSMENT

10.16.23 Onshore operational activities limited to maintenance are expected to be intermittent/ infrequent in comparison to the assessed construction activities.

10.16.24 Based upon the extent of operational activities discussed, NRMM activities can be screened out from requiring further assessment with regards to human and ecological receptors and are considered to be **not significant** in terms of the EIA Regulations.

OFFSHORE ACTIVITIES ASSESSMENT

10.16.25 Operational vessel movements likely to occur within 250 m and/ or 1 km of assessed onshore sensitive receptors are below the LAQM.TG(22) screening criteria. The effects are considered to be insignificant, and no further assessment is required. No mitigation is required, and resultant effects can be concluded as **not significant** in terms of the EIA regulations.

10.16.26 Helicopters may be used as part of the O&M phase. Helicopters will use an existing onshore base/ helipad; all movements will be compliant/ in line with the relevant helipads operational constraints and management plans. The increased number of helicopter movements at the existing helipad will still likely be under the maximum assessed capacity of the existing onshore base/ helipad.

10.16.27 Based on the above, effects can be screened out from further consideration. Effects are concluded to be **not significant** in terms of the EIA regulations.



DECOMMISSIONING PHASE

- 10.16.28 Decommissioning activities are not anticipated to exceed the construction phase worst case criteria assessed, considering the given forecast improvements to air quality, and the potential for onshore cables and/ or ducts to remain in situ.
- 10.16.29 The outcomes of the construction phase assessment indicate that all impacts assessed are not significant. Further assessment in relation to the decommissioning phase is therefore not required – and effects are believed to be not significant.
- 10.16.30 Nonetheless, the decommissioning methodology would be finalised nearer to the end of the lifetime of VE, to be in line with current guidance, policy and legislation. Any such methodology would be agreed with the relevant authorities and statutory consultees.



Table 10.22: Summary of effects

Description of Impact	Magnitude	Sensitivity of Receptor	Additional Mitigation Measures	Residual Effect
Construction				
Dust/ PM ₁₀ generated from temporary construction activities.	High - Low	High - Low	Not required.	Not Significant
Temporary construction-generated road traffic volumes on human receptors.	Negligible	High	Not required.	Not Significant
Temporary construction-generated road traffic volumes on ecological receptors.	Negligible (below screening criteria)	Medium - Low	Not required.	Not Significant
Temporary construction plant (NRMM) emissions on human receptors.	Negligible	High	Not required.	Not Significant
Temporary construction plant (NRMM) emissions on ecological receptors.	Negligible	Medium - Low	Not required.	Not Significant
Temporary construction offshore activity emissions on human receptors.	Negligible (below screening criteria)	High	Not required.	Not Significant
Temporary construction offshore activity emissions on ecological receptors.	Negligible (below screening criteria)	Medium	Not required	Not Significant



Description of Impact	Magnitude	Sensitivity of Receptor	Additional Mitigation Measures	Residual Effect
Operation				
Operational-generated road traffic volumes on human receptors.	Negligible (below screening criteria)	High	Not required	Not Significant
Operational-generated road traffic volumes on ecological receptors.	Negligible (below screening criteria)	Medium - Low	Not required	Not Significant
Operational NRMM emissions on human receptors.	Negligible	High	Not required	Not Significant
Operational NRMM emissions on ecological receptors.	Negligible	Medium - Low	Not required	Not Significant
Operational offshore activity emissions on human receptors.	Negligible (below screening criteria)	High	Not required	Not Significant
Operational construction offshore activity emissions on ecological receptors.	Negligible (below screening criteria)	Medium	Not required	Not Significant
Decommissioning				
Likely air quality impacts associated with decommissioning activities.	Comparable to construction, perhaps lesser given the forecast improvements to air quality given forecast improvements to air quality and the potential for the cables to remain in situ.			



Description of Impact	Magnitude	Sensitivity of Receptor	Additional Mitigation Measures	Residual Effect
Cumulative Effects				
Cumulative dust/ PM ₁₀ generated from temporary concurrent construction activities.	High - Low	High - Low	Not required.	Not Significant
Cumulative road traffic volumes associated with committed developments on human receptors.	Negligible	High	Not required	Not Significant
Cumulative road traffic volumes associated with committed developments on ecological receptors (in-combination screening for national and international ecological designations) .	Negligible (below screening criteria)	Medium	Not required	Not Significant

10.17 NEXT STEPS

10.17.1 The following steps will be undertaken in order to progress the Air Quality Assessment from PEIR stage to DCO Application stage:

- > Once more detailed project design information is available, the assessment presented in this chapter along with the proposed mitigation will be reviewed, updated if necessary, and presented in the DCO application; and
- > Any feedback received from consultees in relation to the PEIR will be reviewed, a response provided, and if any updates to the assessment and/ or the proposed mitigation are required this will be done as part of the DCO application.



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