Habitats Regulations Assessment of the Medway Local Plan 2041

Interpretation of Air Quality Modelling Data

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LEPUS CONSULTING
LANDSCAPE, ECOLOGY, PLANNING & URBAN SUSTAINABILITY

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Acronyms & abbreviations

A-dep	Acid Deposition
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
AIOSI	Adverse Impact on Site Integrity
AODM	Area of Detailed Modelling Boundary
APIS	Air Pollution Information System
AQ	Air Quality
CLe	Critical Levels
CLo	Critical Loads
DMRB	Design Manual for Roads and Bridges
FCS	Favourable Condition Status
FCS	Favourable Conservation Status
HDV	Heavy Duty Vehicle
HRA	Habitats Regulations Assessment
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MLP	Medway Local Plan
MLPR	Maidstone Local Plan Review
MTM	Medway Transport Model
N-dep	Nitrogen Deposition
NH_3	Ammonia
NO_x	Nitrogen Oxides
NPPF	National Planning Policy Framework
PC	Process Contribution
SAC	Special Area of Conservation
SO_2	Sulphur Dioxide
SSSI	Sites of Special Scientific Interest
TAG	Transport Analysis Guidance
TEMPro	Trip End Model Presentation Program
UK	United Kingdom
WFA	Whole Feature Assessments

Executive Summary

E1. Medway Council is preparing a new local plan, known as the Medway Local Plan (MLP), to guide development across the area up to 2041, replacing the currently adopted Medway Plan (2003). An Interim Habitats Regulations Assessment (HRA) was prepared to support the Regulation 19 MLP consultation (June 2025)[1]. Air quality modelling required to assess potential effects on the North Kent Marshes European sites and the North Downs Woodlands Special Area of Conservation (SAC) was however not available at that time.

E2. Further work in the form of air quality modelling has therefore since been undertaken in consultation with Natural England, to inform a comprehensive Appropriate Assessment (AA) of air quality impacts. The findings of this modelling work are presented in the Air Quality Modelling for Ecology Assessment report, referred to hereafter as the Air Quality Report[2].

E3. Natural England has developed a standard methodology for the assessment of traffic-related air quality impacts under the Habitats Regulations, which is relevant to the HRA of land use plans which may result in a change in traffic flows[3]. This guidance has been applied to both screen and inform the AA of air quality impact pathways to European sites in this report.

E4. Screening against Natural England's 1% threshold identified five European sites requiring further assessment for nitrogen oxides (NO_x), ammonia (NH_3) and nitrogen deposition (N-dep). Acid deposition (A-dep) was screened in for the North Downs Woodlands SAC only. The five European sites include:

- Thames Estuary and Marshes Special Protection Area (SPA);
- Thames Estuary and Marshes Ramsar;
- Medway Estuary and Marshes SPA;
- Medway Estuary and Marshes Ramsar; and
- North Downs Woodlands SAC.

E5. For the Medway Estuary and Marshes SPA and Ramsar and the Thames Estuary and Marshes SPA and Ramsar, air quality modelling shows that the MLP will not result in exceedances of critical levels (CLe) for NO_x or NH_3. While N-dep exceeds lower critical loads (CLo) within 200m of a number of road links, this exceedance is largely attributable

[1] Lepus Consulting (2025) Habitats Regulations Assessment of the Medway Local Plan: Interim HRA Report, June 2025. Available at: https://medway.oc2.uk/docfiles/30/Interim%20Habitats%20Regulations%20Assessment.pdf [Date accessed: 04/12/25]

[2] Air Quality Consultants part of Logika Group (2025) Report Medway Local Plan HRA Air Quality Modelling for Ecology Assessment.

[3] Natural England (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001).

to existing background concentrations and contributions from other plans and projects, with the MLP making a limited additional contribution. Estuarine habitats are characterised by strong hydrological nutrient cycling and are therefore relatively resilient to changes in atmospheric nitrogen inputs. In addition, a review of Ramsar non-halophyte plant species, including their ecological characteristics, nitrogen sensitivity and distribution nationally and within Kent, indicates that elevated N-dep will not affect plant species in areas where estuarine processes play a less significant buffering role. Long-term trend data further demonstrates that N-dep levels within 200m of affected road links have declined since 2003. Taking these factors together, it can be concluded that there will be no adverse effect on site integrity (AIOSI) at the Thames Estuary and Marshes SPA and Ramsar, or the Medway Estuary and Marshes SPA and Ramsar, as a result of the MLP, either alone or in combination.

E6. At the North Downs Woodlands SAC, NO_x levels remain below CLe. Exceedances of NH_3, N-dep and A-dep occur within 200m of Lidsing Road. Given these exceedances, mitigation is required to ensure the MLP does not undermine conservation objectives of the SAC. The MLP does not add any contributions from the A229 and adverse air quality impacts from the MLP within 200m of this road link are not considered further.

E7. Modelling undertaken for the Maidstone Local Plan Review (MLPR) demonstrates that a package of transport related mitigation, which includes traffic calming on Boxley Road/Lidsing Road and a new link road for the Lidsing Garden Settlement, can prevent adverse air quality effects. A strategic approach delivered by both Medway Council and Maidstone Borough Council is recommended to secure effective air quality mitigation for the SAC. Findings from this initiative will be necessary to inform the HRA and will be secured in the MLP through policy requirements. In addition, further evidence is required to demonstrate that the proposed mitigation will be effective before a conclusion of no AIOSI at the North Downs Woodlands SAC can be reached.

1 Introduction

1.1 Background

1.1.1 Medway Council (the Council) is preparing a new local plan to set the framework for the area's growth up to 2041. This is known as the Medway Local Plan (MLP) and will provide a framework for where and how new development can take place during the period from 2025/27–2040/41. Once adopted, the MLP will replace the existing 2003 Medway Plan[4].

1.1.2 An Interim Habitats Regulation Assessment (HRA)[5] was prepared to support the 'Proposed Submission Draft' version of the MLP at Regulation 19[6] (referred to hereafter as the Interim HRA). At the time of preparing the Interim HRA, air quality modelling data remained outstanding. This data is required to assess the potential impacts caused by a change in air quality associated with the MLP at the North Kent Marshes European sites[7] and the North Downs Woodlands Special Area of Conservation (SAC). It was therefore not possible to conclude whether the MLP would have an adverse impact upon the integrity of these European sites in relation to air quality impacts at the Regulation 19 stage.

1.1.3 Further work in the form of air quality modelling has since been undertaken in consultation with Natural England, to inform a comprehensive Appropriate Assessment (AA) of air quality impacts. The findings of this modelling work are presented in the Air Quality Modelling for Ecology Assessment report, referred to hereafter as the Air Quality Report[8].

1.2 About this report

1.2.1 Lepus Consulting has prepared this report to provide an ecological interpretation of the air quality dispersion modelling data undertaken to inform an AA of air quality impacts at the North Kent Marshes European sites and the North Downs Woodlands SAC. This report should be read alongside the Air Quality Report.

[4] Medway Council (2003) Medway Local Plan. Available at: https://www.medway.gov.uk/downloads/file/2400/medway_local_plan_2003 [Date accessed:14/05/25].

[5] Lepus Consulting (June 2025) Habitats Regulations Assessment of the Medway Local Plan - Interim Habitats Regulations Assessment Report. Available at: https://medway.oc2.uk/docfiles/30/Interim%20Habitats%20Regulations%20Assessment.pdf [Date accessed: 04/12/25]

[6] Medway Council (June 2025) Medway Local Plan Proposed Submission Draft, Regulation 19. Available at: https://medway.oc2.uk/docfiles/30/Medway%20Local%20Plan%20(Regulation%2019,%202025).pdf [Date accessed: 04/12/25]

[7] These sites comprise the Medway Estuary and Marshes SPA, the Medway Estuary and Marshes Ramsar, the Thames Estuary and Marshes SPA, the Thames Estuary and Marshes Ramsar, the Swale SPA and the Swale Ramsar.

[8] Air Quality Consultants part of Logika Group (2025) Report Medway Local Plan HRA Air Quality Modelling for Ecology Assessment.

2 Screening

2.1 Natural England guidance

2.1.1 Natural England has developed a standard methodology for the assessment of traffic related air quality impacts under the Habitats Regulations which is relevant to the HRA of land use plans[9]. This guidance establishes thresholds for the screening of Likely Significant (air quality) Effects (LSEs) at the HRA screening stage (Stage 1 of the HRA process).

2.1.2 Natural England's guidance (in the form of a series of questions set out below) has been applied to the screening of air quality impacts:

1) Does the Local Plan give rise to emissions which are likely to reach a European site?
2) Are the qualifying features of a European site within 200m of a road sensitive to air pollution?
3) Could the sensitive qualifying features of the European site be exposed to emissions?
4) Application of screening thresholds (alone and then, if necessary, in-combination).

2.1.3 The Interim HRA[10] provides a detailed response to each of the above questions which are not repeated in this report. The Interim HRA included the application of screening thresholds using average annual daily traffic flow (AADT) as a proxy for emissions (under item 4). Widely accepted environmental benchmarks for imperceptible impacts are set at 1% of the critical load or level of each air pollutant, which is considered to be roughly equivalent to Design Manual for Roads and Bridges (DMRB) thresholds for changes in traffic flow of 1,000 AADT and for heavy duty vehicles (HDV) of 200 AADT. The use of the AADT screening threshold is advocated by Highways England in their DMRB. This screening threshold is intended to be used as a guide to determine whether a more detailed assessment of the impact of emissions from road traffic is required.

2.2 European sites

2.2.1 Based on an analysis of the total change in AADT flows against Natural England's 1,000 AADT threshold (both alone and where applicable in-combination), the Interim HRA screened in the following European sites. This indicated that emissions from traffic sources have the potential to result in possible air quality LSEs at sensitive habitats within 200m of a European site:

- Medway Estuary and Marshes Ramsar[11]
- Medway Estuary and Marshes Special Protection Areas (SPA)[12]
- North Downs Woodlands Special Area of Conservation (SAC)

[9] Natural England (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001). Available at: http://publications.naturalengland.org.uk/publication/4720542048845824 [Date accessed: 04/12/25].

[10] Lepus Consulting (June 2025) Habitats Regulations Assessment of the Medway Local Plan - Interim Habitats Regulations Assessment Report. Available at: https://medway.oc2.uk/docfiles/30/Interim%20Habitats%20Regulations%20Assessment.pdf [Date accessed: 04/12/25]

[11] Referred to collectively in this report as the North Kent Marshes European sites.

- Thames Estuary and Marshes Ramsar[12]
- Thames Estuary and Marshes SPA[12]
- The Swale Ramsar[12]
- The Swale SPA[12]

2.2.2 Given the identified exceedances of the 1,000 AADT threshold along road links within 200m of those European sites listed above, air quality dispersion modelling was commissioned to better define air quality impacts associated with an increase in traffic due to the MLP, both alone and in-combination.

2.3 Critical level and critical load thresholds

2.3.1 In an attempt to manage the negative consequences of atmospheric pollution at designated sites, Critical Loads (CLo) and Critical Levels (CLe) have been established for ecosystems across Europe. Each European site is host to a variety of habitats and species with different sensitivities to different levels of air pollution. The CLo of pollutants are defined as a "*…quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge*"[12]. The CLe of pollutants are defined as "*concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge*"[13].

2.3.2 Natural England's advice on the assessment of air quality impacts under the Habitats Regulations states that consideration should be given to the risk of road traffic emissions associated with a local plan[14]. Natural England's guidance provides a screening threshold of 1% of the CLo or CLe for each pollutant where adverse air quality effects are considered likely and further consideration is required through an AA. Natural England advise that this 1% screening threshold firstly be applied for a local plan alone, and then, if there are no exceedances alone, next in-combination. The air quality modelling data presented in the Air Quality Report provides data to both screen air quality effects, applying the 1% CLo and CLe screening threshold, and also inform an AA.

2.3.3 The air quality modelling focused on the following pollutants which are associated with traffic related emission sources:

- Nitrogen oxides (NO_x)
- Ammonia (NH_3)
- Nutrient nitrogen deposition (N-dep)
- Acid deposition (A-dep)[15]

[12] Coordination Centre for Effects (CCE). Critical load and level definitions. Available at: https://www.umweltbundesamt.de/en/Coordination_Centre_for_Effects [Date accessed: 05/11/25].

[13] Ibid

[14] Natural England (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001). Available at: http://publications.naturalengland.org.uk/publication/4720542048845824 [Date accessed: 05/11/25].

[15] At the North Downs Woodlands SAC only.

Nitrogen oxides

2.3.4 Nitrogen oxides (NO_x) are produced during combustion processes, partly from nitrogen compounds in the fuel, but mostly by direct combination of atmospheric oxygen and nitrogen in flames[16]. Road transport emissions of NO_x in 2018 were the largest contributor to United Kingdom's (UK's) total NO_x emissions, most of which related to diesel vehicles[17]. The introduction of catalytic converters has seen an overall reduction in emissions since 1990. NO_x has the potential to impact habitats through direct toxicity and through their contribution to nitrogen deposition. The CLe for all vegetation types from the direct toxic effects of **NO_x has been set at 30µg/m^3**.

Ammonia

2.3.5 Ammonia (NH_3) originates from both natural and anthropogenic sources, with the main man-made source being agriculture. Other man-made sources of NH_3 include industrial processes and vehicular emissions (from catalyst-equipped petrol vehicles and selective catalytic reduction on light and heavy goods diesel-fueled vehicles). As with NO_x, elevated levels of NH_3 can be directly toxic to plants and can also enrich a system with nitrogen causing eutrophication and acidification effects on habitats.

2.3.6 Lichen species can be sensitive to even small increases in NH_3 (1µg/m^3)[18]. As such, there are two CLe for NH_3: 1µg/m^3 for lower-level plants (lichens and bryophytes[19]) and 3µg/m^3 for higher-level plants (all other vegetation). The sensitivity of each European site feature to NH_3 varies depending on the presence and abundance of lichen and bryophyte communities. The CLo and CLe for the qualifying features of the North Kent Marshes SPA designations identified in **paragraph 2.2.1** are presented in **Appendix A**, as derived from the Air Pollution Information System (APIS)[20].

2.3.7 APIS does not provide CLo or CLe data for Ramsar site qualifying features. Therefore, where relevant, the CLo and CLe values for the corresponding qualifying bird species listed under the related SPA have been used.

2.3.8 For other Ramsar site qualifying features (**Appendix B**), including invertebrates and plants, the relevant air quality CLo and CLe data have been extracted from APIS using data for the relevant underpinning Site of Special Scientific Interest (SSSI). It should be noted that the underpinning SSSI may be notified for a broader or different range of features than the overlying Ramsar designation. SSSI features which do not correspond with the Ramsar qualifying features are not relevant to this assessment under the Habitats Regulations.

[16] Air Pollution Information Systems (2017) Pollutants, available at: https://www.apis.ac.uk/ [Date accessed: 04/12/25].

[17] National Atmospheric Emissions Inventory. Available at: https://naei.beis.gov.uk/overview/pollutants?pollutant_id=6 [Date accessed: 04/12/25].

[18] Air Pollution Information Systems. Pollutants. Available at: https://www.apis.ac.uk/ [Date accessed: 05/11/25].

[19] Lichens and mosses are at most risk as they have limited detoxification capacity relative to their uptake potential and a large surface area relative to mass. Source: Air Pollution Information Systems. Pollutants. Available at: http://www.apis.ac.uk/overview/pollutants/overview_NH3.htm [Date accessed: 10/01/25].

[20] Air Pollution Information System. Pollutants. Available at: https://www.apis.ac.uk/ [Date accessed: 05/11/25].

2.3.9 **Appendix A** indicates that avian qualifying features associated with the North Kent Marshes designations are not sensitive to a change in NH_3. However, the Ramsar sites are also designated for nationally scarce plants and invertebrates associated with wetland habitats which are sensitive to NH_3. No CLe has been assigned to the invertebrate assemblage feature on APIS for NH_3. The CLe for vascular plants is set at 3µg/m^3. The CLe for other species is to be determined on a site-specific basis depending on the presence of lichen and bryophytes. APIS indicates that lichen and bryophytes do not form an integral component of each habitat type associated with the plant / habitat features associated with the underpinning SSSIs. Whilst saltmarsh is dominated by higher plants, lichen and bryophytes can occur in these habitats. However, their presence is restricted to upper saltmarsh and transitional zones which are located above the frequent tidal inundation zone and in areas often dominated by *Puccinellia* (salt grass) or *Atriplex* (saltbush) species. These areas are often characterised by bare soil, slightly elevated hummocks, or creek edges. Lichen and bryophytes are not part of the dominant saltmarsh vegetation. However, taking a precautionary approach, the lower CLe **for NH_3 of 1µg/m^3** was applied to the screening of air quality outputs in the Air Quality Report.

2.3.10 The NH_3 CLe for the North Downs Woodlands SAC is 1µg/m^3 for the Beech forests and semi-natural dry grasslands and 3µg/m^3 for the Yew woods. Taking a precautionary approach, the lower CLe **for NH_3 of 1µg/m^3** was applied in the Air Quality Report for the North Downs Woodlands SAC.

2.3.11 In summary to take a precautionary and worst case approach the **lower threshold of 1µg/m^3 for NH_3** was applied in the Air Quality Report for all European sites listed in **paragraph 2.2.1**.

Nitrogen deposition

2.3.12 APIS describes nitrogen deposition as "*the input of reactive nitrogen from the atmosphere to the biosphere both as gases, dry deposition and in precipitation as wet deposition*"[21]. Anthropogenic sources of enhanced reactive nitrogen deposition come from emissions of NO_x, fossil fuel combustion and reduced nitrogen from agricultural sources.

2.3.13 Nitrogen is a major growth nutrient for plants. An increase in nitrogen can be toxic to plants and can lead to eutrophication which can cause species loss and changes in the structure and function of ecosystems. Nitrogen can also cause acidification of soils. Traffic-related inputs of NO_x and NH_3 have an impact on the rates of nitrogen deposition (N-dep). N-dep rates are habitat-specific as different habitats have different tolerances to different levels.

[21] APIS. Nitrogen Deposition. Available at: https://www.apis.ac.uk/ [Date accessed: 04/12/25].

2.3.14 APIS indicates that not all avian qualifying features of the North Kent Marshes designations are sensitive to a change in nitrogen deposition. Those that are sensitive are likely to experience negative impacts due to impacts on bird broad habitat types. The North Kent Marshes designations are dominated by mudflat, saltmarsh and grazing marsh habitats. The CLo range for these habitats provided on APIS is 10–20kg N/ha/yr. The Ramsar sites are also designated for a number of nationally scarce plants and invertebrates associated with wetland habitats which are sensitive to nitrogen deposition. No CLo for N-dep has been assigned to the invertebrate assemblage or vascular plant features on APIS. The CLo range for other habitats and plants provided on APIS is 10–20kg N/ha/yr. Taking a precautionary approach to screening of LSEs, **the lower range of 10kg N/ha/yr for N-dep** was applied in the Air Quality Report for the North Kent Marshes designations.

2.3.15 The nitrogen deposition CLe for Beech forest and Yew woods at the North Downs Woodlands SAC is 10–15kg N/ha/yr. The CLe range for the semi-natural dry grassland feature is 10–20kg N/ha/yr (see **Appendix A**). Taking a precautionary approach to screening of LSEs, the lower range of **10kg N/ha/yr for N-dep** was applied in the Air Quality Report for the North Downs Woodlands SAC.

Acidification

2.3.16 Acidification comprises the deposition of pollutants to soils which changes the pH level causing acidification. The contribution of sulphur dioxide (SO_2) to acid deposition has reduced since the 1980s, with controls on transboundary emissions, so that the main contribution to acidification is from sources of oxidised and reduced nitrogen. The effect of acid deposition (A-dep) is indirect and related to the lowering of soil pH leading to reduced fertility and nutrient deficiencies, the release of toxic metals and changes in microbial transformations[22]. As with N-dep, A-dep rates are habitat-specific.

2.3.17 The North Kent Marshes designations are not sensitive to acid deposition. The acid deposition CLe for Beech forest and Yew woods at the North Downs Woodlands SAC is 1.983 keq/ha/yr. The CLe range for the semi-natural dry grassland feature is 4.856 keq/ha/yr (**Appendix A**). Taking a precautionary approach to screening of LSEs, the **A-dep lower level of 1.983 keq/ha/yr** was applied in the Air Quality Report for the North Downs Woodlands SAC.

Summary

2.3.18 **Table 2.1** provides a summary of CLe and CLo applied in the Air Quality Report in terms of screening likely significant air quality effects at European designated sites. It should be noted that these levels represent a precautionary approach to screening as detailed above.

Table 2.1: *Critical Loads (CLo) and Critical Levels (CLe) applied in the Air Quality Report screening assessment.*

European designation	NOx (µg/m3) CLe	Ammonia (µg/m3) CLe	N-Dep (kgN/ha/yr) CLo	A-dep (keq/ha/yr) CLo
North Kent Marshes European sites	30	1	10	n/a
North Downs Woodlands SAC	30	1	10	1.983

[22] The APIS. Acid Deposition. Available at: http://www.apis.ac.uk/overview/pollutants/acid-deposition [Date accessed: 06/11/25].

2.4 Traffic data and presentation of results

2.4.1 Traffic data used to inform the Air Quality Report was derived from the Medway Transport Model (MTM), built using 'PTV VISUM' software (2022) and modelled within the Medway Area of Detailed Modelling Boundary (AODM). Traffic flows outside the AODM have not necessarily met Transport Analysis Guidance (TAG) base year development criteria. The MTM has been developed using a cordon of the existing Kent Transport Model and therefore has a consistent base year of 2019. Traffic data was provided as AADT movement for the following three scenarios, which allowed consideration of both alone and in-combination effects:

- **2019 Base year**.
- **2041 Reference Case:** This includes the committed schemes within Medway (not constrained to Trip End Model Presentation Program (TEMPro) alongside those within neighbouring authorities (constrained to TEMPro).
- **2041 Local Plan Scenario:** This includes the MLP developments within Medway and the committed growth outside of Medway (noting that the local plan allocations from neighbouring authorities are not included, but consented growth is, showing the impact of the MLP within Medway).

2.4.2 This traffic data was used to consider the effects of the MLP alone and in-combination. Give the location of the Swale SPA and the Swale Ramsar outside the AODM it was not possible to model air quality impacts at this designation. The following scenarios were modelled in the Air Quality Report using traffic data outputs:

- **Scenario A:** existing baseline. This scenario is termed '2019 Base';
- **Scenario B:** a future scenario without any increase in traffic from 2019 (including future-year emissions factors and future-year background concentrations and fluxes but base-year traffic within the dispersion model). This scenario is termed '2041 Zero Growth';
- **Scenario C:** 2041 without the Local Plan but with the forecast background increase in traffic between from 2019 (also including future-year emissions factors and background concentrations and fluxes). This scenario is termed '2041 Base'; and
- **Scenario D:** 2041 with both the proposed Local Plan and background traffic growth (also including future-year emissions factors and background concentrations and fluxes). This scenario is termed '2041 With Plan'.

2.4.3 The three 2041 scenarios (B, C and D) have been compared to derive the impacts of the proposed MLP alone and in combination with other projects and plans:

- The difference between scenarios C and D represents the change (i.e. the 'Process Contribution' (PC)) caused by the proposed MLP alone; and
- The difference between scenarios B and D represents the PC caused by MLP in-combination.

2.4.4 The Air Quality Report provides the outputs of the air quality modelling results against the 1% screening threshold of CLe and CLo set out in **Table 2.1**. The air quality modelling was undertaken at receptors arranged along transects running perpendicular to road links that were screened into the HRA process in the Interim HRA. The transects begin at the closest part of the designated site to the road[23]. Where the designated site is located within 2m of the road, receptors have been placed at the following distances from the road: 2m, 3m, 5m, 9m, 17m, 33m, 65m, 129m and 200m[24]. Where the designated site is set back more than 2m from the road, the same spacing is used beginning at the point closest to the road. These roadside transects are shown in **Appendix C** (**Figure C.1** to **C.8**). All transects fall within the area of the AODM to ensure accuracy of traffic data.

2.5 Screening – Thames Estuary and Marshes SPA and Ramsar

2.5.1 The air quality dispersion modelling allowed a comparison of the change in emissions against 1% of the individual pollutant CLo or CLe. This modelling data was used to provide an assessment of LSEs in the context of CLo and CLe, following Natural England's guidelines, against the 1% screening threshold (see **paragraph 2.3.2**). The following assessment focuses on screening for air quality effects at the Thames Estuary and Marshes SPA and Thames Estuary and Marshes Ramsar.

Nitrogen oxides

2.5.2 The 1% NO_x threshold for the MLP alone was not exceeded at any receptor within 200m of the Thames Estuary and Marshes SPA or Ramsar. In-combination, the 1% screening threshold was exceeded at transects E1_N, E2_N and E3_N within approximately 9m of the A228. The total area over which the 1% NO_x threshold is exceeded in-combination at the Thames Estuary and Marshes SPA and Ramsar is illustrated in **Appendix D, Figure D.1**.

2.5.3 The CLe of 30µg/m^3 was not exceeded at any location within the Thames Estuary and Marshes SPA and Ramsar.

Ammonia

2.5.4 The 1% NH_3 threshold for the MLP alone was exceeded at transects E1_N, E2_N and E3_N within approximately 5m of the A228 at the Thames Estuary and Marshes SPA and Ramsar. In-combination, the 1% screening threshold was exceeded at transects E1_N, E2_N and E3_N within approximately 200m of the A228. The total area over which the 1% NH_3 threshold is exceeded at the Thames Estuary and Marshes SPA and Ramsar is illustrated in illustrated in **Appendix D, Figure D.2**.

2.5.5 The lower CLe of 1µg/m^3 was exceeded at the above locations, with a maximum concentration for the MLP in-combination of 1.28µg/m^3 at the Thames Estuary and Marshes SPA and Ramsar.

2.5.6 The upper CLe of 3µg/m^3 for higher plants was not exceeded at any location at the Thames Estuary and Marshes SPA and Ramsar.

[23] Impacts have not been predicted within 2 m of roads – see Air Quality Report.

[24] These distances are used because they broadly reflect the expected rate at which concentrations of NOx and ammonia reduce with distance from roads. This provides an efficient way to more precisely show the predicted changes.

Nitrogen deposition

2.5.7 The 1% N-dep threshold for the MLP alone was not exceeded at any receptor within 200m of the Thames Estuary and Marshes SPA or Ramsar. In-combination, the 1% screening threshold was exceeded at transects E1_N, E2_N and E3_N within approximately 65m of the A228. The total area over which the 1% N-dep threshold was exceeded at the Thames Estuary and Marshes SPA and Ramsar is illustrated in **Figure D.3, Appendix D**.

2.5.8 At the Thames Estuary and Marshes SPA and Ramsar for the MLP alone and in-combination there were exceedances of the lower CLo for N-Dep (10kgN/ha/yr) at all locations, but there were no exceedances of the upper CLo (of 20kgN/ha/yr depending on qualifying feature).

2.6 Screening – Medway Estuary and Marshes SPA and Ramsar

2.6.1 The following assessment focuses on screening for air quality effects at the Medway Estuary and Marshes SPA and the Medway Estuary and Marshes Ramsar. The outputs of the air quality dispersion modelling have been assessed, which provides a comparison of the change in emissions against 1% of the individual pollutant CLo or CLe, in line with Natural England's guidelines for screening of air quality impacts (see **paragraph 2.3.2)**.

Nitrogen oxides

2.6.2 The 1% NO_x threshold for the MLP alone was not exceeded at any receptor within 200m of the Medway Estuary and Marshes SPA or Ramsar. In-combination, the 1% screening threshold was exceeded at transects E1_S, E2_S and E3_S within approximately 9m of the A228. The total area over which the 1% NO_x threshold was exceeded in-combination at the Medway Estuary and Marshes SPA and Ramsar is illustrated in **Appendix D, Figure D.1**.

2.6.3 The CLe of 30µg/m^3 was not exceeded at any location within the Medway Estuary and Marshes SPA and Ramsar.

Ammonia

2.6.4 The 1% NH_3 threshold for the MLP alone was exceeded at transects E1_S, E2_S and E3_S, within approximately 5m of the A228 and within approximately 167m of the A289 (E4_N and E5_N) at the Medway Estuary and Marshes SPA and Ramsar. In-combination, the 1% screening threshold was exceeded at transects E1_S, E2_S and E3_S, within approximately 129m of the A228, 200m from the A289 and 17m from Gills Terrace. The total area over which the 1% NH_3 threshold was exceeded at the Medway Estuary and Marshes SPA and Ramsar is illustrated in **Figures D.2**, **D.4** and **D.6** of **Appendix D**. There was no exceedance of the NH_3 1% threshold alone or in-combination at transects E6_E (Lower Rainham Road) or E8_W (Otterman Quay Lane). These road links can therefore be screened out of the HRA process in terms of NH_3.

2.6.5 The lower CLe of 1µg/m^3 was exceeded at the above locations, with a maximum concentration for the MLP in-combination of 1.3µg/m^3 at the Medway Estuary and Marshes SPA and Ramsar.

2.6.6 The upper CLe of 3µg/m^3 for higher plants was not exceeded at any location at the Medway Estuary and Marshes SPA and Ramsar.

Nitrogen deposition

2.6.7 The 1% N-Dep threshold for the MLP alone was exceeded at transects E4_N and E5_N within approximately 111m of the A289 at the Medway Estuary and Marshes SPA and Ramsar. In-combination, the 1% screening threshold was exceeded at transects E1_S, E2_S, E3_S, E4_N and E5_N within approximately 65m of the A228 and 167m from the A289. The total area over which the 1% N-Dep threshold was exceeded alone and in-combination at the Medway Estuary and Marshes SPA and Ramsar is illustrated in **Figure D.3** and **D.5, Appendix D**.

2.6.8 There was no exceedance of the N-dep 1% threshold at transects E6_E (Lower Rainham Road), E7_N (Gills Terrace) or E8_W (Otterman Quay Lane) either alone or in-combination. These road links can therefore be screened out of the HRA process in terms of N-dep.

2.6.9 At the Medway Estuary and Marshes SPA and Ramsar for the MLP alone and in-combination there were exceedances of the lower CLo for N-Dep (10kgN/ha/yr) at all locations but no exceedances of the upper CLo (of 20kgN/ha/yr depending on qualifying feature).

2.7 Screening – North Downs Woodlands SAC

2.7.1 The following assessment focuses on screening for air quality effects at the North Downs Woodlands SAC. The outputs of the air quality dispersion modelling have been assessed, which provides a comparison of the change in emissions against 1% of the individual pollutant CLo or CLe in line with Natural England's guidelines for screening of air quality impacts (see **paragraph 2.3.2)**.

Nitrogen oxides

2.7.2 The 1% NO_x threshold for the MLP alone was not exceeded at any receptor within 200m of the North Downs Woodlands SAC. In-combination, the 1% screening threshold was exceeded at transects W2_S, W3_N, W4_N and W4_S within approximately 3-5m of Lidsing Road. The total area over which the 1% NO_x threshold was exceeded in-combination at the North Downs Woodlands SAC is illustrated in **Figure D.7, Appendix D**.

Ammonia

2.7.3 The 1% NH_3 threshold for the MLP alone was exceeded at transects W2_S, W3_N, W3_S, W4_N, W4_S and W5_N within a maximum of 41m from Lidsing Road at the North Downs Woodlands SAC. In-combination, the 1% screening threshold was exceeded at transects W1_E, W2_S, W3_N, W3_S, W4_N, W4_S, W5_N and W6_N within a maximum of 200m from Lidsing Road at the North Downs Woodlands SAC. The total area over which the 1% NH_3 threshold was exceeded at the North Downs Woodlands SAC is illustrated in **Figure D.8, Appendix D**.

2.7.4 The lower CLe of 1µg/m^3 was exceeded at the above locations, with a maximum concentration for the MLP in-combination of 1.83µg/m^3 at the North Downs Woodlands SAC.

2.7.5 The upper CLe of 3µg/m^3 for higher plants was not exceeded at any location.

Nitrogen deposition

2.7.6 The 1% N-Dep threshold for the MLP alone was exceeded at transects W2_S, W3_N, W3_S, W4_N, W4_S and W5_N within a maximum of 33m from Lidsing Road at the North Downs Woodlands SAC. In-combination, the 1% screening threshold was exceeded at transects W1_E, W2_S, W3_N, W3_S, W4_N, W4_S, W5_N and W6_N within a maximum of 175m from Lidsing Road at the North Downs Woodlands SAC (W1_E). The total area over which the 1% NH_3 threshold was exceeded in-combination at the North Downs Woodlands SAC is illustrated in **Figure D.9, Appendix D**.

2.7.7 There was no exceedance of the N-dep 1% threshold at transects (W7_N Pilgrims Way) either alone or in-combination. This road link can therefore be screened out of the HRA process in terms of N-dep.

2.7.8 There were exceedances of both the lower and upper N-Dep CLo ranges for the North Downs Woodlands SAC.

Acid deposition

2.7.9 The 1% A-Dep threshold for the MLP alone was exceeded at transects W2_S, W3_N, W4_N, and W5_N within a maximum of 5m from Lidsing Road at the North Downs Woodlands SAC. In-combination, the 1% screening threshold was exceeded at transects W2_S, W3_N, W3_S, W4_N, W4_S and W5_N within a maximum of 41m from Lidsing Road at the North Downs Woodlands SAC. The total area over which the 1% NH_3 threshold is exceeded in-combination at the North Downs Woodlands SAC is illustrated in in **Figure D.10** of **Appendix D**.

2.7.10 There was no exceedance of the A-dep 1% threshold at transects W1_E (A229), W6_N or W7_N (Pilgrims Way). These road links can therefore be screened out of the HRA process in terms of A-dep.

2.7.11 There were exceedances of the CLo for A-Dep (1.983 keq/ha/yr) at the North Downs Woodlands SAC.

2.8 Screening Conclusion

2.8.1 Based on the comparison of the air quality modelling results with Natural England's 1% screening threshold for each pollutant presented in the Air Quality Report, the following European sites have been screened in for further assessment within the HRA in relation to NOx, NH_3 and nitrogen deposition. Acid deposition has been screened in for the North Downs Woodlands SAC only.

- Medway Estuary and Marshes Ramsar
- Medway Estuary and Marshes SPA
- North Downs Woodlands SAC
- Thames Estuary and Marshes Ramsar
- Thames Estuary and Marshes SPA

3 Thames Estuary and Marshes SPA and Ramsar – Air Quality Appropriate Assessment

3.1 Introduction

3.1.1 The purpose of an Appropriate Assessment (AA) is to undertake an assessment of the implications of the MLP for a European site in light of its conservation objectives[25]. This AA has been prepared in accordance with the Conservation of Habitats and Species Regulations 2017 (as amended), known as the Habitats Regulations[26], and takes appropriate account of relevant case law, best practice and Natural England advice.

3.1.2 This section of the AA focuses on an assessment of air quality impacts upon the conservation objectives of the following designations:

- Thames Estuary and Marshes SPA; and
- Thames Estuary and Marshes Ramsar.

3.1.3 At the AA stage, Natural England recommends that the 1% threshold (used in screening) is treated as a proxy value and is not relied upon in isolation to determine whether there is an adverse effect on site integrity from a plan or project. Other factors are relevant which may mean that a plan or project which exceeds the 1% screening threshold can still demonstrate no adverse effect on site integrity through an appropriate assessment.

3.1.4 Section 5 of Natural England's guidance[27] recommends that the following factors are taken into consideration in an AA:

1) Consider whether the sensitive features of the site would be exposed to emissions;
2) Consider the European site's conservation objectives;
3) Consider the spatial scale and duration of the predicted impact and the ecological functionality of the affected area[28];
4) Consider background pollution;
5) Consider the designated site in a national context;
6) Consider best available evidence on small incremental impacts from nitrogen deposition;
7) Consider site survey information;
8) Consider national, regional or local initiatives or measures which can be relied upon to reduce background levels at the site;
9) Consider measures to avoid or reduce the harmful effects of the plan or project on site integrity; and,

[25] MHLG and DLHC (2024) Planning Practice Guidance. Available at: https://www.gov.uk/government/collections/planning-practice-guidance. [Date accessed: 25/11/25].

[26] The Conservation of Habitats and Species Regulations 2017 SI No. 2017/1012, TSO (The Stationery Office), London. Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents [Date accessed: 25/11/25].

[27] Natural England (2018) Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001). Available at: http://publications.naturalengland.org.uk/publication/4720542048845824 [Date accessed: 25/11/25]

[28] Note – order has been altered slightly in this report.

10) Consider any likely in-combination effects with other live plans and projects from other sources.

3.2 Are the sensitive qualifying features of the site likely to be exposed to emissions?

3.2.1 The North Kent Marshes designations comprise a continuous area of maritime habitat from Gravesend in the west to Whitstable in the east and include the Thames Estuary and Marshes SPA and Ramsar, the Medway Estuary and Marshes SPA and Ramsar and The Swale SPA and Ramsar designations.

3.2.2 North Kent Marshes supports a diversity of habitats represented by a complex of brackish, floodplain grazing marsh, ditches, saline lagoons and intertidal salt marsh and mudflat. These habitats provide nesting and feeding grounds for the qualifying bird features associated with both the Ramsar and SPA designations (see qualifying features in **Appendix B**). This diversity of habitats also supports nationally scarce and local plants and provides microhabitats for specialist saltmarsh invertebrates associated with the Ramsar designations (see qualifying features in **Appendix B**)[29]. The high density of invertebrates provides a vital food source for wading birds. The nationally scarce species of plant are associated with coastal habitat types such as grazing marshes, together with their brackish ditches, upper salt marsh, sandy shingle, tidal mudflats or sandy mud, sea walls and disturbed soils near the sea. Key habitats for invertebrates include salt marshes and grazing marshes with brackish ditches or saline pools and reedbeds. Some species, such as the fly (*Cephalops perspicuous*) and the cranefly (*Erioptera bivittate*), can also be found inland where suitable habitat exists, for instance in reedbed and fen[30].

3.2.3 A change in air quality at these estuarine habitats can lead to a shift in plant species, favouring more nutrient-loving species and resulting in a change of species composition away from specialised species associated with the maritime habitats. A change in air quality may also have an implication for the water chemistry within features such as ditches associated with these habitat types. A shift in species composition may have a negative impact upon broad habitat types which support birds and invertebrates and a direct impact upon plants.

3.2.4 Estuaries are dynamic systems which are regularly flooded with river and saline water. This means they are regularly flushed with nutrient-rich waters. APIS notes that the atmospheric input of nitrogen to these systems is therefore likely to be less important than inputs from river and tidal inundation[31].

[29] Liley, D. (2011) What do we know about the birds and habitats of the North Kent Marshes?: Baseline data collation and analysis. Natural England Commissioned Reports, Number 082.

[30] Ibid

[31] APIS. Nitrogen Deposition. Coastal and Floodplain Grazing Marsh. Available at: https://www.apis.ac.uk/acid-deposition-coastal-and-floodplain-grazing-marsh [Date accessed: 11/10/25]

3.2.5 The Thames Estuary SPA and Ramsar is the furthest west of the North Kent Marshes designations and extends predominantly along the south side of the River Thames, with a small area along its northern shore. Research undertaken by Natural England (2011)[32] notes that the area to the south of the river comprises brackish grazing marsh, some of which has been converted to arable use, with flooded clay pits at Cliffe which have been filled with dredgings. In addition, there is a small extent of salt marsh and broad intertidal mudflats outside the sea wall.

3.2.6 SSSIs are protected areas in the UK and form the building blocks of site-based nature conservation. An SSSI will be designated based on the characteristics of its fauna, flora, geology and/or geomorphology. The conservation status of SSSI features that overlap with European sites offer a useful indicator of habitat/species health at a particular location.

3.2.7 Natural England conducts Whole Feature Assessments (WFAs) which measure the condition of each notified feature across the whole of a SSSI. The conservation status of each notified feature highlights any areas which are particularly vulnerable to threats/pressures. Conservation status is defined as below:

- Favourable;
- Unfavourable – recovering;
- Unfavourable – no change; or,
- Unfavourable – declining.

3.2.8 SSSI features in either an 'Unfavourable – no change' or 'Unfavourable – declining' condition indicate that the European site may be particularly vulnerable to certain threats or pressures. It is important to remember that SSSI features may be in an unfavourable state due to the condition of features unrelated to its designation. However, it is considered that the conservation status of SSSI features that overlap with European provides useful baseline information.

3.2.9 The Thames Estuary and Marshes SPA and Ramsar, where it lies within 200m of road links being considered in this ecological assessment, are underpinned by the South Thames Estuary and Marshes SSSI. The South Thames Estuary and Marshes SSSI comprises 31 SSSI features of which three features are recorded to be in an unfavourable condition. This unfavourable condition is potentially linked to management of habitat. No link to a deterioration in air quality is stated. It is noted that the condition of some features has not been recorded.

Qualifying habitat / features within areas of 1% exceedances

3.2.10 Mapping data has been reviewed to indicate habitat types present within 200m of each road link, within the designation boundary, where an exceedance of the 1% screening thresholds alone or in-combination have been concluded through the air quality modelling (**Chapter 2**). This mapping data is presented in **Appendix E** and shows that suitable habitat which may support qualifying features of the SPAs, Ramsars and SAC (listed in **paragraph 2.8.1**) are located within an area where the 1% CLe or CLo is exceeded for each pollutant modelled (either alone or in-combination).

[32] LILEY, D. 2011. What do we know about the birds and habitats of the North Kent Marshes?: Baseline data collation and analysis. Natural England Commissioned Reports, Number 082.

3.2.11 In summary, the following habitat types associated with the qualifying features of the Thames Estuary and Marshes SPA and Ramsar, where an exceedance of the 1% threshold is predicted (alone or in-combination), is presented in **Table 3.1** and illustrated on **Figure E.1, Appendix E**.

Table 3.1: *Priority habitat at Thames Estuary and Marshes SPA and Ramsar within 200m of the A228*

Road links	Priority habitat types at designated sites within 200m of affected road links
A228 (Grain Road)	Coastal floodplain and grazing marsh Reedbed

3.3 Consideration of the Conservation Objectives

Conservation objectives

3.3.1 The conservation objectives for each SPA, Ramsar and SAC are set out in **Appendix B**. The conservation objectives for the qualifying features in relation to air quality are further defined in the supplementary advice provided by Natural England. This advice relates to the SPAs and SACs only, however, given the similarity of features between these designations and the Ramsar designations, they have been taken into consideration for all designations. Natural England's supplementary advice notes that the air quality target for the Thames Estuary and Marshes SPA is to:

3.3.2 *"Maintain as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).*

3.3.3 *This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of feeding or roosting habitats.*

3.3.4 *Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development."*

3.3.5 The 'maintain' objective is applied where a designated site is considered to be making a sufficient contribution to achieving favourable conservation status (FCS) in terms of air quality.

Background levels

3.3.6 APIS provides mid-year 2021 (2020-2022) air quality data for each SSSI in 1km grid squares. The average 1km grid square 2021 pollutant levels for the Thames Estuary and Marshes SPA and Ramsar is summarised in **Table 3.2**. It is noted that these figures provide a site average, and concentrations may be greater closer to road, agricultural or industrial point sources.

Table 3.2: *Average 1km grid square 2021 levels of pollutants for the Thames Estuary and Marshes SPA*

Appropriate deposition habitat type for qualifying features	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)
Short vegetation	0.917	11.457

3.3.7 When comparing these baseline levels to worst case and precautionary CLe and CLo (**Table 2.1**) for the Thames Estuary and Marshes SPA and Ramsar it can be seen that the lower NH_3 CLe of 1µg/m3 is not exceeded. The lower N-dep CLo of 10kgN/ha/yr is exceeded by 1.457kgN/ha/yr, but the upper CLo range is not exceeded.

3.3.8 The Air Quality Report modelling also provides baseline levels of all pollutants at each designated site for a 2019 baseline scenario. These are presented in Tables 4 – 7 of the Air Quality Report in Chapter 4. This data shows exceedances of the lower NH_3 CLe of 1µg/m3 and N-dep lower range of 10kg/N/ha/yr at the Thames Estuary and Marshes SPA and Ramsar within 200m of the A228. It is therefore likely that there will be a 'restore' objective for each pollutant to ensure that air quality at each designation achieves FCS.

3.3.9 Background air pollution concentrations at the Thames Estuary and Marshes SPA and Ramsar are exceeding CLo and CLe for qualifying features. Therefore, the conservation objectives for air quality (**paragraphs 3.3.2** to **3.3.4**) will be undermined by any proposal for which there is evidence that further emissions will compromise the ability of other national or local measures and initiatives to reduce background levels.

3.3.10 Natural England's guidance notes that this is a judgement to be taken by the competent authority (the Council) which "*should be informed by, amongst others, the extent to which any declining national trends in air pollution or strategic work to tackle emissions affecting the site more locally might otherwise lead to improvements, the rate at which such improvement are anticipated to be delivered, any credible evidence on the extent of the impacts of a plan or project and whether those impacts can properly be considered temporary and reversible".*

3.3.11 The extent to which the MLP will undermine the conservation objectives of the SPA or Ramsar to restore air quality therefore requires further consideration.

3.3.12 An effect from the MLP will be significant if it undermines the FCS of the SPA or Ramsar. It is therefore necessary to determine whether a deterioration of air quality caused by increased traffic flows as a result of the MLP will undermine the achievement of FCS by reducing the ability of air quality to be maintained at CLo and CLe.

3.3.13 A review of APIS data illustrates where measures need to be targeted to ensure the achievement of conservation objectives for the SPA. **Figure 3.1** illustrates local contributions to N-dep at the SPA. Data is taken from APIS for the SPA however no data is provided on APIS for the Ramsar designation. This data shows that local N-dep contributions from road traffic average 11.7% of all contributions. Other sources, including livestock (18.5%) and non-agricultural waste (12.7%)[33] also provide significant contributions to local N-dep.

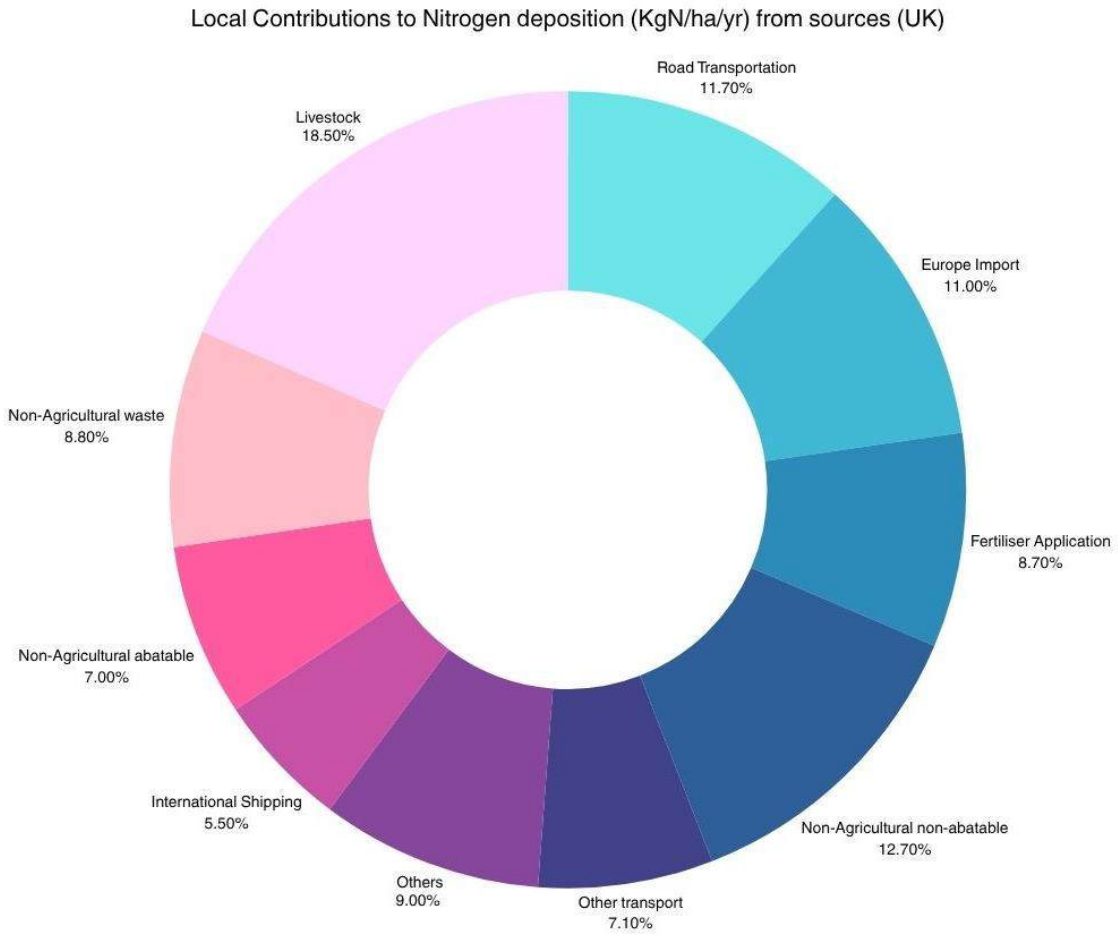


Figure 3.1: *Local contributions to nitrogen deposition (KgN/ha/yr) form sources (UK) at the Thames Estuary and Marshes SPA*

3.4 Spatial scale, duration of the predicted impact and the ecological functionality

3.4.1 The Thames Estuary and Marshes SPA and Ramsar are located immediately adjacent and to the north of the A228. The A228 begins at the Isle of Grain and runs in a south-westerly direction along the Hoo Peninsula to connect with the A289 at Wainscott (to the north east of Strood). At the location of the SPA and Ramsar, the A228 passes directly over the estuary.

[33] These contributions are associated with processes such as fossil fuel combustion and other industrial processes.

3.4.2 A review has been undertaken to determine habitat types present within a 200m corridor of each affected road link. Priority habitat mapping data indicates that habitat associated with the SPA and Ramsar within 200m of the A228 comprises coastal and floodplain grazing marshes and reedbeds (**Table 3.1** and **Appendix E**)[34]. Each European designation is underpinned by one or more SSSI. Each SSSI is further divided into a number of SSSI Management Units. Habitat data which is available for each SSSI Unit has been used to verify habitat type(s) present within 200m of the affected road links screened in due to exceedances of 1,000 AADT thresholds in the Interim HRA (see **Section 2.1**). The underpinning SSSI habitat for the Thames Estuary and Marshes SPA is presented in **Table 3.3**.

Table 3.3: *Main habitat type(s) within 200m of affected road links at the Thames Estuary and Marshes SPA and Ramsar*

Road Link screened into Appropriate Assessment in terms of air quality LSE	European Site within 200m of road link	SSSI Interest Unit underpinning designated site within 200m of road link and a description of main habitat type[35]
A228 Grain Road	Thames Estuary and Marshes SPA and Ramsar	South Thames Estuary and Marshes SSSI Unit 39 Stoke Marsh (039) Main Habitat Type – Neutral Grassland Lowland

3.4.3 In 2022, Natural England assessed SSSI Unit 39 as currently being in an unfavourable declining due to the WeBS data for specific bird features and the condition of the lowland damp grassland to provide for the bird features[36]. Natural England observed that the habitat in this SSSI Unit comprised wet grassland grazing marsh in 2022. Notes included with the 2022 survey state that "*good botanical diversity was recorded during the site visit, with multiple species from the vascular plant assemblage associated with the SSSI being found. These include sea barley, annual beard grass, golden dock and sea clover. Other species recorded that support a wet grassland grazing marsh habitat include sea club rush, saltmarsh goosefoot, strawberry clover, cats ear, autumn hawkbit, fragmites, Berula erecta and Typha angustifolia. The percentage of graminoids across the unit was between 80-100% with a medium sward height covering the majority of the unit, some areas of very short sward and bare ground scattered".* The SSSI Citation for the whole of the South Thames Estuary and Marshes SSSI notes that the site consists of an extensive mosaic of grazing marsh, saltmarsh, mudflats and shingle characteristic of the estuarine habitats of the North Kent marshes.

3.4.4 The air quality dispersion modelling predicts concentrations of NO_x, NH_3 and N-dep at three transect locations within 200m of the A228 (Grain Road) for the Thames Estuary and Marshes SPA and Ramsar (see **Appendix C**). In addition, isopleth air quality data has been provided within 200m of the A228.

[34] The Priority Habitat Inventory is a spatial dataset that maps priority habitats identified in the UK Biodiversity Action Plan and listed as being of principal importance for the purpose of conserving or enhancing biodiversity, under Section 41 of the Natural Environment and Rural Communities Act (2006). Source: Natural England open Data Geoportal. Available at: https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::priority-habitats-inventory-england/about [Date accessed: 04/12/25]

[35] MAGIC. Available at: https://magic.defra.gov.uk/ [Date accessed: 04/12/25]

[36] Natural England Designated Site Viewer. Available at: https://designatedsites.naturalengland.org.uk/UnitDetail.aspx?UnitId=1007043&SiteCode=S1003874&SiteName=south%20thames&countyCode=&responsiblePerson= [Date accessed: 12/11/25].

Nitrogen oxides

3.4.5 At the Thames Estuary and Marshes SPA and Ramsar, in all future year scenarios and at all locations, the total concentration of NO_x is below the CLe of 30µg/m^3. As the CLe will not be exceeded, **no adverse impact upon site integrity (AIOSI) at the Thames Estuary and Marshes SPA or Ramsar will arise as a direct result of elevated NO_x from the MLP, either alone or in combination.**

Ammonia

3.4.6 The air quality modelling has taken a precautionary approach and applied the lower CLe of 1µg/m^3 which is applicable to habitat containing lichen and bryophyte (as discussed in **Section 2.3**). APIS indicates that the Thames Estuary and Marshes SPA is not sensitive to ammonia. This relates to impacts upon broad habitat types used by avian qualifying species of the SPA. As noted in **Appendix B**, the Thames Estuary and Marshes are designated as a Ramsar for both the avian species but also for a number of nationally important plant species and invertebrates.

3.4.7 The NH_3 CLe for vascular plants is 3µg/m^3. No CLe is assigned on APIS for invertebrate assemblages. For other saltmarsh and coastal plant communities a CLe of 1–3µg/m^3 for NH_3 is set depending on the presence of lichen and bryophytes. As noted in **Section 2.3**, lichens and bryophytes do not form a major component of the habitat types found in the Thames Estuary and Marshes Ramsar (and underpinning South Thames Estuary and Marshes SSSI). This is because these lower and middle saltmarsh habitat zones (which are dominated by species including *Salicornia*, *Puccinellia*, *Spartina* associated with the South Thames and Estuary SSSI) are regularly flooded by seawater and therefore conditions are saline and anaerobic. In general, bryophytes and lichen are unable to tolerate these types of conditions. However, in transition areas, upper saltmarsh zones or areas which are raised (e.g. driftwood or stones) where tidal inundation is less frequent, some salt tolerant bryophyte and lichen species can occur. Taking into consideration the nature of habitats within 200m of the A228 of the Thames Estuary and Marshes SPA and Ramsar, a more appropriate NH_3 CLe for is 3µg/m^3.

3.4.8 The air quality modelling data provides total concentrations of NH_3 with the MLP within 200m of the A228 where it is coincident with the Thames Estuary and Marshes SPA and Ramsar. This data indicates that there are no exceedances of the higher NH_3 CLe of 3µg/m^3 at any location within 200m of the A228. It is therefore considered that **no AIOSI will arise at the Thames Estuary and Marshes SPA or Thames Estuary and Marshes Ramsar as a direct result of elevated NH_3 from the MLP, either alone or in combination**.

Nitrogen deposition

3.4.9 N-dep rates are habitat-specific as different habitats have varying tolerances to different levels of deposition. **Appendix A** summarises the CLo at the Thames Estuary and Marshes SPA and Ramsar as set out on APIS. It is noted that data for Ramsar features are taken from the SPA (for avian features) and the underpinning SSSI for invertebrate and plant qualifying features. APIS indicates that not all qualifying features of each designated site are sensitive to N-dep. Where APIS indicates qualifying features are sensitive to changes in nitrogen deposition this is due to potential negative impacts on broad habitats.

3.4.10 The broad habitat type which supports the qualifying bird species of the Thames Estuary and Marshes SPA and Ramsar is Atlantic upper-mid and mid-low salt marshes. This has a CLo range from 10–20 kgN/ha/yr. No site-specific N-dep CLo is provided for the invertebrate assemblage or vascular plants associated with the Ramsar. However, the N-dep CLo provided on APIS for saltmarsh species for the underpinning SSSI indicate that the CLo range used for Atlantic upper-mid and mid-low salt marshes is appropriate.

3.4.11 Air quality modelling shows that total N-dep concentrations exceed the lower CLo at all locations within 200m of the A228. The higher CLo is not exceeded at any location.

3.4.12 It is noted that an exceedance of the CLo does not mean that an adverse impact upon site integrity will occur, as other factors will have an influence.

3.4.13 The total baseline level of N-dep as provided on APIS is within this CLo range (**Table 3.2**). The air quality modelling provides outputs for Scenario C (2041 without Local Plan) and Scenario D (2041 with Local Plan) – see **Section 2.4**. A comparison of these two scenarios allows the contribution of the MLP to N-dep to be explored. Data presented in Table 6 of the Air Quality Report indicate that, at transects coinciding with the Thames Estuary and Marshes SPA and Ramsar site along the A228, the MLP would contribute approximately 0.1kgN/ha/yr to total N-dep within 2m of the road edge. Beyond 17m, data shows that the MLP makes no contribution to N-dep levels. As a result, the predicted increase of 0.1kgN/ha/yr is not significant and would not be expected to alter habitat structure, vegetation composition, or supporting processes relevant to the qualifying bird, plant and invertebrate species of the SPA and Ramsar designations. This conclusion is reflected in the assessment of 1% change screening threshold which shows that there are no MLP-alone exceedances of the threshold.

3.4.14 The Air Quality Report provides an estimated background N-Dep concentration in 2041 (end plan year) at all modelled transects. The highest 2041 background concentration is within 2m of the A228 and is 11.9kgN/ha/yr. This is a reduction from a 2019 baseline used in the air quality modelling (12.9kgN/ha/yr) of 1.0kgN/ha/yr.

3.4.15 The exceedance of the lower N-Dep CLo range can be attributed to the current high background concentrations and in-combination contributions from the MLP with other plans and projects.

3.4.16 The Air Quality Report (at Appendix A3) provides information on the retardation effects of the MLP. N-dep in 2041 will be less than present levels, due to vehicle fleet turnover and polices to reduce emission. As such, the degree of ‘retardation’ to on-going reduction in N-dep have been calculated. Table A3-2 of the Air Quality Report presents the total number of years delay to reductions in N-Dep at the worst-case transects for each designated site.

3.4.17 This data shows that the MLP alone will retard background improvements by under a year (0.9) at the worst-case transect within 2m of the carriageway in the Thames Estuary and Marshes SPA and Ramsar. The MLP in-combination with other plans and projects will retard background improvements by under 19.9 years at the worst-case transect within 2m of the carriageway (transect E1_N).

3.4.18 In addition to the assessment of modelled air quality data, Natural England's guidance recommends that consideration be given to background pollution trend data. For the 1km grid square adjacent to the A228, APIS data shows that N-Dep fell for short vegetation (which is representative of the estuary) from 14.88kg N/ha/year in 2003 to 12.15kg N/ha/year in 2021, as shown in **Figure 3.2**.

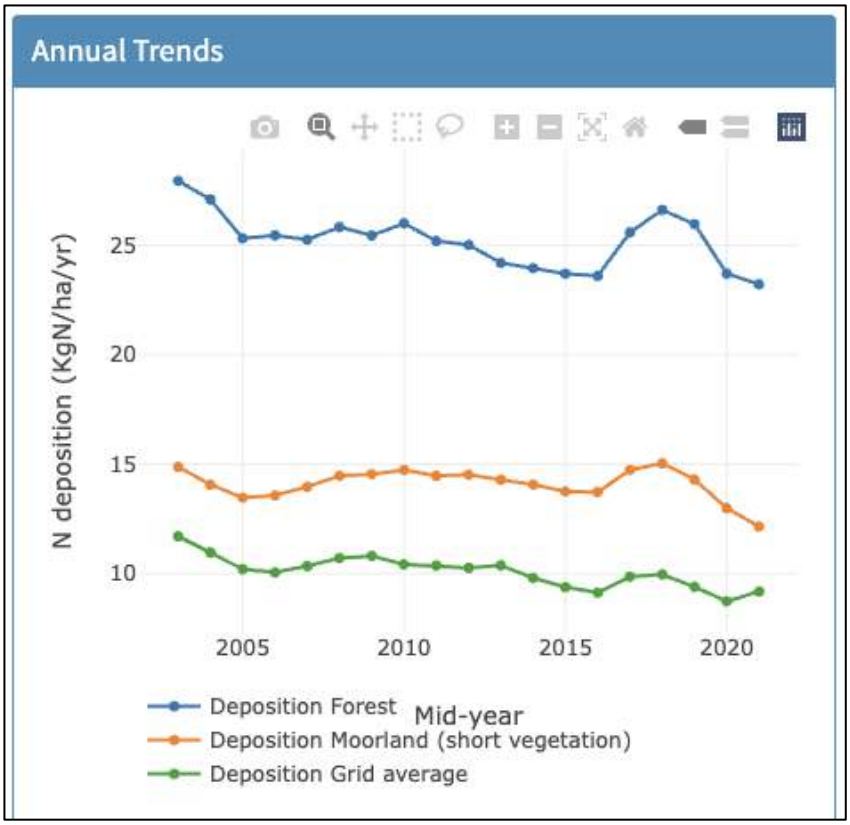


***Figure 3.2**: Annual N-dep trends for the 1km grid square within 200m of the A228: source APIS*

3.4.19 Studies have been undertaken into the effect of nitrogen deposition on coastal saltmarsh systems. Estuaries are dynamic systems which are regularly flooded with river and saline water. This means they are regularly flushed with nutrient-rich waters. These habitat types are therefore already adapted to high nutrient turnover, salinity stress and flooding frequency. APIS notes that the atmospheric input of nitrogen to these systems is therefore likely to less important than inputs from river and tidal inundation. Habitat structure is the most important factor (when compared to species diversity) for the qualifying bird and invertebrate species associated with the SPA and Ramsar designations. In summary, estuarine and coastal salt marsh systems are buffered against atmospheric N-dep due to nutrient dynamics being dominated by hydrology; they process and remove nitrogen efficiently and the ecological integrity of these systems are reliant on the physical and structural attributes of the habitats rather than subtle changes in nutrient inputs.

3.4.20 The Thames Estuary and Marshes Ramsar is designated for a number of plant interest features under criterion 4. These species include a number of non-halophyte (or not-true-halophyte) plant species associated with the Thames Estuary and Marshes Ramsar. These species therefore have the potential to be present in habitats outside the main estuary itself in areas where inputs from river and tidal inundation plays a less significant role in buffering of atmospheric N-dep inputs.

3.4.21 **Table 3.4** sets out the habitat conditions in which these non-halophyte species are found.

***Table 3.4:** Habitat requirements for non-halophyte plant species associated with the Thames Estuary Ramsar designation*

Common Name	Latin name	Habitat[37]
Bulbous Foxtail	*Alopecurus bulbosus*	Wet grassy places, usually brackish and grazed, near sea or in estuaries.
Slender Hare's-ear	*Bupleurum tenuissimum*	Grassy or brackish ground.
Divided Sedge	*Carex divisa*	Dams, usually brackish grassy places, in marshes, pastures and diches.
Small Red Goosefoot	*Chenopodium chenopodioides*	Dykes and in brackish pastures by sea.
Least Lettuce	*Lactuca saligna*	Shingle, waste places, arable margins and sea-walls near the sea.
Clustered Clover	*Trifolium glomeratum*	Grassy places on sandy soil mostly near sea.
Sea Clover	*Trifolium squamosum*	Often brackish, turf by sea.

3.4.22 These nationally scarce non-halophyte plants are associated with habitats which are found in coastal locations as indicated in **Table 3.4**. Non-halophyte species cannot grow on true saltmarsh or mudflats because they lack salt tolerance. They may therefore be found above the saltmarsh on coastal grassland, on sea walls, embankments, upper drift lines and in brackish environments but not within saline ditches or inland of the tidal limit.

3.4.23 As shown in **Appendix E** habitats within 17m of the A228 comprises the saline lagoon and coastal and floodplain grazing marsh priority habitat. Data provided in **Table 3.4** indicates that non-halophyte plant species are found above the saltmarsh on coastal grassland, on sea walls, embankments, upper drift lines and in brackish but not within saline ditches / lagoons or inland of the tidal limit in lower or mid saltmarsh. They are therefore unlikely to be present within 17m of the A228.

3.4.24 Following a similar approach to that applied in a Shadow HRA for a development in the neighbouring Local Planning Authority area of Swale[38], a review has been undertaken drawing on known distribution data from the Kent Rare Plant Register (KRPR)[39] and information available on the BSBI's Distribution Database[40] for non-halophyte plant species which form part of the Thames Estuary and Marshes Ramsar.

3.4.25 This review follows a similar approach and divides non-halophyte plant interest species into three main groups based on distribution data:

[37] Stace, C.A. 1992. New Flora of the British Isles. Cambridge University Press.

[38] Aspect Ecology (2025) Highstead Park (North and South) Shadow Habitats Regulations Assessment (including Appropriate Assessment) (Updated April 2025).

[39] Kitchener, G (2025). Kent Rare Plant Register. Available at: https://bsbi.org/media/pages/learn/publications/rare-plant-registers/kent-2025/f3ac600e0c-1751631322/kent-2025.pdf [Date accessed: 12/12/25].

[40] Botanical Society of Britain and Ireland Website: https://database.bsbi.org/

- **Group 1:** Species for which distribution records show the species have no known occurrence within the vicinity;
- **Group 2:** Species for which no suitable habitat appears to be present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo;
- **Group 3:** Species that are well distributed within the estuary and affected areas of potential habitat comprise a negligible proportion of the overall potential habitat resource within the Ramsar, such that no adverse effect would arise on their overall conservation status.

3.4.26 **Table 3.5** summarises the association of non-halophyte plant species with nitrogen, drawing on the relevant Ellenberg nitrogen values, and describes their national and Kent-level distribution. The table also assigns each species to a group based on the categories described above.

Table 3.5: *Assessment of distribution of non-halophyte plant species associated with the Thames Estuary Ramsar designation and their sensitivities to nitrogen*

Common Name	Latin name	Ellenburg Value[41]	2025 Kent Rare Plant Register[42]	Assessment category
Bulbous Foxtail	*Alopecurus bulbosus*	5 - indicating relatively low sensitivity to nitrogen.	Although in England and in Great Britain *Alopecurus bulbosus* is not considered to be threatened (its status being of 'Least Concern'), it is both nationally and locally scarce, and the Kent populations are noted to be detached from the concentrations of distribution along the south coast of England, south Wales and along the Severn estuary. A review of BSBI data shows no records within areas of exceedance discussed below for A228.	Group 1 In addition, it is likely that no suitable habitat is present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo.
Slender Hare's-ear	*Bupleurum tenuissimum*	4	The Slender Hare's-ear is nationally scarce. Although the distribution is noted to be largely stable with some losses, particularly in the northerly part of its distribution, and it is therefore considered to be Vulnerable, both in England and Great Britain. It is included as a species of principal importance for the purpose of conserving biodiversity under Section 41 of the Natural Environment and Rural Communities Act 2006 and is said to be a good indicator of a coastal habitat threatened by agricultural intensification and development (the quality of its habitat is recognised by the plant's status as a Kent axiophyte). In Kent, it is	Group 3 Furthermore, it is likely that no suitable habitat for this species is present within the areas of the Ramsar where nitrogen deposition exceeds the lower critical load.

[41] Ellenberg N values indicate association with nitrogen levels, ranging from 1 for nutrient poor to 10 for nutrient rich. The N value expresses how strongly a plant is associated with low-nutrient or high-nutrient soils. Source from Ecoflora at www.ecoflora.org.uk.

[42] Botanical Society of Britain and Ireland Website: https://bsbi.org/media/pages/learn/publications/rare-plant-registers/kent-2025/f3ac600e0c-1751631322/kent-2025.pdf and https://bsbi.org/recording/maps-data/distribution

Common Name	Latin name	Ellenburg Value[41]	2025 Kent Rare Plant Register[42]	Assessment category
			uncommon, but sufficiently well represented around Sheppey and the Hoo peninsular so as not to be treated as locally rare or scarce. BSBI records indicate potential presence within areas of nitrogen deposition exceedance associated with the A228. However, suitable habitat for *Bupleurum tenuissimum* is limited and highly localised, and the areas affected by nitrogen deposition exceedance represent a negligible proportion of the overall potential habitat resource within the Ramsar site.	
Divided Sedge	*Carex divisa*	6 - indicating relatively low sensitivity to nitrogen.	Carex divisa is regarded as Scarce and Vulnerable in Great Britain, primarily a plant of the south east, with potential to be affected by coastal development or conversion of grazing marshes, and it is treated as a species of principal importance for the purpose of conserving biodiversity under Section 41 of the Natural Environment and Rural Communities Act 2006. In spite of this, its risk status in England is one of 'Least Concern'. In Kent it is quite common in low coastal areas and no county designation of scarcity is appropriate. BSBI records indicate potential presence within areas of nitrogen deposition exceedance associated with the A228.	Group 3 In addition, it is likely that no suitable habitat is present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo.
Small Red Goosefoot	*Chenopodium chenopodioides*	8 - indicating low sensitivity to nitrogen	Saltmarsh Goosefoot is nationally scarce, being largely restricted to Essex, so that the Thames estuary represents its core distribution. As it has diminished in its East Anglian range and is a characteristic species of good quality coastal grazing marsh and saltmarsh, its conservation status in England and in Great Britain as a whole is one of 'Least Concern', but this reflects a view regarding the stability of its populations. In Kent, it is not common, but is locally frequent where it does occur, and does not warrant designation for rarity or scarcity.	Group 3 In addition, it is likely that no suitable habitat is present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo.

Common Name	Latin name	Ellenburg Value[41]	2025 Kent Rare Plant Register[42]	Assessment category
			BSBI records indicate potential presence within areas of nitrogen deposition exceedance associated with the A228.	
Least Lettuce	*Lactuca saligna*	5 - indicating relatively low sensitivity to nitrogen.	*Lactuca saligna* is a nationally rare plant, designated as an Endangered species in both England and Great Britain as a whole. It currently grows in coastal areas, especially sea wall embankments, and was thought in the 1990s to be restricted in the British Isles to two populations, one in Rye harbour in East Sussex and the other at Fobbing in Essex. There are however two colonies in Kent, perhaps best interpreted as three, which qualify it to be regarded as rare in the county. These are along the sea wall on the west side of Yantlet Creek (on the Hoo Peninsula) and on Sheppey, alongside the Swale, near The Dray, which marks the beginning of Elmley Island. Neither of these areas are within the areas of exceedance. BSBI records indicate potential presence within areas of nitrogen deposition exceedance associated with the A228.	Group 1 It is likely that no suitable habitat is present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo.
Clustered Clover	*Trifolium glomeratum*	2	*Trifolium glomeratum* is a winter annual clover which grows primarily by the coast of southern England and the Channel Islands. It has formerly been treated as nationally scarce, but is no longer so and its conservation threat assessment in both England and Great Britain as a whole is one of 'Least Concern'. In Kent, Philp (2010) suggests that has been a substantial decline, to the level of scarcity, between the periods 1971-80 and 1991-2006. However, subsequent records are more extensive and the species, although far from common, does not appear to be rare or scarce in the county. Nevertheless, in view of the earlier evidence of decline, it is being maintained on this register for continued observation. It is a Kent axiophyte and so is indicative of good habitat. BSBI records indicate potential presence within areas of nitrogen deposition exceedance associated with the A228.	Group 3 In addition, it is likely that no suitable habitat is present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo.
Sea Clover	*Trifolium squamosum*	6 - indicating relatively	*Trifolium squamosum* is an annual clover of saline or brackish estuarial or coastal habitat in south Britain and the Channel	Group 3 In addition, it is likely that no

Common Name	Latin name	Ellenburg Value[41]	2025 Kent Rare Plant Register[42]	Assessment category
		low sensitivity to nitrogen.	Islands. It is nationally scarce, although its conservation threat assessment in both England and Great Britain as a whole is one of 'Least Concern'. It is neither rare nor scarce in Kent, although virtually restricted to the north coast, but its Kent populations are significant in a national context. BSBI records indicate potential presence within areas of nitrogen deposition exceedance associated with the A228.	suitable habitat is present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo.

3.4.27 It should be noted that the above assessment has not included a detailed site walkover or botanical survey within the areas of N-dep exceedance to which the MLP contributes. In addition, it is noted that a lack of desk-based species records does not confirm species absence.

3.4.28 Based on the above information it can be concluded that given the priority habitat type within 17m of the A228 (saline lagoons and coastal and floodplain grazing marsh), the habitat associations of these non-halophyte species (**Table 3.4**) and their distribution nationally and in Kent locally (**Table 3.5**) that there are unlikely to be adverse impacts from N-dep as a result of the MLP upon these Ramsar interest features.

3.4.29 Taking into consideration these factors it can be concluded that **no AIOSI will arise at the Thames Estuary and Marshes SPA and Ramsar as a direct result of elevated N-dep from the MLP, either alone or in combination**.

3.5 Consideration of the designated site in the national context

3.5.1 The Thames Estuary and Marshes SPA and Ramsar is of national importance due to its estuarine habitats which form one of the UK's most extensive and ecologically significant estuarine wetland systems (see **Section 3.2**). These habitats represent a critical component of the national site network. They include intertidal mudflat, saltmarsh, coastal grazing marsh, grazing wetlands, and reedbed, which are themselves nationally significant, but also provide supporting habitat for internationally important populations of migratory and overwintering birds, plants and invertebrates. The maintenance of these habitats in an FCS represent an important contribution to the achievement of the conservation status of European designations within the UK in the context of the national site network.

3.6 Consideration of best available evidence on small incremental impacts from nitrogen deposition

3.6.1 Given the conclusions set out above, it is not considered necessary to consider small incremental impacts of nitrogen deposition at the Thames Estuary and Marshes SPA or Ramsar.

3.7 Consideration of site survey information

3.7.1 Detailed site survey information has not been collated for the purposes of this assessment. Baseline data has however been obtained from sources such as Natural England's Priority Habitat Inventory and Natural England's Designated Sites Viewer, the latter of which provides FCS survey information for all SSSI units which underpin the SPA and Ramsar.

3.8 Consideration of national, regional or local initiatives

3.8.1 There are national and local initiatives and measures in place to promote a modal shift away from the private car, promote the use of electric vehicles and uptake of active travel, which will have a positive impact upon local air quality. In addition, local initiatives for instance the Four Elms Hill area action plan, include measures to improve air quality. However, there are no measures in place to reduce air pollution levels at the SPA or Ramsar designations specifically.

3.9 Consideration of measures to avoid or reduce the harmful effects of the plan

3.9.1 Given the conclusions set out above, is not considered necessary to consider mitigation measures.

3.10 Consideration of any likely in-combination effects

3.10.1 The air dispersion modelling has been informed by a traffic modelling prepared for the MLP. The traffic model takes into consideration baseline traffic flows which may act in combination with the MLP. In addition, the air quality dispersion modelling incorporates background air quality concentration from all other sectors.

3.11 Summary of findings

3.11.1 The CLe for NO_x will not be exceeded at any point within 200m of the A228. Therefore, no AIOSI will arise as a direct result of elevated NO_x from the MLP, either alone or in combination, at the Thames Estuary and Marshes SPA or Ramsar.

3.11.2 A review of habitat data within 200m of the A228 suggests that the most relevant CLe for NH_3 to be applied at the Thames Estuary and Marshes SPA and Ramsar is 3µg/m^3. Contributions from the MLP alone and in-combination are below 3µg/m^3 and therefore it can therefore be concluded that there will be no AIOSI at the Thames Estuary and Marshes SPA or Ramsar due to a change in NH_3 levels.

3.11.3 Air quality modelling shows that total N-dep concentrations exceed the lower CLo at all locations within 200m of the A228. The higher CLo is not exceeded at any location. The exceedance of the lower N-Dep CLo range is heavily influenced by the current high background concentrations and in-combination contributions from the MLP with other plans and projects. Trend data indicates that N-dep levels at the SPA and Ramsar within 200m of the A228 have reduced since 2003. Estuarine and coastal salt marsh systems are buffered against atmospheric N-dep due to nutrient dynamics being dominated by hydrology, they process and remove nitrogen efficiently and the ecological integrity of these systems if reliant on the physical and structural attributes of the habitats rather than subtle changes in nutrient inputs. Taking into consideration these factors, it can be concluded that there will be no AIOSI at the Thames Estuary and Marshes SPA and Ramsar as a direct result of elevated N-dep from the MLP, either alone or in combination.

4 Medway Estuary and Marshes SPA and Ramsar– Air Quality Appropriate Assessment

4.1 Introduction

4.1.1 This section of the AA focuses on an assessment of air quality impacts upon the conservation objectives of the following designations:

- Medway Estuary and Marshes SPA; and
- Medway Estuary and Marshes Ramsar.

4.1.2 The AA has been prepared following Natural England's guidance as set out in **Section 3.1**.

4.2 Are the sensitive qualifying features of the site likely to be exposed to emissions?

4.2.1 The North Kent Marshes designations comprise a continuous area of maritime habitat. **Section 3.2** describes these habitats in detail, as well as the potential impacts that may occur at these habitats as a result of a change in air quality.

4.2.2 The Medway Estuary and Marshes SPA and Ramsar is located on both the northern and southern banks of the Medway Estuary and forms a single tidal system with the Swale. It joins the Thames Estuary between the Isle of Grain and Sheerness. It consists of a complex arrangement of tidal channels, which drain around large islands of saltmarsh and peninsulas of grazing marsh. The mudflats are rich in invertebrates and also support beds of Enteromorpha and some Eelgrass (*Zostera spp*.). Small shell beaches occur, particularly in the outer part of the estuary. Grazing marshes are present inside the sea walls around the estuary. The complex and diverse mixes of coastal habitats support important numbers of waterbirds throughout the year. In summer, the estuary supports breeding waders and terns, whilst in winter it holds important numbers of geese, ducks, grebes and waders. The Medway Estuary and Marshes SPA and Ramsar is also of importance during spring and autumn migration periods, especially for waders[43].

4.2.3 The Medway Estuary and Marshes SPA and Ramsar are underpinned by the Medway Estuary and Marshes SSSI. This is comprised of 23 SSSI features of which 12 features are recorded to be in an unfavourable condition. This unfavourable condition is potentially linked to management of habitat or disturbance of birds. No link to a deterioration in air quality is stated. It is noted that the condition of some features has not been recorded.

[43] JNCC Medway Estuary and Marshes SPA Site Description. Available at: http://jncc.defra.gov.uk/default.aspx?page=2043. [Date Accessed: 11/10/25]

Qualifying habitat / features within areas of 1% exceedances

4.2.4 Mapping data has been reviewed to indicate habitat types present within 200m of each road link, within the designation boundary, where an exceedance of the 1% screening thresholds alone or in-combination have been concluded through the air quality modelling. This mapping data is presented in **Figures E.1** to **E.4** in **Appendix E** and shows that suitable habitat which may support qualifying features of the Medway Estuary and Marshes SPA and Ramsar (**Appendix B**) are located within an area where the 1% CLe or CLo is exceeded for each pollutant modelled (either alone or in-combination).

4.2.5 In summary the following habitat types, associated with the qualifying features of the Medway Estuary and Marshes SPA and Ramsar, where an exceedance of the 1% threshold is predicted (alone or in-combination) is presented in **Table 4.1**.

Table 4.1: *Priority habitat at the Medway Estuary and Marshes SPA and Ramsar within 200m of affected road links.*

Road links	Priority habitat types at designated sites within 200m of affected road links
A228 (Grain Road)	Coastal floodplain and grazing marsh Mudflats Coastal saltmarsh Saline lagoons
A289 (Gads Hill)	Mudflats Coastal saltmarsh
Lower Rainham Road	None provided in inventory
Gills Terrace	Mudflats
Otterham Quay Lane	Mudflats

4.3 Consideration of the Conservation Objectives

Conservation objectives

4.3.1 The conservation objectives for the Medway Estuary and Marshes SPA and Ramsar are set out in **Appendix B**. The conservation objectives for these qualifying features in relation to air quality are further defined in the supplementary advice provided by Natural England. This advice relates to the SPA only, however, given the similarity of features between these designations and the Ramsar designations, they have been taken into consideration for all designations. Natural England's supplementary advice notes that the air quality target for the SPA is as follows:

4.3.2 *"Maintain as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).*

4.3.3 *This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of feeding or roosting habitats.*

4.3.4 *Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development."*

4.3.5 The 'maintain' objective is applied where a designated site is considered to be making a sufficient contribution to achieving FCS in terms of air quality.

Background levels

4.3.6 APIS provides mid-year 2021 (2020-2022) air quality data for each SSSI in 1km grid squares. The average 1km grid square 2021 pollutant levels for the Medway Estuary and Marshes SPA are summarised in **Table 4.2**. It is noted that these figures provide a site average, and concentrations may be greater closer to road, agricultural or industrial point sources.

Table 4.2: *Average 1km grid square 2021 levels of pollutants for the Medway Estuary and Marshes SPA*

Appropriate deposition habitat type for qualifying features	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)
Short vegetation	0.897	11.879

4.3.7 When comparing these baseline levels to worst case and precautionary CLe and CLo the Medway Estuary and Marshes SPA and Ramsar (**Table 2.1**), it can be concluded that the lower NH_3 CLe of 1µg/m^3 is not exceeded. The lower N-dep CLo of 10kgN/ha/yr is exceeded by 1.879kgN/ha/yr but the upper CLo range is not exceeded.

4.3.8 The Air Quality Report modelling also provides baseline levels of all pollutants at each designated site for a 2019 baseline scenario (see Tables 4 – 7 of the Air Quality Report in Chapter 4). This data shows exceedances of the lower NH_3 CLe of 1µg/m^3 and N-dep lower range of 10kg/N/ha/yr at each designated site within 200m of the modelled road links.

4.3.9 Background air pollution concentrations at the Medway Estuary and Marshes SPA and Ramsar are exceeding CLo and CLe for qualifying features. Therefore, the conservation objectives for air quality (**paragraphs 4.3.2** to **4.3.4**) will be undermined by any proposal for which there is evidence that further emissions will compromise the ability of other national or local measures and initiatives to reduce background levels.

4.3.10 Natural England's guidance notes that this is a judgement to be taken by the competent authority (the Council) which "*should be informed by, amongst others, the extent to which any declining national trends in air pollution or strategic work to tackle emissions affecting the site more locally might otherwise lead to improvements, the rate at which such improvement are anticipated to be delivered, any credible evidence on the extent of the impacts of a plan or project and whether those impacts can properly be considered temporary and reversible".*

4.3.11 The extent to which the MLP will undermine the conservation objectives of the SPA or Ramsar to restore air quality therefore requires further consideration.

4.3.12 An effect from the MLP will be significant if it undermines the FCS of the SPA or Ramsar. It is therefore necessary to determine whether a deterioration of air quality caused by increased traffic flows as a result of the MLP will undermine the achievement of FCS by reducing the ability of air quality to be maintained at CLo and CLe.

4.3.13 A review of APIS data illustrates where measures need to be targeted to ensure the achievement of conservation objectives for the SPA. **Figure 4.1** illustrates local contributions to N-dep at the SPA. Data is taken from APIS for the SPA however no data is provided on APIS for the Ramsar designation. This data shows that local N-dep contributions from road traffic average 7.54% of all contributions. Non-agricultural waste represents nearly half of all local N-dep contributions (47%)[44].

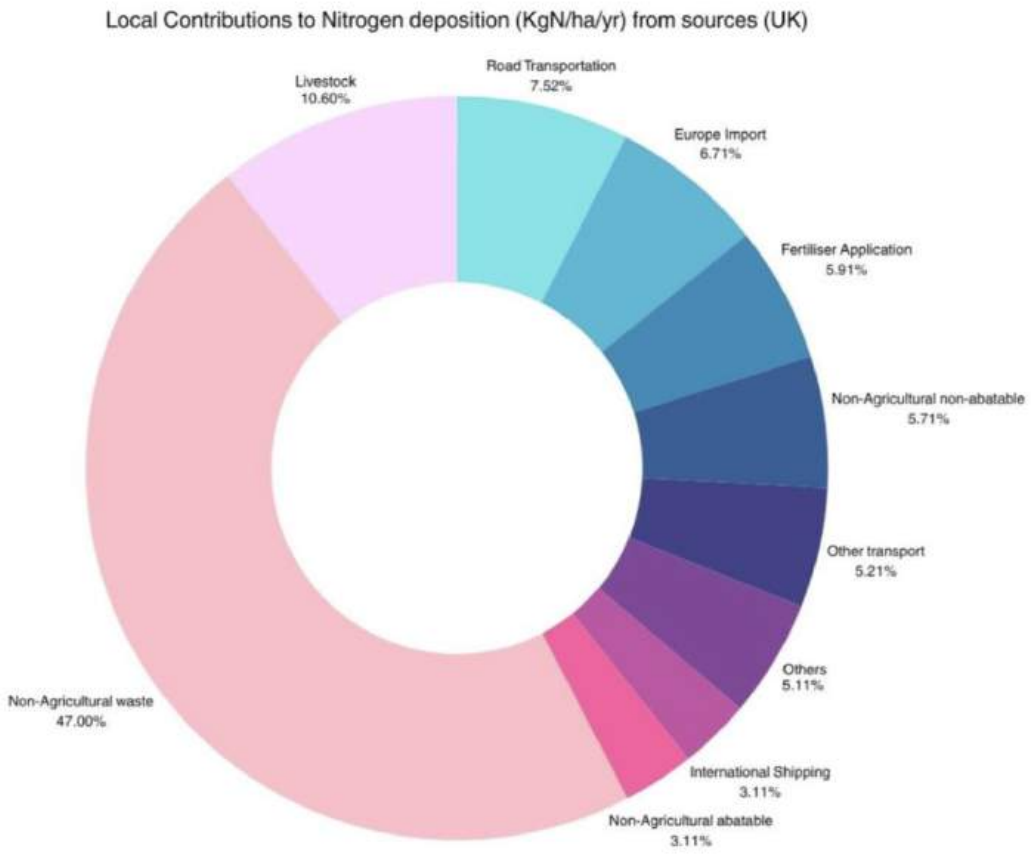


Figure 4.1: *Local contributions to nitrogen deposition (KgN/ha/yr) form sources (UK) at the Medway Estuary and Marshes SPA*

[44] These contributions are associated with processes such as fossil fuel combustion and other industrial processes.

4.4 Spatial scale, duration of the predicted impact and the ecological functionality

4.4.1 As set out in **Section 2.1**, analysis of traffic data in the Interim HRA indicated that there are a number of road links within 200m of the Medway Estuary and Marshes SPA and Ramsar which exceed the 1,000 AADT limit. Each of these road links were modelled in the Air Quality Report and are shown in Figures 3 to 6 of that report. These road links include the following:

- A228 Grain Road – Medway Estuary and Marshes SPA and Ramsar located to the immediate south.
- A289 Gads Hill – Medway Estuary and Marshes SPA and Ramsar located at its closest point 50m to the north.
- B2004 Lower Rainham Road – Medway Estuary and Marshes SPA and Ramsar located at its closest point 178m to the north.
- Gills Terrace – Medway Estuary and Marshes SPA and Ramsar located at its closest point 13m to the north.
- Otterham Quay Lane – Medway Estuary and Marshes SPA and Ramsar located at its closest point 70m to the north west.

4.4.2 **Section 3.4** provides a summary of the A228 at the point where it is located immediately adjacent to the Medway Estuary and Marshes SPA and Ramsar. The A289 forms part of the Medway Towns Northern Relief Road. The Lower Rainham Road, Otterham Quay Lane and Gills Terrace are smaller roads serving the local populations of Lower Rainham and Otterham Quay. At the point where the 1,000 AADT threshold is exceeded within 200m of the Lower Rainham Road and Otterham Quay Lane, the SPA and Ramsar are separated by arable fields, a boat/vehicle storage facility and industrial units (**Appendix C**).

4.4.3 A review has been undertaken to determine habitat type(s) present within a 200m corridor of the effected road links (i.e. area of LSE). Priority habitat mapping data indicates that habitat associated with the SPA and Ramsar within comprises coastal and floodplain grazing marshes, mudflats, saline lagoons, coastal marsh and reedbeds (**Table 4.1** and **Appendix E**). Further data is presented in **Table 4.3** drawing on habitat information in relation to the underpinning SSSI.

Table 4.3: *Main habitat type(s) within 200m of affected road links at the Medway Estuary and Marshes SPA and Ramsar*

Road Link screened into Appropriate Assessment in terms of air quality LSE	European Site within 200m of road link	SSSI Interest Unit underpinning designated site within 200m of road link and a description of main habitat type[45]
A228 Grain Road	Medway Estuary and Marshes SPA and Ramsar	Medway Estuary and Marshes SSSI Unit 100 Medway Intertidal (100) Main Habitat Type – Littoral Sediment.
		Medway Estuary and Marshes SSSI Unit 001 Stoke Marshes South (001) Main Habitat Type – Neutral Grassland Lowland

[45] https://magic.defra.gov.uk/

Road Link screened into Appropriate Assessment in terms of air quality LSE	European Site within 200m of road link	SSSI Interest Unit underpinning designated site within 200m of road link and a description of main habitat type[45]
A289 Gads Hill	Medway Estuary and Marshes SPA and Ramsar	Medway Estuary and Marshes SSSI Unit 100 Medway Intertidal (100) Main Habitat Type – Littoral Sediment.
B2004 Lower Rainham Road	Medway Estuary and Marshes SPA and Ramsar	Medway Estuary and Marshes SSSI Unit 100 Medway Intertidal (100) Main Habitat Type – Littoral Sediment.
Gills Terrance	Medway Estuary and Marshes SPA and Ramsar	Medway Estuary and Marshes SSSI Unit 100 Medway Intertidal (100) Main Habitat Type – Littoral Sediment.
Otterham Quay Lane	Medway Estuary and Marshes SPA and Ramsar	Medway Estuary and Marshes SSSI Unit 100 Medway Intertidal (100) Main Habitat Type – Littoral Sediment.

4.4.4 In 2010 Natural England assessed SSSI Unit 01 as currently being in an unfavourable recovering condition due to criterion for a number of wintering and breeding birds not being met[46]. Natural England observed that the habitat in this SSSI Unit comprised wet grassland grazing marsh in 2022. In 2017 Natural England assessed SSSI Unit 100 as currently being in an unfavourable declining condition due to "*algal blooms on Bartlett spit and Bishops ooze in front of the Motney Sewage treatment works outfall - smothering the mudflats and impacting on the food availability for the Medway bird assemblage*"[47]. The SSSI Citation for the whole of the Medway Estuary and Marshes SSSI notes that the site consists of a complex of mudflats and saltmarsh and, in places, grazing marsh behind the sea walls which is intersected by dykes and fleets.

4.4.5 The air quality dispersion modelling predicts concentrations of NO_x, NH_3 and N-dep at three transect locations within 200m of each affected road link for the Medway Estuary and Marshes SPA and Ramsar (**Appendix C**). In addition, isopleth air quality data has been provided.

Nitrogen oxides

4.4.6 At the Medway Estuary and Marshes SPA and Ramsar, in all future year scenarios and at all locations, the total concentration of NO_x is below the CLe of 30µg/m^3. As the CLe will not be exceeded, **no AIOSI at the Medway Estuary and Marshes SPA or Ramsar will arise as a direct result of elevated NO_x from the MLP, either alone or in combination.**

[46] Natural England Designated Site Viewer: https://designatedsites.naturalengland.org.uk/UnitDetail.aspx?UnitId=1016729&SiteCode=S1000244&SiteName=medway&countyCode=&responsiblePerson= [Date Accessed: 12/11/25].

[47] Natural England Designated Site Viewer: https://designatedsites.naturalengland.org.uk/UnitDetail.aspx?UnitId=1023903&SiteCode=S1000244&SiteName=medway&countyCode=&responsiblePerson= [Date Accessed: 12/11/25].

Ammonia

4.4.7 APIS indicates that not all SPA qualifying features are sensitive to a change in ammonia. It notes that for some species, there will be no expected negative impact on species' broad habitat. For other species, APIS notes that there may be positive impacts due to a change in food supply. APIS does not provide data for the Ramsar designations. As such air quality data for the underpinning SSSIs (Medway Estuary and Marshes SSSI) has been used to inform this assessment in respect of other qualifying species, such as invertebrates and plants, for each Ramsar.

4.4.8 As noted in **Section 2.3**, the air quality modelling has taken a precautionary approach and applied the lower CLe of 1µg/m^3 which is applicable to habitat containing lichen and bryophyte. Taking into consideration the habitat types within 200m of the affected road links at the Medway Estuary and Marshes SPA and Ramsar, and the distribution of lichen and bryophytes within these estuarine habitats, the most appropriate NH_3 CLe for is 3µg/m^3.

4.4.9 The air quality modelling data provides total concentrations of NH_3 with the MLP within 200m of each affected road link where it is coincident with the Medway Estuary and Marshes SPA and Ramsar. This data indicates that there are no exceedances of the higher NH_3 CLe of 3µg/m3 at any location within the SPA or Ramsar. It is therefore considered that **no AIOSI will arise at the Medway Estuary and Marshes SPA and Ramsar as a direct result of elevated NH_3 from the MLP, either alone or in combination.**

Nitrogen deposition

4.4.10 As noted in **Section 2.3**, N-dep rates are habitat-specific as different habitats have varying tolerances to different levels of deposition and for some species a change in N-dep is likely to be positive. **Appendix A** summarises the critical loads at the Medway Estuary and Marshes SPA and Ramsar as set out on the APIS.

4.4.11 The broad habitat type which supports the qualifying bird species of the Medway Estuary and Marshes SPA and Ramsar is Atlantic upper-mid and mid-low salt marshes. This has a CLo range from 10–20 kgN/ha/yr. No site-specific N-dep CLo is provided for the invertebrate assemblage or vascular plants associated with the Ramsar. However, N-dep CLo provided on APIS for saltmarsh species for the underpinning SSSI indicate that the CLo range used for Atlantic upper-mid and mid-low salt marshes is appropriate (see data presented in **Appendix A**).

4.4.12 The air quality modelling for all affected road links shows that total N-dep concentrations exceed the lower CLo at all locations within 200m. The higher CLo is not exceeded at any location.

4.4.13 It is noted that an exceedance of the CLo does not mean that an adverse impact upon site integrity will occur as other factors will have an influence.

4.4.14 The total baseline level of N-dep as provided on APIS is within this critical load range (**Table 4.2**). The air quality modelling provides outputs for Scenario C (2041 without Local Plan) and Scenario D (2041 with Local Plan). A comparison of these two scenarios allows the contribution of the MLP to N-dep to be explored.

4.4.15 Data presented in Table 6 of the Air Quality Report indicate that, at transects coinciding with the Medway Estuary and Marshes SPA and Ramsar site along the A228, the MLP would contribute approximately 0.1kgN/ha/yr to total N-dep within 2m of the road edge. Beyond 17m data shops that the MLP makes no contribution to N-dep levels. As a result, the predicted increase of 0.1kgN/ha/yr is not significant and would not be expected to alter habitat structure, vegetation composition, or supporting processes relevant to the qualifying bird, plant and invertebrate species of the SPA and Ramsar designations. This conclusion is reflected in the assessment of 1% change screening threshold which shows that there are no MLP alone exceedances of the threshold.

4.4.16 At transects coinciding with the Medway Estuary and Marshes SPA and Ramsar site along the A289, the MLP would contribute approximately 0.2kgN/ha/yr to total N-dep within 2m of the road edge (transect E4_N and E5_N). Beyond a maximum of 167m, the MLP contributes 0.0kgN/ha/yr. The assessment of the 1% change screening threshold at this location shows an exceedance of this 1% threshold within 111m from the MLP alone and up to 167m for the MLP in-combination.

4.4.17 The Air Quality Report provides an estimated background N-Dep concentration in 2041 (end plan year) at all modelled transects. The highest 2041 background concentration is within 2m of the A228 and is 11.8kgN/ha/yr and 13.1kgN/ha/yr at the A289. This is a reduction from a 2019 baseline used in the air quality modelling of 1.0kgN/ha/yr at the A228 and 1.4kgN/ha/yr at the A289.

4.4.18 The Air Quality Report (at Appendix A3) provides information on the retardation effects of the MLP. N-dep in 2041 will be less than present levels due to vehicle fleet turnover and policies to reduce emission. As such the degree of 'retardation' to on-going reduction in N-dep have been calculated. Table A3-2 of the Air Quality presents the total number of years delay to reductions in N-Dep at the worst case transects for each designated site.

4.4.19 This shows that the MLP alone will retard background improvements by under a year (0.8) at the worst case transect within 2m of the carriageway. The MLP in combination with other plans and projects will retard background improvements by under 18.9 years at the worst case transect within 2m of the carriageway (transect E1_S).

4.4.20 In addition to the assessment of modelled air quality data, Natural England's guidance recommends that consideration be given to background pollution trend data. As illustrated in **Figure 3.2 (Chapter 3)**, for the 1km grid square adjacent to the A228, APIS data shows that N-Dep fell for short vegetation (relevant to the estuary habitat types) from 14.88 kg N/ha/year in 2003 to 12.15kg N/ha/year in. As illustrated in **Figure 4.2**, for the 1km grid square adjacent to the A289, APIS data shows that N-Dep fell for short vegetation (grassland) from 15.93 kg N/ha/year in 2003 to 12.73 kg N/ha/year in 2021.

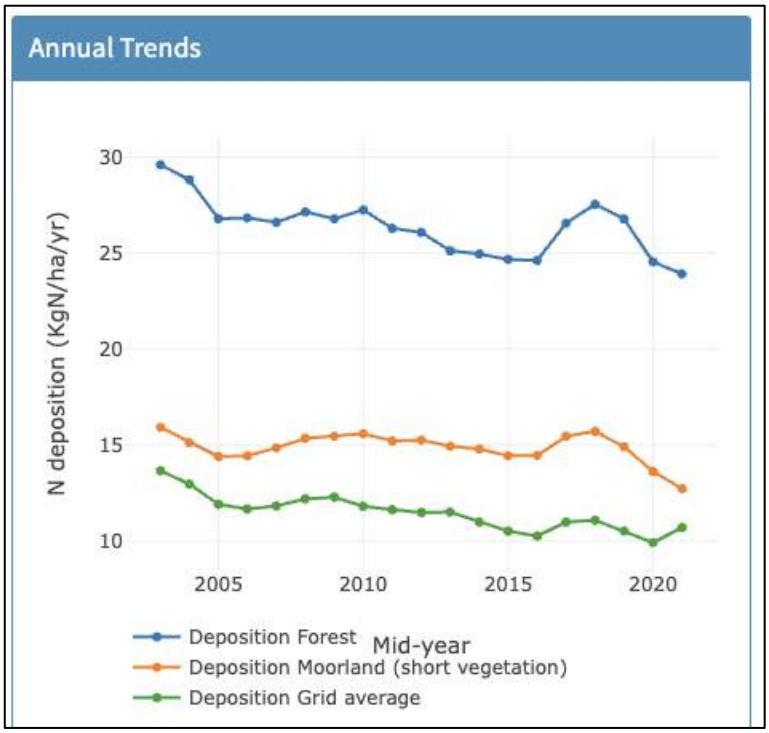


***Figure 4.2**: Annual N-dep trends for the 1km grid square within 200m of the A289: source APIS*

4.4.21 As detailed in **Section 3.4**, the nature of the estuary means that it has the capacity to buffer against atmospheric N-dep due to nutrient dynamics being dominated by hydrology, efficient nitrogen removal and the ecological reliance on physical and structural habitat attributes rather than subtle changes in nutrient inputs.

4.4.22 Similarly to the Thames Estuary (see **Section 3.4**), the Medway Estuary and Marshes Ramsar is designated for a number of plant interest features under criterion 4. These species include a number of non-halophyte (or not-true-halophyte) plant species. These species therefore have the potential to be present in habitats outside the main estuary itself in areas where inputs from river and tidal inundation plays a less significant role in buffering of atmospheric N-dep inputs.

4.4.23 **Table 4.4** sets out the habitat conditions in which these non-halophyte species are found.

***Table 4.4:** Habitat requirements for non-halophyte plant species associated with the Medway Estuary Ramsar designation*

Common Name	Latin name	Habitat[48]
Slender Hare's-ear	*Bupleurum tenuissimum*	Grassy or brackish ground.
Small Red Goosefoot	*Chenopodium chenopodioides*	Dykes and brackish pastures by sea.
Curved Hard-grass	*Parapholis incurva*	Sparsely -grassed ground on salt-marshes and creeks and drier spots on cliff-tops and banks.

[48] Stace, C.A. 1992. New Flora of the British Isles. Cambridge University Press.

4.4.24 These nationally scarce non-halophyte plants are associated with habitats which are found in coastal locations as indicated in **Table 4.4**. Non-halophyte species cannot grow on true saltmarsh or mudflats because they lack salt tolerance. They may therefore be found above the saltmarsh on coastal grassland, on sea walls, embankments, upper drift lines and in brackish environments but not within saline ditches or inland of the tidal limit.

4.4.25 As shown in **Appendix E** habitats within 17m of the A228 comprises the saline lagoon and coastal and floodplain grazing marsh priority habitat. Habitat within 167m of the A289 comprises mudflat priority habitat only. Data provided in **Table 3.4** indicates that non-halophyte plant species are found above the saltmarsh on coastal grassland, on sea walls, embankments, upper drift lines and in brackish but not within saline ditches / lagoons or inland of the tidal limit in lower or mid saltmarsh. They are therefore unlikely to be present within 17m of the A228 or within 167m of the A289.

4.4.26 As detailed in **paragraph 3.4.24** a review has been undertaken drawing on known distribution data from the Kent Rare Plant Register (KRPR)[49] and information available on the BSBI's Distribution Database[50] for non-halophyte plant species which form part of the Thames Estuary and Marshes Ramsar. This review divides non-halophyte plant interest species into three main groups as detailed in **paragraph 3.4.25**.

4.4.27 **Table 4.5** summarises the association of non-halophyte plant species with nitrogen, drawing on the relevant Ellenberg nitrogen values, and describes their national and Kent-level distribution. The table also assigns each species to a group based on the categories detailed in **paragraph 3.4.25**.

Table 4.5: *Assessment of distribution of non-halophyte plant species associated with the Medway and Thames Estuary Ramsar designations and their sensitivities to nitrogen*

Common Name	Latin name	Ellenburg Value[51]	2025 Kent Rare Plant Register[52]	Assessment category
Slender Hare's-ear	*Bupleurum tenuissimum*	4	See summary in **Table 3.5**	See summary in **Table 3.5**
Small Red Goosefoot	*Chenopodium chenopodioides*	8 - indicating low sensitivity to nitrogen	See summary in **Table 3.5**	See summary in **Table 3.5**
Curved Hard-grass	*Parapholis incurva*	4	*Parapholis incurva* is a coastal plant of saline conditions, and also found by inland roads affected by de-icing salt, with its main	Group 3 In addition, it is likely that no

[49] Kitchener, G (2025). Kent Rare Plant Register. Available at: https://bsbi.org/media/pages/learn/publications/rare-plant-registers/kent-2025/f3ac600e0c-1751631322/kent-2025.pdf [Date accessed: 12/12/25].

[50] Botanical Society of Britain and Ireland Website: https://database.bsbi.org/

[51] Ellenberg N values indicate association with nitrogen levels, ranging from 1 for nutrient poor to 10 for nutrient rich. The N value expresses how strongly a plant is associated with low-nutrient or high-nutrient soils. Source from Ecoflora at www.ecoflora.org.uk.

[52] Botanical Society of Britain and Ireland Website: https://bsbi.org/media/pages/learn/publications/rare-plant-registers/kent-2025/f3ac600e0c-1751631322/kent-2025.pdf and https://bsbi.org/recording/maps-data/distribution

Common Name	Latin name	Ellenburg Value[51]	2025 Kent Rare Plant Register[52]	Assessment category
			British distribution along the south and east coasts of England and the south coast of Wales. It is a nationally scarce plant whose conservation risk status in both England and Great Britain as a whole is one of 'Least Concern'. It is reasonably well represented in Kent, particularly along the north coast from Seasalter to Thanet, and is neither rare nor scarce in the county. BSBI records indicate potential presence within areas of nitrogen deposition exceedance associated with the A228 and A289.	suitable habitat is present within the affected area of the Ramsar i.e. within areas of N-dep exceedance of lower CLo.

4.4.28 It should be noted that the above assessment has not included a detailed site walkover or botanical survey within the areas of N-dep exceedance to which the MLP contributes. In addition, it is noted that a lack of desk-based species records does not confirm species absence.

4.4.29 Based on the above information it can be concluded that given the priority habitat type within 17m of the A228 (saline lagoons and coastal and floodplain grazing marsh) and 167m of the A289 (mudflats), the habitat associations of these non-halophyte species (**Table 4.4**) and their distribution nationally and in Kent locally (**Table 4.5**) that there are unlikely to be adverse impacts from N-dep as a result of the MLP upon these Ramsar interest features.

4.4.30 It can therefore be concluded that there will be **no AIOSI at the Medway Estuary and Marshes SPA and Ramsar as a direct result of elevated N-dep from the MLP, either alone or in combination**.

4.5 Consideration of the designated site in the national context

4.5.1 The Medway Estuary and Marshes SPA and Ramsar is of national importance due to its estuarine habitats which form one of the UK's most extensive and ecologically significant estuarine wetland systems (see **Section 3.2**). These habitats represent a critical component of the national site network. They include intertidal mudflat, saltmarsh, coastal grazing marsh, grazing wetlands, and reedbed, which are themselves nationally significant, but also provide supporting habitat for internationally important populations of migratory and overwintering birds, plants and invertebrates. The maintenance of these habitats in an FCS represent an important contribution to the achievement of the conservation status of European designations within the UK in the context of the national site network.

4.6 Consideration of best available evidence on small incremental impacts from nitrogen deposition

4.6.1 Given the conclusions set out above, it is not considered necessary to consider small incremental impacts of nitrogen deposition at the Medway Estuary and Marshes SPA or Ramsar.

4.7 Consideration of site survey information

4.7.1 Detailed site survey information has not been collated for the purposes of this assessment. Baseline data has however been obtained from sources such as Natural England's Priority Habitat Inventory and Natural England's Designated Sites Viewer, the latter of which provides FCS survey information for all SSSI units which underpin the SPA and Ramsar.

4.8 Consideration of national, regional or local initiatives

4.8.1 There are national and local initiatives and measures in place to promote a modal shift away from the private car, promote the use of electric vehicles and uptake of active travel, which will have a positive impact upon local air quality. In addition, local initiatives for instance the Four Elms Hill area action plan, include measures to improve air quality. However, there are no measures in place to reduce air pollution levels at the SPA or Ramsar designations specifically.

4.9 Consideration of measures to avoid or reduce the harmful effects of the plan

4.9.1 Given the conclusions set out above, is not considered necessary to consider mitigation measures.

4.10 Consideration of any likely in-combination effects

4.10.1 The air dispersion modelling has been informed by a traffic modelling prepared for the MLP. The traffic model takes into consideration baseline traffic flows which may act in-combination with the MLP. In addition, the air quality dispersion modelling incorporates background air quality concentration from all other sectors.

4.11 Summary of findings

4.11.1 The CLe for NOx will not be exceeded at any point within 200m of the A228. Therefore, no AIOSI will arise as a direct result of elevated NOx from the MLP, either alone or in combination, at the Medway Estuary and Marshes SPA or Ramsar.

4.11.2 A review of habitat data within 200m of the A228 suggests that the most relevant CLe for NH3 to be applied at the Medway Estuary and Marshes SPA and Ramsar is 3µg/m3. Contributions from the MLP alone and in-combination are below 3µg/m3 and therefore it can therefore be concluded that there will be no AIOSI at the Medway Estuary and Marshes SPA or Ramsar due to a change in NH3 levels.

4.11.3 Air quality modelling shows that total N-dep concentrations exceed the lower CLo at all locations within 200m of an affected road link. The higher CLo is not exceeded at any location. The exceedance of the lower N-Dep CLo range is heavily influenced by the current high background concentrations and in-combination contributions from the MLP with other plans and projects. Trend data indicates that N-dep levels at the SPA and Ramsar have reduced since 2003. Estuarine and coastal salt marsh systems are buffered against atmospheric N-dep due to nutrient dynamics being dominated by hydrology, they process and remove nitrogen efficiently and the ecological integrity of these systems if reliant on the physical and structural attributes of the habitats rather than subtle changes in nutrient inputs. Taking into consideration these factors it can be concluded that there will be no AIOSI will arise at the Medway Estuary and Marshes SPA and Ramsar as a direct result of elevated N-dep from the MLP, either alone or in combination.

5 North Downs Woodlands SAC – Air Quality Appropriate Assessment

5.1 Introduction

5.1.1 This section of the AA focuses on an assessment of air quality impacts upon the conservation objectives of the North Downs Woodlands SAC.

5.1.2 It follows Natural England's guidance for AA as set out in **Section 3.1**.

5.2 Are the sensitive qualifying features of the site likely to be exposed to emissions?

5.2.1 The North Downs Woodlands SAC consists of mature Beech (*Fagus sylvatica*) forests and Yew (*Taxus baccata*) woods on steep slopes (see **Appendix B**). The stands lie within a mosaic of scrub, other woodland types and areas of unimproved grassland on thin chalk soils[53].

5.2.2 The North Downs Woodlands SAC is underpinned by Halling to Trottiscliffe Escarpment SSSI and Wouldham to Detling Escarpment SSSI. Halling to Trottiscliffe Escarpment SSSI is comprised of seven SSSI features, of which one feature is recorded to be in an unfavourable condition. Wouldham to Detling Escarpment SSSI is comprised of eight SSSI features, of which two features are recorded to be in an unfavourable condition. This unfavourable condition is potentially linked to management of habitat and dominance of scrub. No link to a deterioration in air quality is stated. It is noted that not all features have been recorded.

Qualifying habitat / features within areas of 1% exceedances

5.2.3 Mapping data has been reviewed to indicate habitat types present within 200m of each road link, within the designation boundary, where an exceedance of the 1% screening thresholds alone or in-combination have been concluded through the air quality modelling (**Chapter 2**). This mapping data is presented in **Appendix E** and shows that suitable habitats which may support qualifying features of the SAC are located within an area where the 1% CLe or CLo is exceeded for each pollutant modelled (either alone or in-combination).

5.2.4 In summary, the following habitat types, associated with the qualifying features of the SAC, where an exceedance of the 1% threshold is predicted (alone or in-combination) is presented in **Table 5.1** and **Figures E.5** and **E.6** of **Appendix E**.

Table 5.1: *Priority habitat within the SAC boundary which are located within 200m of affected road links.*

Road links	Priority habitat types at designated sites within 200m of affected road links
Lidsing Road	Deciduous woodland Lowland calcareous grassland
Pilgrims Way	Deciduous woodland Lowland calcareous grassland

[53] Natural England (2019) North Downs Woodlands SAC. Supplementary Advice. Available at: http://publications.naturalengland.org.uk/file/5280120969625600 [Date accessed: 11/11/25]

Road links	Priority habitat types at designated sites within 200m of affected road links
Harp Farm Road	Deciduous woodland
Chatham Road	Deciduous woodland

5.3 Consideration of the Conservation Objectives

Conservation objectives

5.3.1 The conservation objectives for the North Downs Woodlands SAC are set out in **Appendix B**. The conservation objectives for its qualifying features in relation to air quality are further defined in the supplementary advice provided by Natural England as follows:

5.3.2 *"Maintain as necessary, the concentrations and deposition of air pollutants to at or below the site-relevant Critical Load or Level values given for this feature of the site on the Air Pollution Information System (www.apis.ac.uk).*

5.3.3 *This target has been included because the structure and function of habitats which support this SPA feature may be sensitive to changes in air quality. Exceeding critical values for air pollutants may result in changes to the chemical status of its habitat substrate, accelerating or damaging plant growth, altering vegetation structure and composition and thereby affecting the quality and availability of feeding or roosting habitats.*

5.3.4 *Critical Loads and Levels are thresholds below which such harmful effects on sensitive UK habitats will not occur to a noteworthy level, according to current levels of scientific understanding. There are critical levels for ammonia (NH_3), oxides of nitrogen (NO_x) and sulphur dioxide (SO_2), and critical loads for nutrient nitrogen deposition and acid deposition. There are currently no critical loads or levels for other pollutants such as Halogens, Heavy Metals, POPs, VOCs or Dusts. These should be considered as appropriate on a case-by-case basis. Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development.*

5.3.5 *Ground level ozone is regionally important as a toxic air pollutant but flux-based critical levels for the protection of semi-natural habitats are still under development. It is recognised that achieving this target may be subject to the development, availability and effectiveness of abatement technology and measures to tackle diffuse air pollution, within realistic timescales. There are concerns about the risk of atmospheric nitrogen deposition which have been flagged as needing further investigation but currently the critical load for the site is within acceptable limits."*

5.3.6 The 'maintain' objective is applied where a designated site is considered to be making a sufficient contribution to achieving FCS in terms of air quality.

Background Data

5.3.7 APIS provides mid-year 2021 (2020-2022) air quality data for each SSSI in 1km grid squares. The average 1km grid square 2021 pollutant levels for the SAC are summarised in **Table 5.2.** It is noted that these figures provide a site average, and concentrations may be greater closer to road, agricultural or industrial point sources.

Table 5.2: *Average 1km grid square 2021 levels of pollutants for the North Downs Woodlands SAC*

Appropriate deposition habitat type for qualifying features	Ammonia (µg/m3)	N-Dep (kgN/ha/yr)	A-Dep
Tall vegetation	0.955	25.259	1.925
Short vegetation	0.955	13.69	1.061

5.3.8 When comparing these baseline levels to worst case and precautionary CLe and CLo for the SAC (**Table 2.1**) it can be concluded that the lower NH_3 CLe of 1µg/m^3 is not exceeded. For deposition to tall vegetation (at woodland habitat) the upper N-dep CLo of 15kgN/ha/yr is exceeded by 10.259kgN/ha/yr. For deposition to short vegetation (at calcareous grassland) the lower N-dep CLo of 10kgN/ha/yr is exceeded by 3.69kgN/ha/yr but the upper CLo range of 20kgN/ha/yr is not exceeded. The lower A-Dep CLo range is not exceeded for deposition to either short or tall vegetation.

5.3.9 The Air Quality Report modelling also provides baseline levels of all pollutants at each designated site for a 2019 baseline scenario. These are presented in Tables 4–7 of the Air Quality Report in Chapter 4. This data show exceedances of the lower NH_3 CLe of 1µg/m3 and N-dep lower range of 10kg/N/ha/yr within 200m of the modelled road links and exceedances of the A-dep lower range of 1.983 keq/ha/yr at the North Downs Woodlands SAC.

5.3.10 Background air pollution concentrations at the North Downs Woodlands SAC are exceeding CLo and CLe for qualifying features. Therefore, the conservation objectives for air quality (**paragraphs 5.3.2** to **5.3.5**) will be undermined by any proposal for which there is evidence that further emissions will compromise the ability of other national or local measures and initiatives to reduce background levels.

5.3.11 Natural England's guidance notes that this is a judgement to be taken by the competent authority (the Council) which "*should be informed by, amongst others, the extent to which any declining national trends in air pollution or strategic work to tackle emissions affecting the site more locally might otherwise lead to improvements, the rate at which such improvement are anticipated to be delivered, any credible evidence on the extent of the impacts of a plan or project and whether those impacts can properly be considered temporary and reversible".*

5.3.12 The extent to which the MLP will undermine the conservation objectives of the SAC to restore air quality therefore requires further consideration.

5.3.13 An effect from the MLP will be significant if it undermines the FCS of the SAC. It is therefore necessary to determine whether a deterioration of air quality caused by increased traffic flows as a result of the MLP will undermine the achievement of FCS by reducing the ability of air quality to be maintained at CLo and CLe.

5.3.14 A review of APIS data illustrates where measures need to be targeted to ensure the achievement of conservation objectives for the SAC. **Figure 5.1** illustrates local contributions to N-dep at the SAC. The APIS data shows that local N-dep contributions from road traffic average 16.6% of all contributions. Non-Agricultural non-abatable ()13.8%), Livestock (16.9%) and fertiliser application (9%) also represents significant local N-dep contributions.

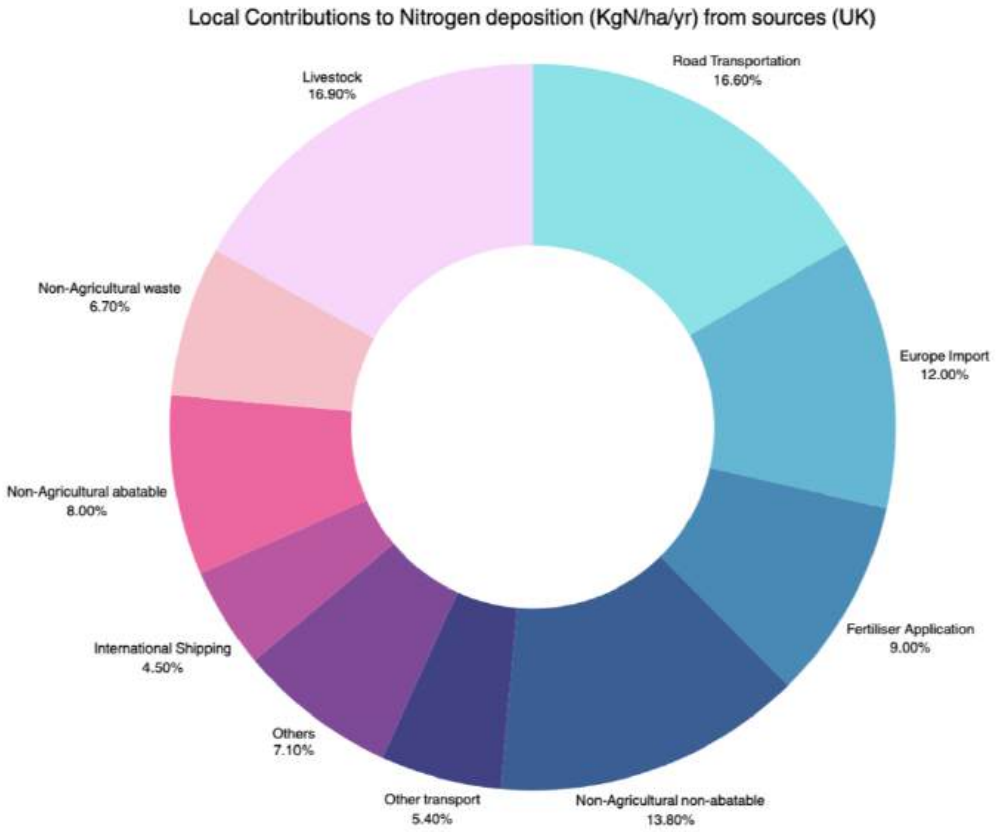


Figure 5.1: *Local contributions to nitrogen deposition (KgN/ha/yr) form sources (UK) at the North Downs Woodlands SAC*

5.4 Spatial scale, duration of the predicted impact and the ecological functionality

5.4.1 The North Downs Woodlands SAC is split over two locations, the first of which contains part of the Halling to Trottiscliffe Escarpment SSSI, and the second which contains part of the Wouldham to Detling Escarpment SSSI. A small proportion of the SAC near Upper Halling falls within Medway's boundary.

5.4.2 There are no strategic road links within 200m of the Halling to Trottiscliffe Escarpment SSSI component of the SAC. The air quality modelling has focused on an assessment of impacts at the Wouldham to Detling Escarpment SSSI where the following road links pass within 200m.

- A229 – This is a strategic connection providing access to Rochester in Medway, the North Downs at Blue Bell Hill and Maidstone. It also connects the M2 and M20. The SAC is located approximately 172m to the east of the A229.
- Lidsing Road – This road is a minor road connecting local settlements between the M2 and M20. This road link passes through the North Downs Woodlands SAC.
- Harp Farm Road – This road is a minor road connecting local settlements between the M2 and M20. The SAC is located approximately 26m to the south of Harp Farm Road.

- Pilgrims Way – This road is a minor road connecting local settlements between the M2 and M20. The North Downs Woodlands SAC is adjacent to the Pilgrims Way.
- The Street – This road is a minor road connecting local settlements between the M2 and M20. The SAC is located approximately 152m to the north of The St.

5.4.3 A review of mapping data indicates that habitat associated with the SAC within 200m of these road links comprises deciduous woodland with a small area of lowland calcareous grassland to the south west (see **Figures E.5** and **E.6, Appendix E**).

5.4.4 The above road links are located within 200m of the Wouldham to Detling Escarpment SSSI and SSSI Units 18, 19, 20 and 21. Units 19, 20 and 21 were assessed in 2021 by Natural England as being in a favourable condition. These units comprise lowland broadleaved mixed and yew woodland. The most recent condition surveys undertaken by Natural England indicates that Units 19, 20 and 21 include healthy Yew areas with good regeneration. Unit 18 comprises lowland calcareous grassland and was assessed in 2018 by Natural England as being in an unfavourable recovering condition due to domination of brome and brambles.

5.4.5 The air quality dispersion modelling predicts concentrations of NO_x, NH_3, N-dep and A-dep at eight transect locations within 200m of the North Downs Woodlands SAC (see **Appendix C**). In addition, isopleth air quality data has been provided.

Nitrogen oxides

5.4.6 At the North Downs Woodlands SAC, in all future year scenarios and at all locations, the total concentration of NOx is below the CLe of 30µg/m^3. As the CLe will not be exceeded, **no AIOSI at the North Downs Woodlands SAC will arise as a direct result of elevated NOx from the MLP, either alone or in combination.**

Ammonia

5.4.7 As set out in **Section 2.3**, the NH_3 CLe for the North Downs Woodlands SAC is 1µg/m^3 for the Beech forests and semi-natural dry grasslands and 3µg/m^3 for the Yew woods. Taking a precautionary approach the lower range of 1µg/m^3 was applied in the Air Quality Report.

5.4.8 The air quality modelling is presented in Table 5 of the Air Quality Report. This shows that at transects W1_E and W6_N there is no contribution (0.00µg/m^3) from the MLP to NH_3 levels and therefore impacts at these transects can be discounted. Transect W1_E is associated with contributions from the A229 and therefore this road link can be discounted from the assessment of NH_3 impacts. Transect W6_N is associated with contributions from the Pilgrims Way and therefore this road link can also be discounted from the assessment of NH_3 impacts.

5.4.9 At all other transects (W2_S, W3_N, W3_S, W4_N, W4_S and W5_N) the MLP contributes towards total NH_3 levels. At all locations the total concentration of NH_3 is greater than 1µg/m^3. The maximum concentrations are at 2m from each road link with the highest total concentration being 1.84µg/m^3 (at transect W5_N). A total concentration of 1.5 to 2.0 µg/m^3 is located within 3–9m of each road link. Levels beyond 9m range between 1–1.5µg/m^3.

5.4.10 It is likely that these exceedances are associated with traffic flows on Lidsing Road.

Nitrogen deposition

5.4.11 As noted in **Section 2.3**, N-dep rates are habitat-specific. The N-Dep CLo for the Beech forest and Yew woods qualifying features of the North Downs Woodlands SAC is 10–15kg N/ha/yr. The CLo range for the semi-natural dry grassland qualifying feature is 10–20kg N/ha/yr (**Appendix A**). Taking a precautionary approach to screening of LSEs, the lower range of 10kg N/ha/yr for N-dep was applied in the Air Quality Report for the North Downs Woodlands SAC.

5.4.12 The air quality modelling for all affected road links set out in **paragraph 5.4.2** shows that total N-dep concentrations with the Plan in combination with other plans and projects exceed the lower CLo for all qualifying features of 10kgN/ha/yr by a maximum of 20.1kgN/ha/yr (transect W5_N). For calcareous grassland the upper CLo range (20kgN/ha/yr) is also exceeded by 10.1 kgN/ha/yr (transect W5_N). Total N-dep to Beech and Yew woodland exceeds the upper CLo range (15kgN/ha/yr) by 15.1 kgN/ha/yr (transect W5_N).

5.4.13 It is noted that an exceedance of the CLo does not mean that an adverse impact upon site integrity will occur as other factors will have an influence.

5.4.14 The total baseline level of N-dep as provided on APIS is above the upper CLo range for all qualifying features of the SAC (**Table 5.2**). The air quality modelling provides outputs for Scenario C (2041 without Local Plan) and Scenario D (2041 with Local Plan). A comparison of these two scenarios allows the contribution of the MLP to N-dep to be explored.

5.4.15 The air quality modelling is presented in Table 6 of the Air Quality Report. This shows that at transects W1_E and W6_N there is no contribution (0.00kgN/ha/yr) from the MLP to N-dep levels and therefore impacts at these transects can be discounted. Transect W1_E is associated with contributions from the A229 and therefore this road link can be discounted from the assessment of N-dep impacts.

5.4.16 Modelling data shows that the MLP would contribute a maximum of approximately 0.5kgN/ha/yr within a maximum distance of 41m from the road (transect W3_N – Lidsing Road). Beyond a worst-case distance of 65m (transect W4_N – Lidsing Road), data shows that the MLP makes no contribution to N-dep levels.

5.4.17 The Air Quality Report provides an estimated background N-Dep concentration in 2041 (end plan year with no growth) at all modelled transects. The highest 2041 background concentration is within 2m of Lidsing Road and is 28.6kgN/ha/yr (transect W5_N). This is a reduction from a 2019 baseline used in the air quality modelling of 5.6kgN/ha/yr.

5.4.18 The Air Quality Report (at Appendix A3) provides information on the retardation effects of the MLP. N-dep in 2041 will be less than present due to vehicle fleet turnover and policies to reduce emission. As such the degree of ‘retardation’ to on-going reduction in N-dep have been calculated. Table A3-2 of the Air Quality presents the total number of years delay to reductions in N-Dep at the worst case transects for each designated site.

5.4.19 This shows that the MLP alone will retard background improvements by just over a year (1.6 years) at the worst case transect within 2m of the carriageway (transect W4_N). The MLP in combination with other plans and projects will retard background improvements by under 6.6 years at the worst case transect within 2m of the carriageway (transect W4_N).

5.4.20 In addition to the assessment of modelled air quality data, Natural England's guidance recommends that consideration be given to background pollution trend data.

5.4.21 As illustrated in **Figure 5.2**, for the 1km grid square adjacent to Lidsing Road, APIS data shows that N-Dep fell for forest (appropriate for woodland habitat at the SAC) from 32.087 kgN/ha/year in 2003 to 25.170 kgN/ha/year in 2021.

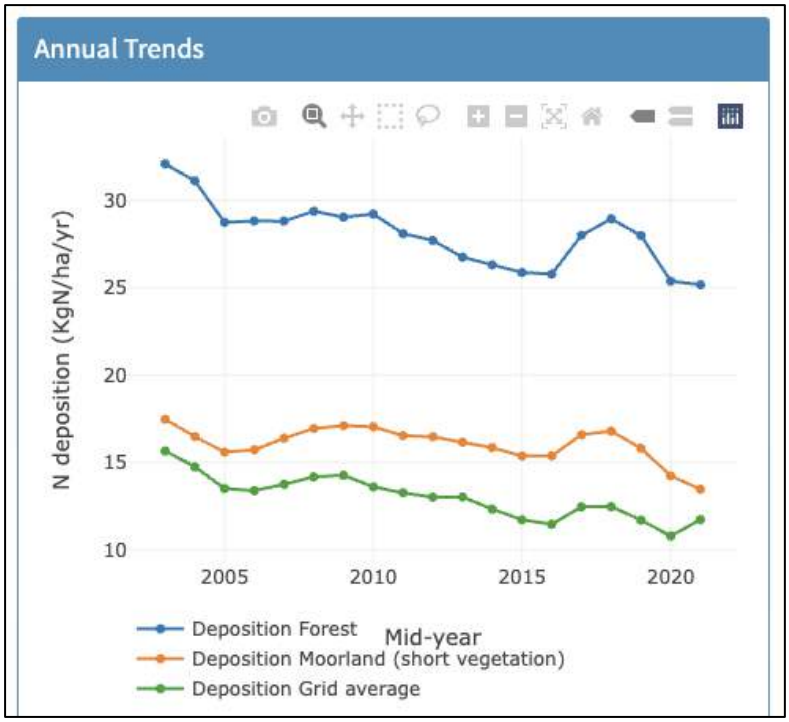


***Figure 5.2**: Annual N-dep trends for the 1km grid square within 200m of Lidsing Road: source APIS*

Acid deposition

5.4.22 The A-dep CLo for beech forest and yew woodland is 1.98 Keq/ha/yr. The CLo for semi-natural dry grassland is 4.856 Keq/ha/yr (**Appendix A**). Taking a precautionary approach to screening of LSEs, the lower range of 1.98 Keq/ha/yr for A-dep was applied in the Air Quality Report for the North Downs Woodlands SAC.

5.4.23 The air quality modelling for all affected road links shows that total A-dep concentrations with the Plan in combination with other plans and projects exceed the CLo for woodland of 1.98 Keq/ha/yr at transect W2_S, W3_N, W4_N, W4_S, W5_N by a maximum of 0.17 Keq/ha/yr (transects W4_N and W5_N). There are no exceedances of the CLo at transect W3_S (south of Lidsing Road). For calcareous grassland the CLo level of 4.856 Keq/ha/yr is not exceeded.

5.4.24 It is noted that an exceedance of the CLo does not mean that an adverse impact upon site integrity will occur as other factors will have an influence.

5.4.25 Table 7 of the Air Quality Report indicates that the woodland CLo is exceeded only within 5m of the road verge. The Air Quality Report provides an estimated background A-Dep concentration in 2041 (end plan year with no growth) at transects W2_S, W3_N, W4_N, W4_S, W5_N. The highest 2041 background concentration is within 2m of Lidsing Road and is 2.04 Keq/ha/yr (transect W5_N). This is a reduction from a 2019 baseline used in the air quality modelling of 0.4 Keq/ha/yr.

5.4.26 In addition to the assessment of modelled air quality data, Natural England's guidance recommends that consideration be given to background pollution trend data. As illustrated in **Figure 5.3**, for the 1km grid square adjacent to Lidsing Road, APIS data shows that A-Dep fell to forest (appropriate for woodland habitat at the SAC) from 2.766 Keq/ha/yr in 2003 to 1.917 Keq/ha/yr in 2021.

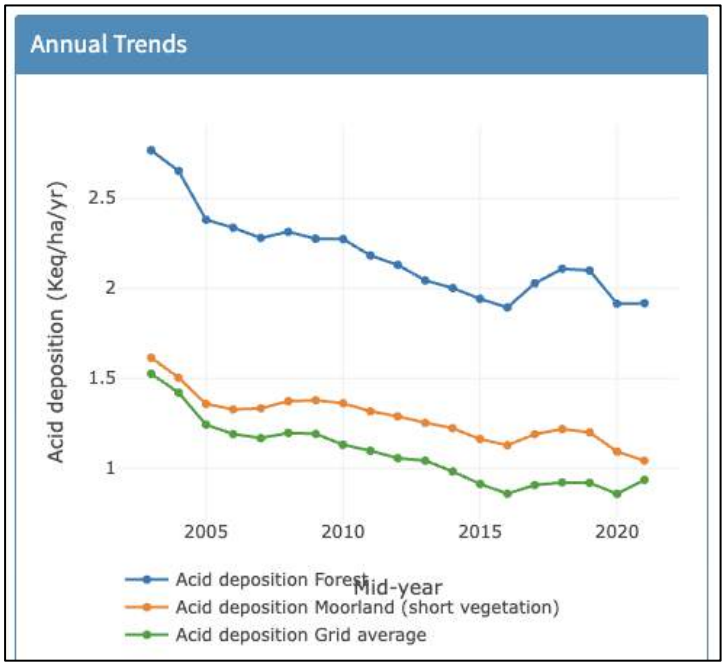


***Figure 5.3**: Annual A-dep trends for the 1km grid square within 200m of Lidsing Road: source APIS*

5.5 Consideration of the designated site in the national context

5.5.1 The North Downs Woodlands SAC is of national importance due to the presence of ancient semi-natural woodland and calcareous woodland communities which represent examples of Beech and Yew woodlands on chalk in the UK. These woodland types are rare at a national scale and have been designated as priority habitats, reflecting their high conservation value and limited distribution.

5.5.2 Maintaining these woodland habitats in FCS is vital for achieving the conservation objectives of the wider national site network. The SAC makes a significant contribution to national targets for the protection and restoration of ancient woodland, calcareous habitats, and species reliant on undisturbed woodland ecosystems. The North Downs Woodlands SAC therefore plays an important role in enabling the UK to meet its statutory obligations for the conservation of its rare woodland habitats at a national level.

5.6 Consideration of best available evidence on small incremental impacts from nitrogen deposition

5.6.1 Consideration has not been given to evidence on small incremental impacts from N-dep due to the area of impact and the exceedance of CLe and CLo from NH_3 and A-dep.

5.7 Consideration of site survey information

5.7.1 Detailed site survey information has not been collated for the purposes of this assessment. Baseline data has however been obtained from sources such as Natural England's Priority Habitat Inventory and Natural England's Designated Sites Viewer, the latter of which provides FCS survey information for all SSSI units which underpin the SAC.

5.8 Consideration of national, regional or local initiatives

5.8.1 There are national and local initiatives and measures in place to promote a modal shift away from the private car, promote the use of electric vehicles and uptake of active travel, which will have a positive impact upon local air quality. In addition, local initiatives, for instance the Four Elms Hill Area Action Plan, include measures to improve air quality. However, there are no measures in place to reduce air pollution levels at the SAC specifically.

5.9 Consideration of measures to avoid or reduce the harmful effects of the plan

5.9.1 The Maidstone Local Plan Review (MLPR) was adopted on 20th March 2024. The MLPR was supported by an HRA which considered air quality impacts of the MLPR alone and in-combination at the North Downs Woodlands SAC. The Regulation 19 HRA[54] concluded the following:

5.9.2 *"Nitrogen deposition at North Downs Woodlands SAC has the potential for adverse effects on integrity, due to the impact of the LPR in combination with other plans and projects, on traffic flows the A229, A249 and Detling Road.*

5.9.3 *Mitigation could include measures such as reducing speeds on affected roads or reducing nitrogen deposition from other sources such as agriculture. Provided that a mitigation strategy is developed and agreed with Natural England before the Local Plan Review is adopted, then it can be concluded that there will not be adverse effects on the integrity of the SAC. This could be verified during the Examination process and confirmed in an HRA Addendum and/or Adoption Statement."*

5.9.4 Natural England's response to the publication consultation at Regulation 19 stated that it cannot support a conclusion of no adverse effects on the integrity of North Downs Woodlands SAC due to there not being the sufficient level of scientific certainty required at the AA stage, as the mitigation strategy had not been developed and agreed at the time.

5.9.5 In response to this, Maidstone Borough Council commissioned a number of studies including the following:

- Refine and update the assumptions underlying the transport modelling work.
- Assess the condition of the habitats within the area of the SAC affected by the predicted increase in air pollution, and determine whether there would be an adverse effect on the integrity of the site without mitigation.
- Consider mitigation options.

[54] Land Use Consultants (September 2021) Maidstone Local Plan Review Habitats Regulations Assessment Reg 19 HRA Report.

5.9.6 The Main Modification HRA[55] provides a summary of these outputs.

5.9.7 The updated and refined traffic and air quality model outputs showed that it is only Boxley Road that will see an increase in air pollution above the screening thresholds, and only within 10m of the road. This is due to a number of factors including the following:

- Updated assumptions on electric vehicle usage within Defra's Emission Factor Toolkit (EFT version 11);
- Removal of Binbury Park development from traffic model (previously included as an application had been submitted but not recommended for approval);
- Only the part of the Lidsing development that will come forward within the Plan period is now included in the model; and
- Transect points within two metres of the road have been excluded, in line with Institute of Air Quality Management guidance.

5.9.8 The ecological survey work concluded that, as baseline air quality is already above the CLo and CLe at the SAC, it was necessary to determine whether a deterioration of air quality caused by increased traffic flows as a result of the MLPR would undermine the achievement of FCS by reducing the ability of air quality to be maintained at CLo and CLe.

5.9.9 The surveys undertaken confirmed the presence of qualifying habitat associated with the SAC within areas of exceedance.

5.9.10 A number of mitigation options were explored and reported upon by Jacobs[56], which included:

- Green Travel Planning focused on employment facilities, commercial facilities, schools and the use of transport connections within and adjacent to the development.
- Traffic calming to discourage access/egress via Boxley and Bredhurst.
- Provision of cycle and pedestrian facilities to encourage sustainable modes of transport via Boxley and Bredhurst.
- On-site measures to encourage/increase take up of low emission vehicles, such as electric vehicle charging points.
- HDV and other vehicle 'site servicing' and 'delivery route' management strategies.
- Strategic road signage strategy.
- Off-site planting at agreed locations and species (note that this option is not appropriate to the Boxley Road, where the SAC qualifying features are adjacent to the road).
- The design of residential layouts and configuration of estate roads in a manner which discourages access/egress via Boxley and Bredhurst.
- Typologies of development located at the southern sector of the site which generate lower car ownership levels of trip rates, i.e.: higher density apartment type accommodation, older persons accommodation.

[55] Land Use Consultants (September 2023) Maidstone Borough Council Maidstone Local Plan Review of Habitats Regulations Assessment: HRA Report Addendum: Main Modifications.

[56] Jacobs (June 2023) North Downs Woodlands SAC – Air Quality Mitigations.

- Home and flexible working supported by broadband infrastructure to encourage and enable people to drive less.
- Low emission strategy at south of site and through Boxley/Bredhurst.

5.9.11 Jacobs subsequently modelled traffic calming on Boxley Road / Lidsing Road, along with a new road linking the proposed Lidsing Garden Settlement to the M2, as these options were considered to be most effective at reducing nitrogen deposition at North Downs Woodlands SAC. The modelling demonstrated that these measures would reduce N-dep such that none of the modelled transects exceed the screening threshold, on any of the roads within 200m of the SAC.

5.9.12 In their technical note[57] Jacobs concluded that "*It is recognised that KCC and National Highways will not be in a position to endorse the proposed traffic calming at this stage as the wider impacts for such an intervention remain unknown, including assessment of the impact at key junctions*." In the event that the tested mitigation could not be delivered, safeguards were therefore incorporated within the Main Modifications to the MLPR in Policies LPR SP14a and LPR SP4b. These modifications provided assurance that development would not proceed without suitable mitigation being agreed and in place.

5.9.13 The Main Modifications HRA therefore concluded that AIOSI from the MLPR alone and in-combination would not occur with the implementation of proposed and modelled mitigation. The HRA goes on to note that further detailed work will be undertaken by developer proposers for Lidsing at the planning application stage once site layout etc is known. If this shows a likely exceedance of air quality screening thresholds, then an alternative mitigation approach may be proposed and agreed with Natural England.

5.9.14 Whilst the traffic modelling undertaken as part of the MLPR did not include the MLP allocations, it is likely that mitigation proposed in the MLPR Main Modifications HRA will result in similar mitigation results for development set out in the MLP (alone and in-combination).

5.9.15 Subject to traffic and air quality modelling of the MLPR North Downs Woodlands SAC mitigation measures for the MLP to demonstrate no exceedance of air quality CLo and CLe as a result of the MLP, it is considered that a similar approach would deliver similar beneficial outcomes. It is therefore recommended that a strategic approach to transport mitigation be taken by both Medway Council and Maidstone Borough Council at the North Downs Woodlands SAC. This will achieve the most effective and deliverable approach to air quality mitigation.

5.9.16 Findings from this initiative will be necessary to inform the HRA and will need to be secured in the MLP through policy requirements.

5.9.17 This AA identifies adverse air quality impacts from the MLP at the North Downs Woodlands SAC. A strategic approach to transport mitigation at the SAC is likely to reduce these impacts. However, further evidence is required to demonstrate that the proposed mitigation will be effective before a conclusion of no AIOSI can be reached.

[57] Jacobs (June 2023) North Downs Woodlands SAC – Air Quality Mitigations.

5.10 Consideration of any likely in-combination effects

5.10.1 The air dispersion modelling has been informed by a traffic modelling prepared for the MLP. The traffic model takes into consideration baseline traffic flows which may act in combination with the MLP. In addition, the air quality dispersion modelling incorporates background air quality concentration from all other sectors.

5.11 Summary of findings

5.11.1 The CLe for NO_x will not be exceeded at any point within 200m of any affected road link. Therefore, no AIOSI will arise as a direct result of elevated NO_x from the MLP, either alone or in combination, at the North Downs Woodlands SAC.

5.11.2 The NH_3 CLe of 1µg/m^3 for lower-level plants will be exceeded at all modelled transect points along Lidsing Road within 200m of this road link.

5.11.3 The modelling showed that there was zero NH_3 contributions from the MLP at the North Downs Woodlands SAC from the A229 at all distances and therefore this road link can be discounted from the assessment of NH_3 impacts.

5.11.4 The modelling shows that along Lidsing Road the lower CLo for N-dep is exceeded at all locations and within 200m of this road link. Beyond 65m however the modelling data shows that the MLP makes zero contribution to N-dep levels.

5.11.5 The modelling showed that there were zero N-dep contributions from the MLP at the North Downs Woodlands SAC from the A229 and therefore this road link can be discounted from the assessment of N-dep impacts.

5.11.6 The air quality modelling for all affected road links shows that total A-dep concentrations with the Plan in combination with other plans and projects exceed the CLo for woodland within 5m of all modelled road links. Beyond 5m the CLo for woodland is not exceeded. For calcareous grassland the CLo level is not exceeded.

5.11.7 Given the exceedances of the NH_3 CLe and CLo for N-Dep and A-Dep at the SAC, it is necessary to consider mitigation measures that can be put in place to ensure air quality at the SAC is maintained below CLo and CLe and that increased traffic flows as a result of the MLP (alone and in-combination) do not undermine the achievement of FCS.

5.11.8 Traffic and air quality modelling undertaken in support of the MLPR has demonstrated that adverse air quality effects on the integrity of North Downs Woodlands SAC can be avoided, alone or in combination with other plans or projects. The modelled approach looked at mitigation associated with traffic calming along Boxley Road / Lidsing Road, and the new link road for Lidsing Garden Settlement.

5.11.9 It is considered that a similar approach could be relevant to the HRA of the MLP. It is therefore recommended that a strategic approach to transport mitigation be taken by both Medway Council and Maidstone Borough Council at the North Downs Woodlands SAC. This will achieve the most effective and deliverable approach to air quality mitigation. Findings from this initiative will be necessary to inform the HRA and will need to be secured in the MLP through policy requirements.

5.11.10 Adverse air quality impacts from the MLP at the North Downs Woodlands SAC have been identified. A strategic approach to transport mitigation at the SAC is likely to reduce these impacts. However, further evidence is required to demonstrate that the proposed mitigation will be effective before a conclusion of no AIOSI can be reached.

6 Conclusions

6.1 Summary of results

6.1.1 This report provides an ecological interpretation of air quality dispersion modelling for the HRA of the MLP, focusing on the North Kent Marshes European sites and the North Downs Woodlands SAC. Screening against Natural England's 1% thresholds identified several sites requiring further assessment for NO_x, NH_3 and N-dep, with A-dep relevant only to the North Downs Woodlands SAC.

6.1.2 For the Medway Estuary and Marshes SPA and Ramsar and the Thames Estuary and Marshes SPA and Ramsar, modelling shows that the MLP will not cause exceedances of NO_x or NH_3 CLe. Although N-dep exceeds lower critical loads, this is driven by high background levels rather than MLP emissions. A review of Ramsar non-halophyte plant species, including their characteristics, association with nitrogen and their distribution both nationally and in Kent, indicates that there will be no impact upon plant species where estuarine dynamics play a less significant role in buffering N-dep. Given long-term downward trends and the natural buffering capacity of estuarine systems, no AIOSI are expected, either alone or in combination.

6.1.3 For the North Downs Woodlands SAC, NO_x critical levels are not exceeded. However, exceedances of NH_3 and N-dep and A-dep CLe and CLo occur within 200m of Lidsing Road. The modelling outputs show no contribution of N-dep or A-dep from the MLP from the A229. Given the exceedances modelled at Lidsing Road, mitigation is required to ensure air quality does not undermine the SAC's conservation objectives. Evidence from the MLPR indicates that traffic-related mitigation, which includes traffic calming and a new link road, will mitigate adverse air quality effects.

6.1.4 A strategic mitigation approach jointly delivered by Medway Council and Maidstone Borough Council is recommended to ensure effective and coordinated reduction of air quality impacts at the SAC. Findings from this initiative will be necessary to inform the HRA and will be secured in the MLP through policy requirements.

6.1.5 This AA identifies adverse air quality impacts from the MLP at the North Downs Woodlands SAC. A strategic approach to transport mitigation at the SAC is likely to reduce these impacts. However, further evidence is required to demonstrate that the proposed mitigation will be effective before a conclusion of no AIOSI can be reached.

6.2 Next steps

6.2.1 No further air quality work is required for the North Kent Marshes European sites.

6.2.2 Mitigation proposals for the North Downs Woodlands SAC will need to be secured through the MLP.

Appendix A: European site air quality critical loads and critical levels

All data sourced from APIS.

Table A.1: *Critical Levels and Loads for qualifying features at the Medway Estuary and Marshes SPA*

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr) (N_{max})[1]
Sterna albifrons (Eastern Atlantic – breeding – reproducing) – Little Tern	Not sensitive	Not sensitive	5-15a	No expected negative impact on the species due to impacts on the species' broad habitat.
Sterna hirundo (Northern/Eastern Europe – breeding – reproducing) – Common Tern	Not sensitive	Not sensitive	5-15a	No expected negative impact on the species due to impacts on the species' broad habitat.
Anas penelope (Western Siberia/North-western/North-eastern Europe - wintering) – Eurasian Wigeon	Not sensitive	Not sensitive	10-20b	No expected negative impact on the species due to impacts on the species' broad habitat.
Branta bernicla bernicla – wintering - Dark-bellied Brent Goose	Not sensitive	Not sensitive	10-20b	No expected negative impact on the species due to impacts on the species' broad habitat.
Limosa limosa islandica (Iceland – breeding - wintering) – Black-tailed Godwit	Not sensitive	Not sensitive	10-20b	No expected negative impact on the species due to impacts on the species' broad habitat.
Numenius arquata (Europe – breeding - wintering) – Eurasian Curlew	Not sensitive	Not sensitive	10-20c	No expected negative impact on the species due to impacts on the species' broad habitat.
Numenius arquata (Europe – breeding - wintering) – Eurasian Curlew	Not sensitive	Not sensitive	10-20b	No expected negative impact on the species due to impacts on the species' broad habitat.
Podiceps cristatus (North-western Europe – wintering – Great Crested Grebe	Not sensitive	Not sensitive	10-20b	Potential negative impact on species due to impacts on the species' broad habitat.

[1] Acid deposition is assessed against the "CLmaxN" value published on APIS (2025). This is the level above which additional deposition will cause acidification.

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr) (N_{max})[1]
Recurvirostra avosetta (Western Europe/Western Mediterranean – breeding - wintering) – Pied Avocet	Not sensitive	Not sensitive	10-20b	No expected negative impact on the species due to impacts on the species' broad habitat.
Recurvirostra avosetta (Western Europe/Western Mediterranean – breeding – reproducing) – Pied Avocet	Not sensitive	Not sensitive	10-20b	No expected negative impact on the species due to impacts on the species' broad habitat.
Sterna albifrons (Eastern Atlantic – breeding – reproducing) – Little Tern	Not sensitive	Not sensitive	10-20d	No expected negative impact on the species due to impacts on the species' broad habitat.
Sterna hirundo (Northern/Eastern Europe – breeding – reproducing) – Common Tern	Not sensitive	Not sensitive	10-20d	No expected negative impact on the species due to impacts on the species' broad habitat.
Anas acuta (North-western Europe - wintering) – Northern Pintail	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No expected negative impact on the species due to impacts on the species' broad habitat.
Anas clypeata (North-western/Central Europe - wintering) – Northern Shoveler	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No expected negative impact on the species due to impacts on the species' broad habitat.
Anas crecca (North-western Europe - wintering) – Eurasian Teal	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation.	No expected negative impact on the species due to impacts on the species' broad habitat.

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr) (N_{max})[1]
			No comparable habitat with established critical load estimate available	
Anas penelope (Western Siberia/North-western/North-eastern Europe - wintering) – Eurasian Wigeon	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No expected negative impact on the species due to impacts on the species' broad habitat.
Anas platyrhynchos (North-western Europe - wintering) - Mallard	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No expected negative impact on the species due to impacts on the species' broad habitat.
Aythya ferina (North-western/North-eastern Europe - wintering) – Common Pochard	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No expected negative impact on the species due to impacts on the species' broad habitat.
Cygnus columbianus bewickii (Western Siberia/North-eastern & North-western Europe - wintering) – Tundra Swan	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No expected negative impact on the species due to impacts on the species' broad habitat.
Phalacrocorax carbo (North-western Europe - wintering) – Great Cormorant	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation.	APIS identifies species as sensitive to acidity impacts on broad habitat type but no critical load range given.

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr) (N_{max})[1]
			No comparable habitat with established critical load estimate available	
Podiceps cristatus (North-western Europe - wintering) – Great Crested Grebe	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	APIS identifies species as sensitive to acidity impacts on broad habitat type but no critical load range given.
Sterna hirundo (Northern/Eastern Europe – breeding – reproducing) – Common Tern	Not sensitive	Not sensitive	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	MinCLmaxN: 4.86

Table Notes: a – Coastal dune grasslands habitat; b - Atlantic upper-mid & mid-low salt marshes; c- Low and medium altitude hay meadows; and d – Shifting coastal dunes.

Table A.2: *Critical Levels and Loads for qualifying features at the Thames Estuary and Marshes SPA*

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr)
Limosa limosa islandica (Iceland – breeding - wintering) – Black-tailed Godwit	Not sensitive	Not sensitive	10-20a	No expected negative impact on the species due to impacts on the species' broad habitat.
Recurvirostra avosetta (Western Europe/Western Mediterranean – breeding - wintering) – Pied Avocet	Not sensitive	Not sensitive	10-20a	No expected negative impact on the species due to impacts on the species' broad habitat.

Table Notes: a - Atlantic upper-mid & mid-low salt marshes

Table A.3: *Features of all SSSI which underpin the Medway Estuary and Marshes SPA and Ramsar and the Thames Estuary and Marshes SPA and Ramsar designations*

SSSIs which underpin the North Kent Coastal Ramsar sites	SSSI Features[2]
Medway Estuary and Marshes SSSI	Aggregations of breeding birds - Avocet, *Recurvirostra avosetta* - Little tern, *Sterna albifrons* - Avocet, *Recurvirostra avosetta* - Black-tailed godwit, *Limosa limosa islandica* - Brent goose (dark-bellied), *Branta bernicla bernicla* - Curlew, *Numenius arquata* - Dunlin, *Calidris alpina alpina* - Great crested grebe, *Podiceps cristatus* - Grey plover, *Pluvialis squatarola* - Pintail, *Anas acuta* - Redshank, *Tringa tetanus* - Ringed plover, *Charadrius hiaticula* - Shelduck, *Tadorna tadorna* - Shoveler, *Anas clypeata* - Teal, *Anas crecca* - Turnstone, *Arenaria interpres* - White-fronted goose, *Anser albifrons albifrons* - Wigeon, *Anas Penelope* Assemblages of breeding birds - Lowland damp grasslands Ditches Lowland wetland including basin fen, valley fen, floodplain fen, waterfringe fen, spring/flush fen and raised bog lagg SM4-28 – Saltmarsh Vascular plant assemblage
South Thames Estuary and Marshes SSSI	Aggregations of breeding birds: - Bearded tit, *Panurus biarmicus* - Garganey, *Anas querquedula* - Pintail, *Anas acuta* - Shoveler, *Anas clypeata* - Avocet, *Recurvirostra avosetta* - Black-tailed godwit, *Limosa limosa islandica* - Curlew, *Numenius arquata* - Dunlin, *Calidris alpina alpina* - Gadwall, *Mareca strepera* - Greenshank, *Tringa nebularia* - Grey plover, *Pluvialis squatarola* - Hen harrier, *Circus cyaneus* - Knot, *Calidris canutus* - Pintail, *Anas acuta* - Redshank, *Tringa tetanus* - Ringed plover, *Charadrius hiaticula*

[2] SSSI features have been obtained from Natural England's Designated Sites View: https://designatedsites.naturalengland.org.uk/

SSSIs which underpin the North Kent Coastal Ramsar sites	SSSI Features[2]
	- Shelduck, *Tadorna tadorna* - Shoveler, *Anas clypeatac* - Shoveler, *Anas clypeata* - White-fronted goose, *Anser albifrons albifrons* Assemblages of breeding birds - Lowland damp grasslands Assemblages of breeding birds - Lowland open waters and their margins Assemblages of breeding birds - Sand-dunes and saltmarshes Coastal vegetated shingle (SD1-3) Ditches Invert. assemblage F1 unshaded early successional mosaic Invert. assemblage M311 saltmarsh and transitional brackish marsh Invert. assemblage W211 open water on disturbed sediments Invert. assemblage W314 reed-fen & pools SM4-28 – Saltmarsh Vascular plant assemblage

Table A.4: *CLes and CLo for non-avian features associated with the Medway Estuary and Marshes SSSI. Note it is assumed that CLes and CLo for avian features are the same as those quoted for the corresponding SPA designation*

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr)
Annual Salicornia Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Atriplex portulacoides Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Inula crithmoides Stands	30	1 or 3	10-20a	Not assessed for this feature
Lolium perenne - *Cynosurus cristatus* Grassland	30	3	10-20b	MinCLmaxN: 4.86
Puccinellia maritima Saltmarsh, *Puccinellia maritima* Dominant Sub-Community	30	1 or 3	10-20a	Not assessed for this feature
Rayed *Aster tripolium* On Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Sarcocornia perennis	30	1 or 3	10-20a	Not assessed for this feature
Spartina anglica Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Suaeda maritima Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Transitional Low Marsh Vegetation with *Puccinellia maritima*, Annual *Salicornia* Species and *Suaeda maritima*.	30	1 or 3	10-20a	Not assessed for this feature
Lowland ditch systems	30	1 or 3	No comparable habitat with established critical load estimate available	Not assessed for this feature
Zostera Communities	30	1 or 3	No critical level has been assigned for this feature, please seek site specific advice	Not assessed for this feature
Vascular plants	30	3	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No comparable acidity value

Table Notes: a - Atlantic upper-mid & mid-low salt marshes; b - Low and medium altitude hay meadows

Table A.5: *Critical Levels and Loads for non-avian qualifying features associated with the South Thames Estuary and Marshes SSSI. Note it is assumed that CLes and CLo for avian features are the same as those quoted for the corresponding SPA designation*

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr)
Annual *Salicornia* Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Atriplex portulacoides Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Inula crithmoides Stands	30	1 or 3	10-20a	Not assessed for this feature
Puccinellia maritima Saltmarsh, *Puccinellia maritima* Dominant Sub-Community	30	1 or 3	10-20a	Not assessed for this feature
Rayed *Aster tripolium* On Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Rumex crispus - Glaucium flavum Shingle Community	30	1 or 3	No information provided	Not assessed for this feature
Sarcocornia perennis	30	1 or 3	10-20a	Not assessed for this feature
Spartina anglica Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Suaeda maritima Saltmarsh	30	1 or 3	10-20a	Not assessed for this feature
Transitional Low Marsh Vegetation With *Puccinellia maritima*, Annual *Salicornia* Species And *Suaeda maritima*.	30	1 or 3	10-20a	Not assessed for this feature
Lowland ditch systems	30	1 or 3	No comparable habitat with established critical load estimate available	Not assessed for this feature
Vascular plants	30	3	Decision to be taken at a site-specific level since habitat sensitivity depends on N or P limitation. No comparable habitat with established critical load estimate available	No comparable acidity class

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr)
Invertebrate assemblage	No critical level has been assigned for this feature, please seek site specific advice	No critical level has been assigned for this feature, please seek site specific advice	To be determined at site level	No comparable acidity class
Zostera Communities	30	1 or 3	No information provided	Not assessed for this feature
Lowland damp grasslands	Not sensitive	Not sensitive	No information provided	Not assessed for this feature
Lowland open waters and their margins	Not sensitive	Not sensitive	No information provided	Not assessed for this feature
Sand-dunes and saltmarshes	Not sensitive	Not sensitive	No information provided	Not assessed for this feature

Table Notes: a - Atlantic upper-mid & mid-low salt marshes

Table A.6: *Critical Levels and Loads for qualifying features associated with the North Downs Woodlands SAC*

Qualifying features	NOx Annual Critical Level ($\mu g/m^3$)	NH_3 Annual Mean Critical Level ($\mu g/m^3$)	N Deposition Critical Load (kg N/ha/yr)	Acid Deposition (keq/ha/yr) N_{max}
Asperulo-Fagetum beech forests	30	1 or 3	10-15	MinCLmaxN: 1.983
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites)	30	1	10-20	MinCLmaxN: 4.856
Taxus baccata woods of the British Isles	30	3	10-15	MinCLmaxN: 1.983

Appendix B: European site conservation objectives and qualifying features

Medway Estuary and Marshes SPA[1]

Conservation objectives:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

Qualifying features:

A046a *Branta bernicla bernicla*; Dark-bellied Brent Goose (Non-breeding)

A048 *Tadorna tadorna*; Common Shelduck (Non-breeding)

A054 *Anas acuta*; Northern Pintail (Non-breeding)

A132 *Recurvirostra avosetta*; Pied Avocet (Breeding)

A132 *Recurvirostra avosetta*; Pied Avocet (Non-breeding)

A137 *Charadrius hiaticula*; Ringed Plover (Non-breeding)

A141 *Pluvialis squatarola*; Grey Plover (Non-breeding)

A143 *Calidris canutus*; Red Knot (Non-breeding)

A149 *Calidris alpina alpina*; Dunlin (Non-breeding)

A162 *Tringa totanus*; Common Redshank (Non-breeding)

A195 *Sterna albifrons*; Little Tern (Breeding)

Waterbird assemblage

Breeding bird assemblage

Waterbird assemblage includes:

Medway Estuary and Marshes SPA is one of the key estuaries in the UK for wintering wildfowl and waders. The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season[2]. At the time of classification, the site supported internationally or nationally important wintering populations of the following migratory waterfowl Dark-bellied Brent Geese (*Branta bernicla bernicla*), Shelduck (*Tadorna tadorna*), Wigeon (*Anas penelope*), Teal (*Anas crecca*), Pintail (*Anas acuta*), Ringed Plover (*Charadrius hiaticula*), Grey Plover (*Pluvialis squatarola*), Knot (*Calidris canutus*), Great Crested Grebe (*Podiceps cristiatus*), Shoveler (*Anas clypeata*), Dunlin (*Calidris alpina*), Black-tailed Godwit (*Limosa limosa islandica*), Oyster Catcher (*Haematopus*

[1] Natural England (2019) Medway Estuary & Marshes SPA Conservation Objectives Available at: http://publications.naturalengland.org.uk/publication/6672791487119360 [Date accessed: 17/11/25].

[2] English Nature. 2001. Medway Estuary and Marshes (Kent): SPA citation (UK9012031): English Nature.

Medway Estuary and Marshes SPA[1]

ostralegus), Curlew (*Numenius arquata*) and Redshank (*Tringa totanus*), Greenshank (*Tringa nebularia*) and Turnstone (*Arenaria interpres*)[3].

Breeding bird assemblage includes:

The Medway Estuary and Marshes SPA qualifies under Article 4.2 by supporting regularly in summer a diverse assemblage of breeding migratory waterfowl including Oystercatcher (*Haematopus ostralegus*), Lapwing (*Vanellus vanellus*), Ringed Plover (*Charadrius hiaticula*), Redshank (*Tringa totanus*), Shelduck (*Tadorna tadorna*), Mallard (*Anas platyrhynchos*), Teal (*Anas crecca*), Shoveler (*Anas clypeata*), Pochard (*Aythya farina*) and Common Tern (*Sterna hirundo*)[4]. The Chetney Peninsula is among the most important wildfowl breeding areas in Kent. Breeding species include Shelduck, Shoveler, Avocet (*Recurvirostra avosetta*), Pochard (*Athyia ferina*), Mute Swan (*Cygnus olor*), Tufted Duck (*Athyia fuligula*), Teal (*Anas crecca*) and Gadwall (*Anas strepera*)[5].

Medway Estuary and Marshes Ramsar[6]

Ramsar sites do not have Conservation Objectives in the same way as SPAs and SACs. Information regarding the designation of Ramsar sites is contained in JNCC Ramsar Information Sheets. Ramsar Criteria are the criteria for identifying Wetlands of International Importance. The relevant criteria and ways in which this site meets the criteria are presented in the table below.

Ramsar Criterion	Justification for the application of each criterion
2	The site supports a number of species of rare plants and animals. The site holds several nationally scarce plants, including Sea Barley *Hordeum marinum*, Curved Hard-grass *Parapholis incurva*, Annual Beard-grass *Polypogon monspeliensis*, Borrer's Saltmarsh-grass *Puccinellia fasciculata*, Slender Hare`s-ear *Bupleurum tenuissimum*, Sea Clover *Trifolium squamosum*, Saltmarsh Goose-foot *Chenopodium chenopodioides*, Golden Samphire *Inula crithmoides*, Perennial Glasswort *Sarcocornia perennis* and One-flowered Glasswort *Salicornia pusilla*. A total of at least twelve British Red Data Book species of wetland invertebrates have been recorded on the site. These include a ground beetle *Polistichus connexus*, a fly *Cephalops perspicuus*, a dancefly *Poecilobothrus ducalis*, a fly *Anagnota collini*, a weevil *Baris scolopacea*, a water beetle *Berosus spinosus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, the ground lackey moth *Malacosoma castrensis*, a horsefly *Atylotus latistriatuus*, a fly *Campsicnemus magius*, a solider beetle, *Cantharis fusca*, and a cranefly *Limonia danica*. A significant number of non-wetland British Red Data Book species also occur.

[3] English Nature. 2001. Medway Estuary and Marshes (Kent): SPA citation (UK9012031): English Nature.

[4] English Nature. 2001. Medway Estuary and Marshes (Kent): SPA citation (UK9012031): English Nature.

[5] Gordon, A. 2013. Nor Marsh and Motney Hill RSPB Management Plan 2008-2013 update.: Royal Society for the Protection of Birds.

[6] JNCC (2008) Information Sheet on Medway Estuary and Marshes Ramsar Wetlands Available at: https://jncc.gov.uk/jncc-assets/RIS/UK11040.pdf [Date accessed: 17/11/25].

Ramsar Criterion	Justification for the application of each criterion
5	Assemblages of international importance: Species with peak counts in winter: 47637 waterfowl (5-year peak mean 1998/99-2002/2003)
6	Qualifying Species/populations (as identified at designation): Species with peak counts in spring/autumn: • Grey Plover, *Pluvialis squatarola*, E Atlantic/W Africa -wintering 3103 individuals, representing an average of 1.2% of the population (5-year peak mean 1998/9-2002/3) • Common Redshank, *Tringa totanus totanus*, 3709 individuals, representing an average of 1.4% of the population (5-year peak mean 1998/9-2002/3) Species with peak counts in winter: • Dark-bellied Brent Goose, *Branta bernicla bernicla*, 2575 individuals, representing an average of 1.1% of the population (5-year peak mean 1998/9-2002/3) • Common Shelduck, *Tadorna tadorna*, NW Europe 2627 individuals, representing an average of 3.3% of the GB population (5-year peak mean 1998/9-2002/3) • Northern Pintail, *Anas acuta*, NW Europe 1118 individuals, representing an average of 1.8% of the population (5-year peak mean 1998/9-2002/3) • Ringed Plover, *Charadrius hiaticula*, Europe/Northwest Africa 540 individuals, representing an average of 1.6% of the GB population (5-year peak mean 1998/9- 2002/3) • Red Knot, *Calidris canutus islandica*, W & Southern Africa (wintering) 3021 individuals, representing an average of 1% of the GB population (5-year peak mean 1998/9- 2002/3) • Dunlin, *Calidris alpina alpina*, W Siberia/W Europe 8263 individuals, representing an average of 1.4% of the GB population (5-year peak mean 1998/9-2002/3) Species/populations identified subsequent to designation for possible future consideration under criterion 6. Species with peak counts in spring/autumn: • Black-tailed Godwit, *Limosa limosa islandica*, Iceland/W Europe 721 individuals, representing an average of 2% of the population (5-year peak mean 1998/9- 2002/3) Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually.

Thames Estuary and Marshes SPA[7]

Conservation objectives:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

Qualifying features:

A082 *Circus cyaneus*; Hen Harrier (Non-breeding)
A132 *Recurvirostra avosetta*; Pied Avocet (Non-breeding)
A137 *Charadrius hiaticula*; Ringed Plover (Non-breeding)
A141 *Pluvialis squatarola*; Grey Plover (Non-breeding)
A143 *Calidris canutus*; Red Knot (Non-breeding)
A149 *Calidris alpina alpina*; Dunlin (Non-breeding)
A156 *Limosa limosa islandica*; Black-tailed Godwit (Non-breeding)
A162 *Tringa totanus*; Common Redshank (Non-breeding)
Waterbird assemblage

Waterbird Assemblage includes:

The site regularly supports large numbers of birds, with the 1993/4-1998/9 wintering population being 75,019, which supported classification of the SPA[8]. The citation lists the following species as regularly occurring on the site in non-qualifying numbers. Passage and wintering Bewick's Swan *Cygnus columbianus bewickii*, Golden Plover *Pluvialis apricaria* and Ruff *Philomachus pugnax*. Also nationally important populations of Shelduck *Tadorna tadorna*, Teal *Anas crecca*, Pintail *Anas acuta*, Gadwall *Anas strepera*, Shoveler *Anas clypeata*, Tufted Duck *Aythya fuligula* and Pochard *Aythya farina*[9].

[7] Natural England (2019) Thames Estuary & Marshes SPA Conservation Objectives Available at: https://publications.naturalengland.org.uk/publication/4698344811134976 [Date accessed: 17/11/25].

[8] English Nature (EN). 2000. Directive 79/409 on the conservation of wild birds: Special Protection Area - Thames Estuary and Marshes Citation.

[9] English Nature (EN). 2000. Directive 79/409 on the conservation of wild birds: Special Protection Area - Thames Estuary and Marshes Citation.

Thames Estuary and Marshes Ramsar[10]

Ramsar sites do not have Conservation Objectives in the same way as SPAs and SACs. Information regarding the designation of Ramsar sites is contained in JNCC Ramsar Information Sheets. Ramsar Criteria are the criteria for identifying Wetlands of International Importance. The relevant criteria and ways in which this site meets the criteria are presented in the table below.

Ramsar Criterion	Justification for the application of each criterion
2	The site supports one endangered plant species and at least 14 nationally scarce plants of wetland habitats. The site also supports more than 20 British Red Data Book invertebrates
5	Assemblages of international importance: Species with peak counts in winter: 45118 waterfowl (5-year peak mean 1998/99-2002/2003)
6	Qualifying Species/populations (as identified at designation): Species with peak counts in spring/autumn: • Ringed Plover, *Charadrius hiaticula*, Europe/Northwest Africa 595 individuals, representing an average of 1.8% of the GB population (5-year peak mean 1998/9- 2002/3) • Black-tailed Godwit, *Limosa limosa islandica*, Iceland/W Europe 1640 individuals, representing an average of 4.6% of the population (5-year peak mean 1998/9-2002/3) Species with peak counts in winter: • Grey Plover, *Pluvialis squatarola*, E Atlantic/W Africa -wintering 1643 individuals, representing an average of 3.1% of the GB population (5-year peak mean 1998/9-2002/3) • Red Knot, *Calidris canutus islandica*, W & Southern Africa (wintering) 7279 individuals, representing an average of 1.6% of the population (5-year peak mean 1998/9-2002/3) • Dunlin, *Calidris alpina alpina*, W Siberia/W Europe 15171 individuals, representing an average of 1.1% of the population (5-year peak mean 1998/9-2002/3) • Common Redshank, *Tringa totanus totanus*, 1178 individuals, representing an average of 1% of the GB population (5-year peak mean 1998/9- 2002/3) Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the annual Wetland Bird Survey report.

[10] JNCC. (2008) Information Sheet on Ramsar Wetlands (RIS). Available at: https://jncc.gov.uk/jncc-assets/RIS/UK11069.pdf [Date accessed: 17/11/25].

Summary of the plant Ramsar interest features at the Medway Estuary and Marshes and Thames Estuary and Marshes Ramsar designations

Common Name	Latin name	Thames Estuary & Marshes	Medway Estuary & Marshes
Bulbous Foxtail	*Alopecurus bulbosus*	Yes	No
Slender Hare's-ear	*Bupleurum tenuissimum*	Yes	Yes
Divided Sedge	*Carex divisa*	Yes	No
Small Red Goosefoot	*Chenopodium chenopodioides*	Yes	Yes
Sea Barley	*Hordeum marinum*	Yes	Yes
Golden Samphire	*Inula crithmoides*	Yes	Yes
Least Lettuce	*Lactuca saligna*	Yes	No
Curved Hard-grass	*Parapholis incurve*	No	Yes
Annual Beard-grass	*Polypogon monspeliensis*	Yes	Yes
Borrer's Salt marsh Grass	*Puccinellia fasciculate*	Yes	Yes
Stiff Salt marsh Grass	*Puccinellia rupestris*	Yes	Yes
One-flowered Glasswort	*Salicornia pusilla*	Yes	Yes
Perennial Glasswort	*Sarcocornia perennis*	No	Yes
Small Cord-grass	*Spartina maritime*	Yes	Yes
Clustered Clover	*Trifolium glomeratum*	Yes	No
Sea Clover	*Trifulium squamosum*	Yes	No
Narrow-leaved Eel-grass	*Zostera angustifolia*	Yes	No
Dwarf Eel-grass	*Zostera noltei*	Yes	No

Summary of the invertebrate Ramsar interest features at the Medway Estuary and Marshes and Thames Estuary and Marshes Ramsar designations

Latin Name	Invertebrate	Thames Estuary & Marshes	Medway Estuary & Marshes
Anagnota collini	Fly	No	Yes
Anisodactylus poeciloides	Ground Beetle	Yes	No
Aulacochthebius	Water Beetle	Yes	Yes
Bagous cylindrus	Weevil	Yes	Yes
Bagous longitarsis	Weevil	Yes	No
Baris scolopacea	Weevil	No	Yes
Baryphyma duffeyi	Spider	Yes	No
Berosus spinosus	Water Beetle	Yes	No
Campsicnemus magius	Fly	Yes	Yes
Cantharis fusca	Soldier Beetle	No	Yes
Cephalops perspicuous	Fly	No	Yes
Cercyon bifenestratus	Water Beetle	Yes	No
Elachiptera rufifrons	True Fly	No	Yes
Erioptera bivittata	Cranefly	Yes	Yes
Haematopota bigoti	Horsefly	Yes	No
Henestaris halophilus	Groundbug	Yes	No
Hybomitra expollicata	Horsefly	Yes	No
Hydrochus elongatus	Water Beetle	Yes	No
Hydrochus ignicollis	Water Beetle	Yes	No
Hydrophilus piceus	Water Beetle	Yes	No
Lejops vittata	Hoverfly	Yes	Yes
Lestes dryas	Damselfly	Yes	No
Limnophila pictipennis	Cranefly	Yes	No
Malachius vulneratus	Beetle	Yes	Yes
Malacosoma castrensis	Ground Lackey Moth	Yes	Yes
Ochthebius exaratus	Water Beetle	Yes	No
Philanthus triangulum	Solitary Wasp	Yes	No
Philonthus punctus	Rove Beetle	Yes	Yes
Poecilobothrus ducalis	Dancefly	Yes	Yes
Pteromicra leucopeza	Snail-killing Fly	Yes	No
Stratiomys longicornis	Soldier Fly	Yes	No

Latin Name	Invertebrate	Thames Estuary & Marshes	Medway Estuary & Marshes
Telmatophilus brevicollis	Fungus Beetle	Yes	No

North Downs Woodlands SAC[11]

Conservation objectives:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;

- The extent and distribution of qualifying natural habitat
- The structure and function (including typical species) of qualifying natural habitats, and
- The supporting processes on which the qualifying natural habitats rely

Qualifying features:

H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco- Brometalia*); Dry grasslands and scrublands on chalk or limestone

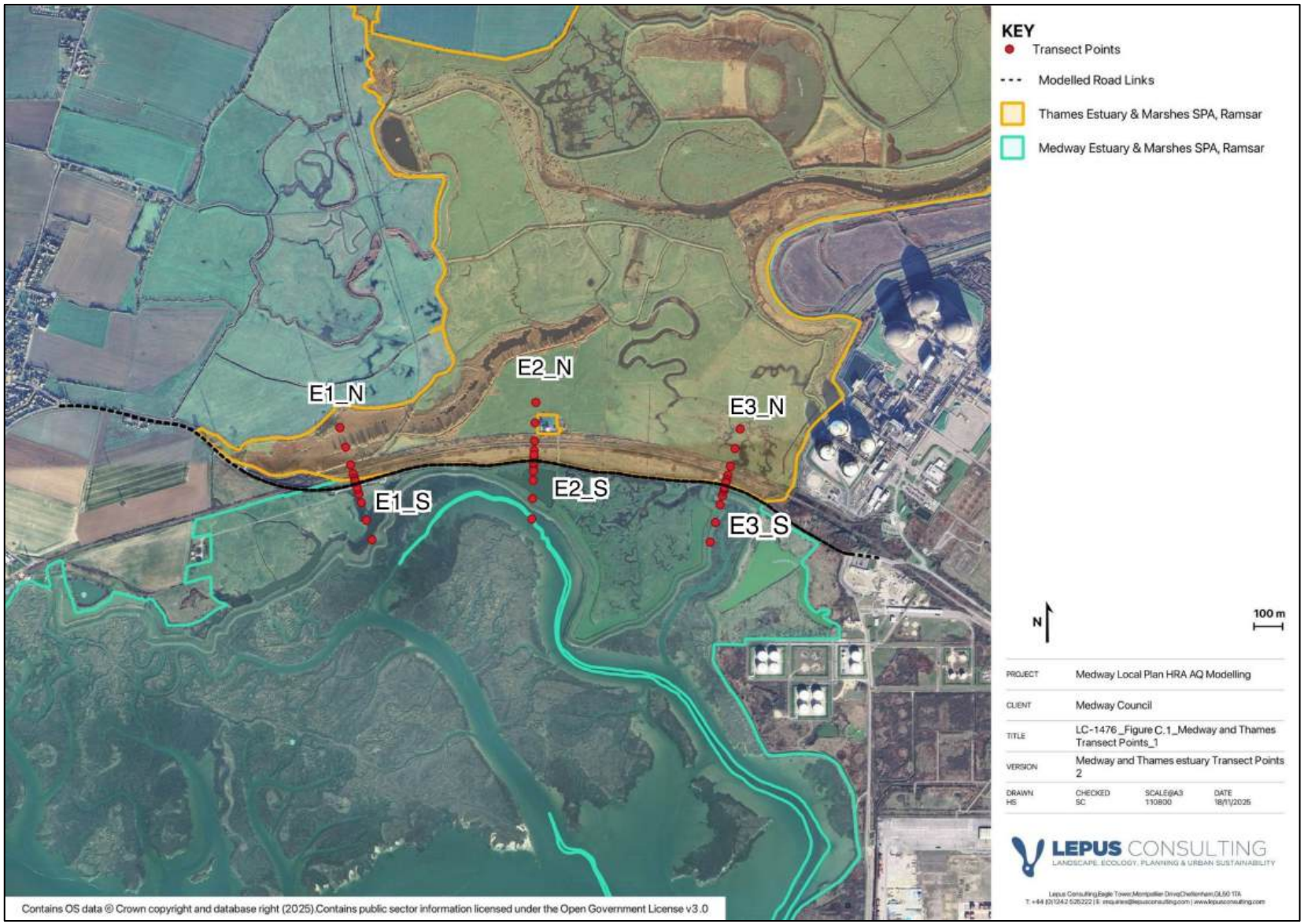
H9130. *Asperulo-Fagetum* Beech forests; Beech forests on neutral to rich soils

H91J0. *Taxus baccata* woods of the British Isles; Yew-dominated woodland*

*Priority natural habitats or species.

[11] Natural England (2018) North Downs Woodlands SAC Conservation Objectives Available at: http://publications.naturalengland.org.uk/publication/5717001544663040 [Date accessed: 17/11/25].

Appendix C: Air quality modelling transect figures


E1_N
E2_N
E3_N
E1_S
E2_S
E3_S
KEY
Transect Points
Modelled Road Links
Thames Estuary & Marshes SPA, Ramsar
Medway Estuary & Marshes SPA, Ramsar
N
100 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
LC-1476 _Figure C.1_Medway and Thames Transect Points_1
VERSION
Medway and Thames estuary Transect Points 2
DRAWN HS
CHECKED SC
SCALE@A3 1:10800
DATE 18/11/2025
LEPUS CONSULTING
LANDSCAPE, ECOLOGY, PLANNING & URBAN SUSTAINABILITY
Contains OS data © Crown copyright and database right (2025).Contains public sector information licensed under the Open Government License v3.0


KEY
Transect Points
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
E4_N
E5_N
E6_E
E7_N
E8_W
N
0.5
1 km
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Overview of Medway Estuary & Marshes Transect Points
VERSION
LC-1476_Overview of Medway Estuary & Marshes Transect Points_1_Figure C.2
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HS
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21/11/2025
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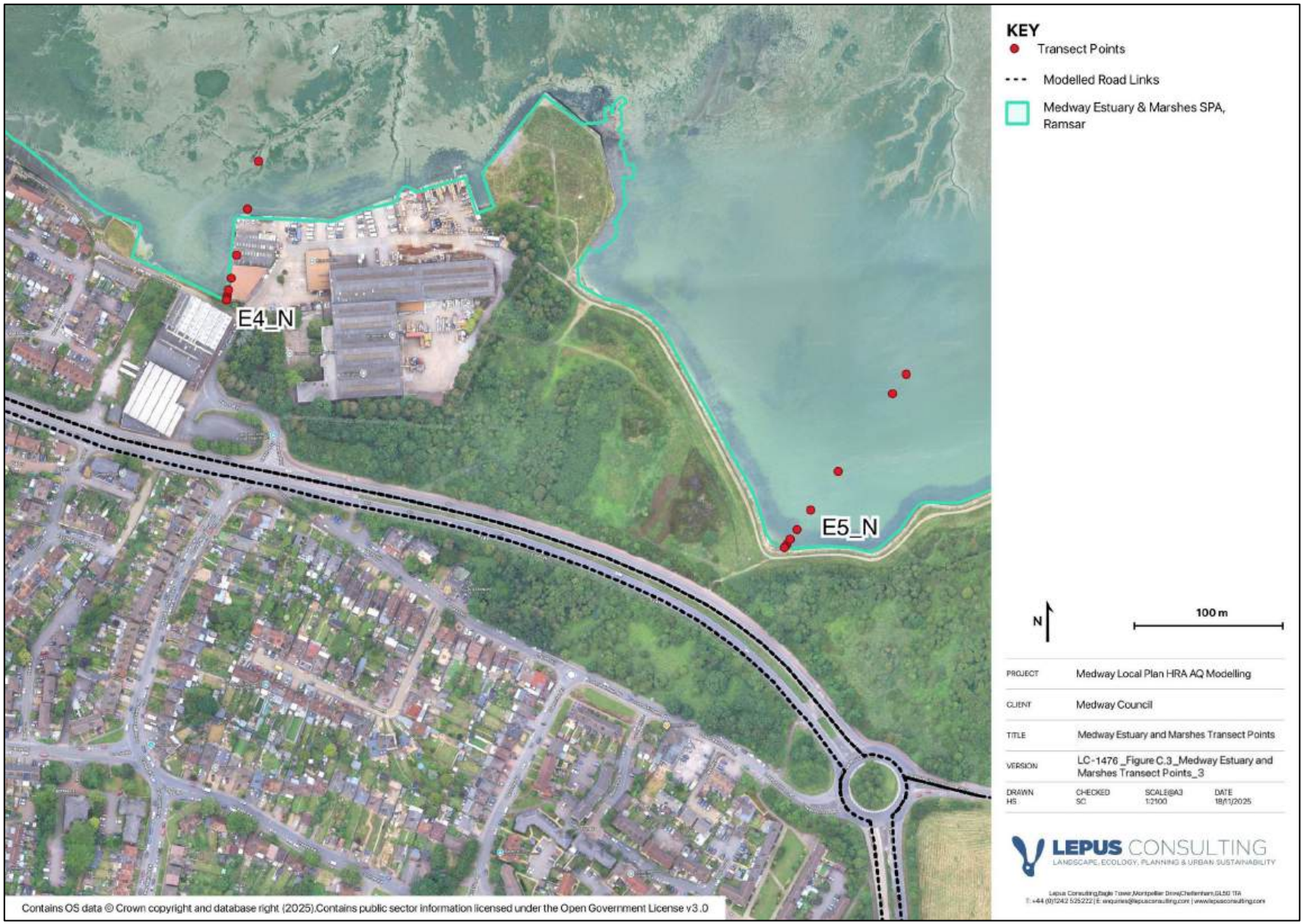
LANDSCAPE, ECOLOGY, PLANNING & URBAN SUSTAINABILITY
Contains OS data © Crown copyright and database right (2025).Contains public sector information licensed under the Open Government License v3.0


KEY
Transect Points
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
E4_N
E5_N
N
100 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Medway Estuary and Marshes Transect Points
VERSION
LC-1476 _Figure C.3_Medway Estuary and Marshes Transect Points_3
DRAWN
HS
CHECKED
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SCALE@A3
1:2100
DATE
18/01/2025
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KEY
Transect Points
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
E6_E
N
100 m
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE 1476 LC-1476 _Figure C.4 _Medway Estuary and Marshes Transect Points_2
VERSION Medway Estuary and Marshes Transect Points
DRAWN HS
CHECKED SC
SCALE@A3 1:1400
DATE 18/01/2025
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KEY
Transect Points
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
E8_W
E7_N
N
50m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
LC-1476 _FigureC.5_Medway Estuary and Marshes Transect Points_1
VERSION
Medway Estuary and Marshes Transect Points
DRAWN
HS
CHECKED
SC
SCALE@A3
1:800
DATE
18/01/2025
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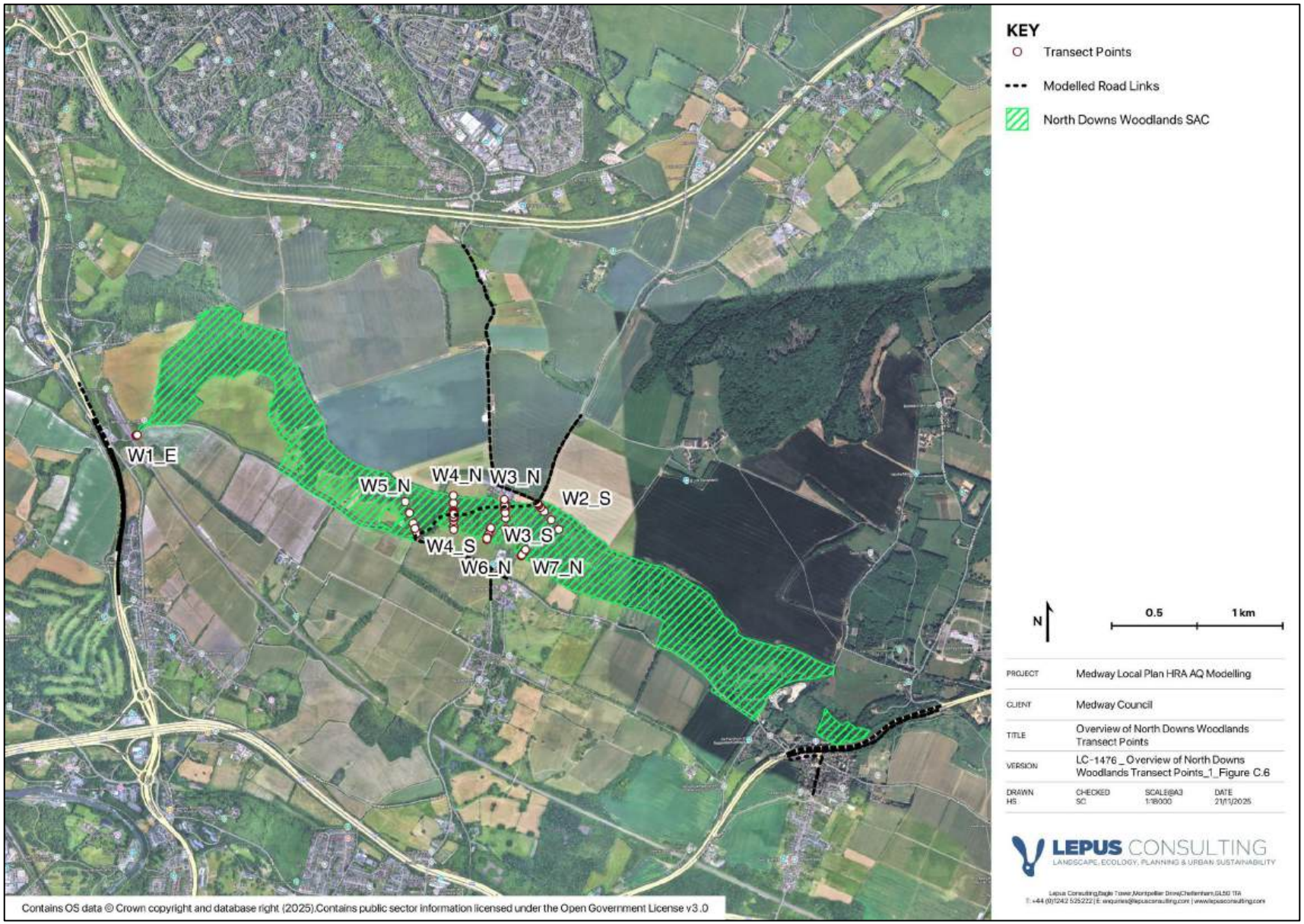
KEY
Transect Points
Modelled Road Links
North Downs Woodlands SAC
W1_E
W5_N
W4_N
W3_N
W2_S
W3_S
W4_S
W6_N
W7_N
N
0.5
1 km
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Overview of North Downs Woodlands Transect Points
VERSION
LC-1476_Overview of North Downs Woodlands Transect Points_1_Figure C.6
DRAWN
HS
CHECKED
SC
SCALE@A3
1:18000
DATE
21/11/2025
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KEY
Transect Points
Modelled Road Links
North Downs Woodlands SAC
W1_E
N
100 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
LC-1476 _FigureC.7_North Downs Transect Point_1
VERSION
North Downs SAC Transect Points 2
DRAWN
HS
CHECKED
SC
SCALE@A3
1:800
DATE
18/01/2025
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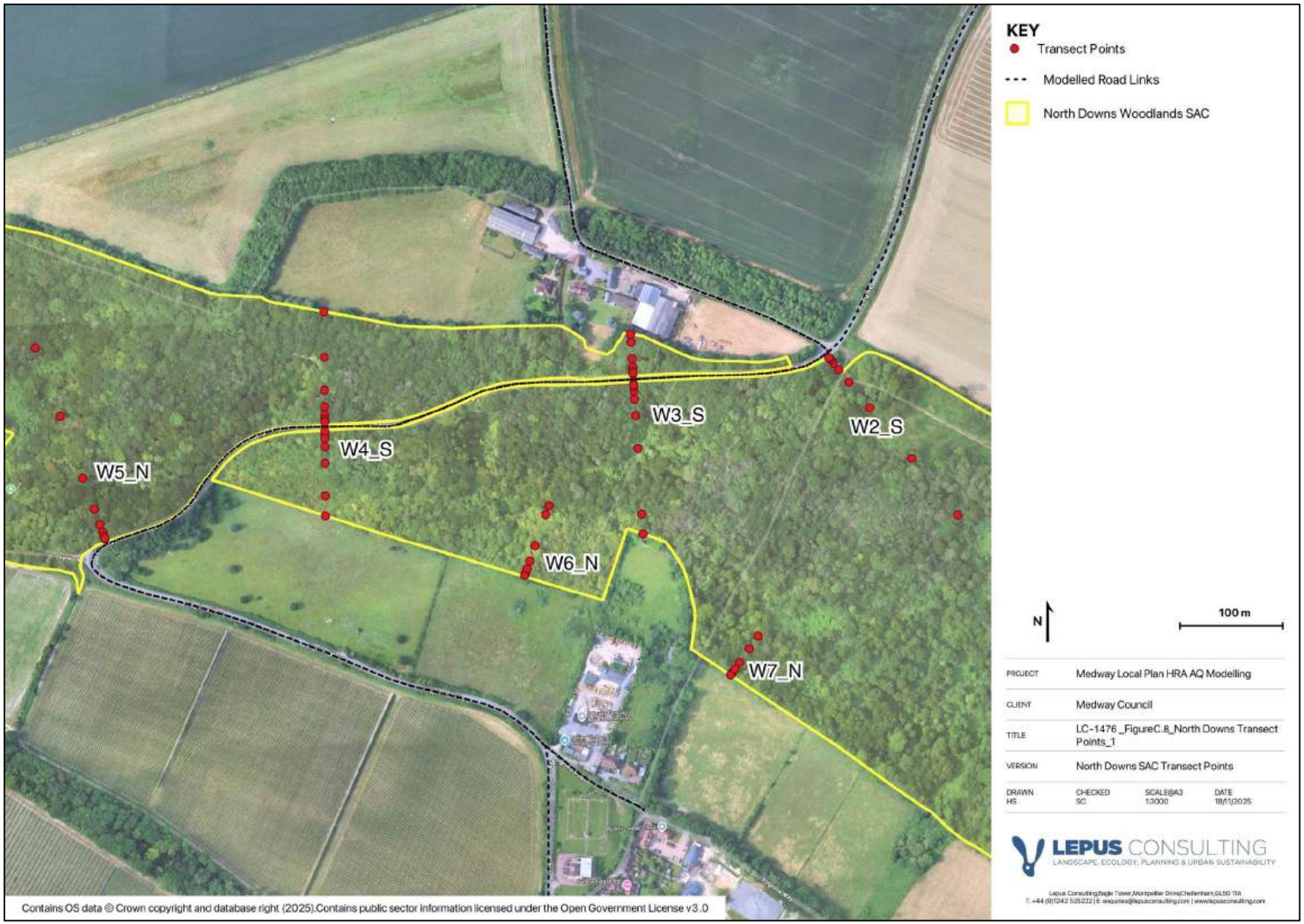
KEY
Transect Points
Modelled Road Links
North Downs Woodlands SAC
W2_S
W3_S
W4_S
W5_N
W6_N
W7_N
N
100 m
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE LC-1476 _FigureC.8_North Downs Transect Points_1
VERSION North Downs SAC Transect Points
DRAWN HS
CHECKED SC
SCALE@A3 1:3000
DATE 18/01/2025
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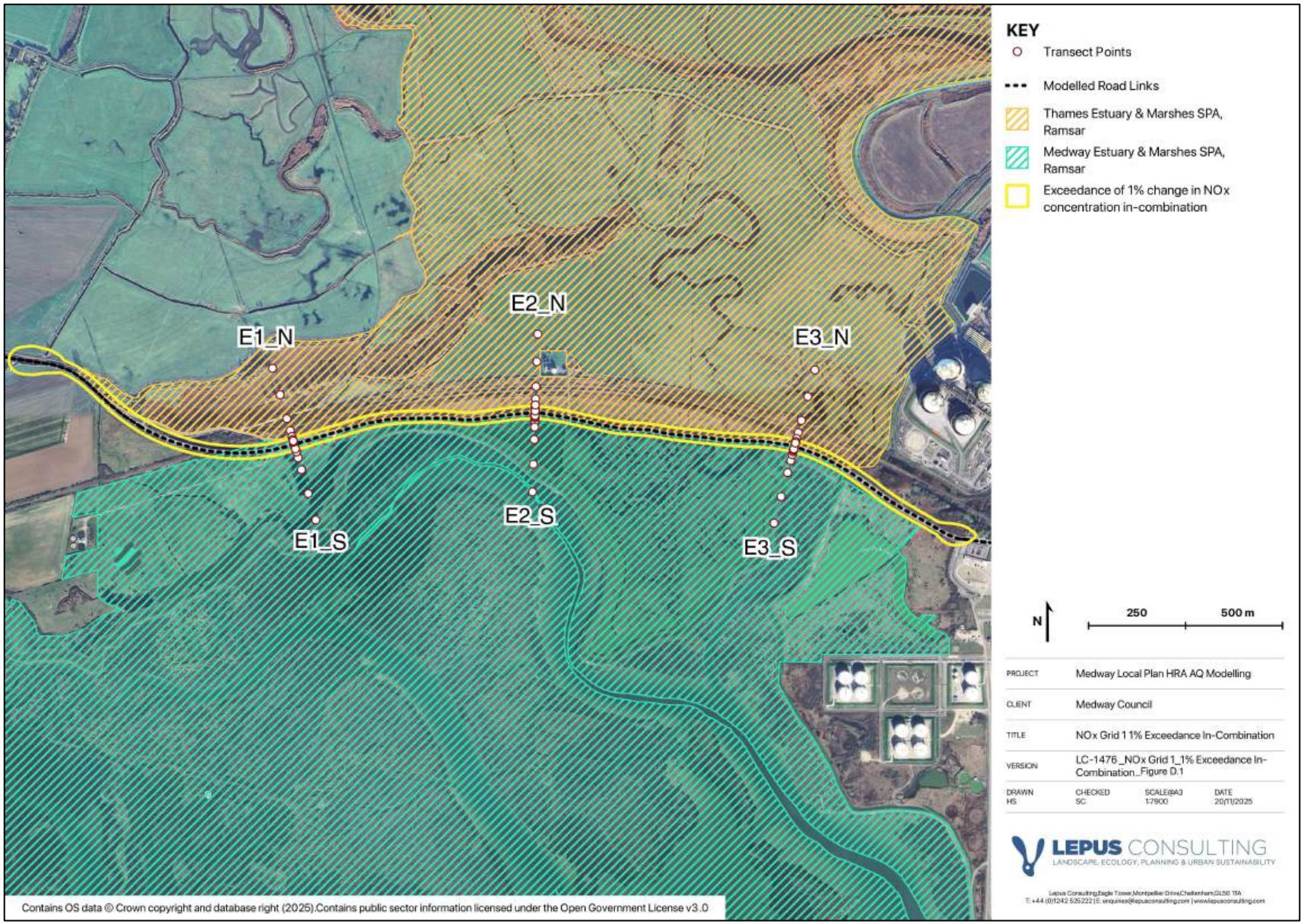
Appendix D: Exceedance of 1% screening thresholds


E1_N
E2_N
E3_N
E1_S
E2_S
E3_S
KEY
Transect Points
Modelled Road Links
Thames Estuary & Marshes SPA, Ramsar
Medway Estuary & Marshes SPA, Ramsar
Exceedance of 1% change in NOx concentration in-combination
N
250
500 m
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE NOx Grid 1 1% Exceedance In-Combination
VERSION LC-1476_NOx Grid 1_1% Exceedance In-Combination_Figure D.1
DRAWN HS
CHECKED SC
SCALE@A3 1:7900
DATE 20/11/2025
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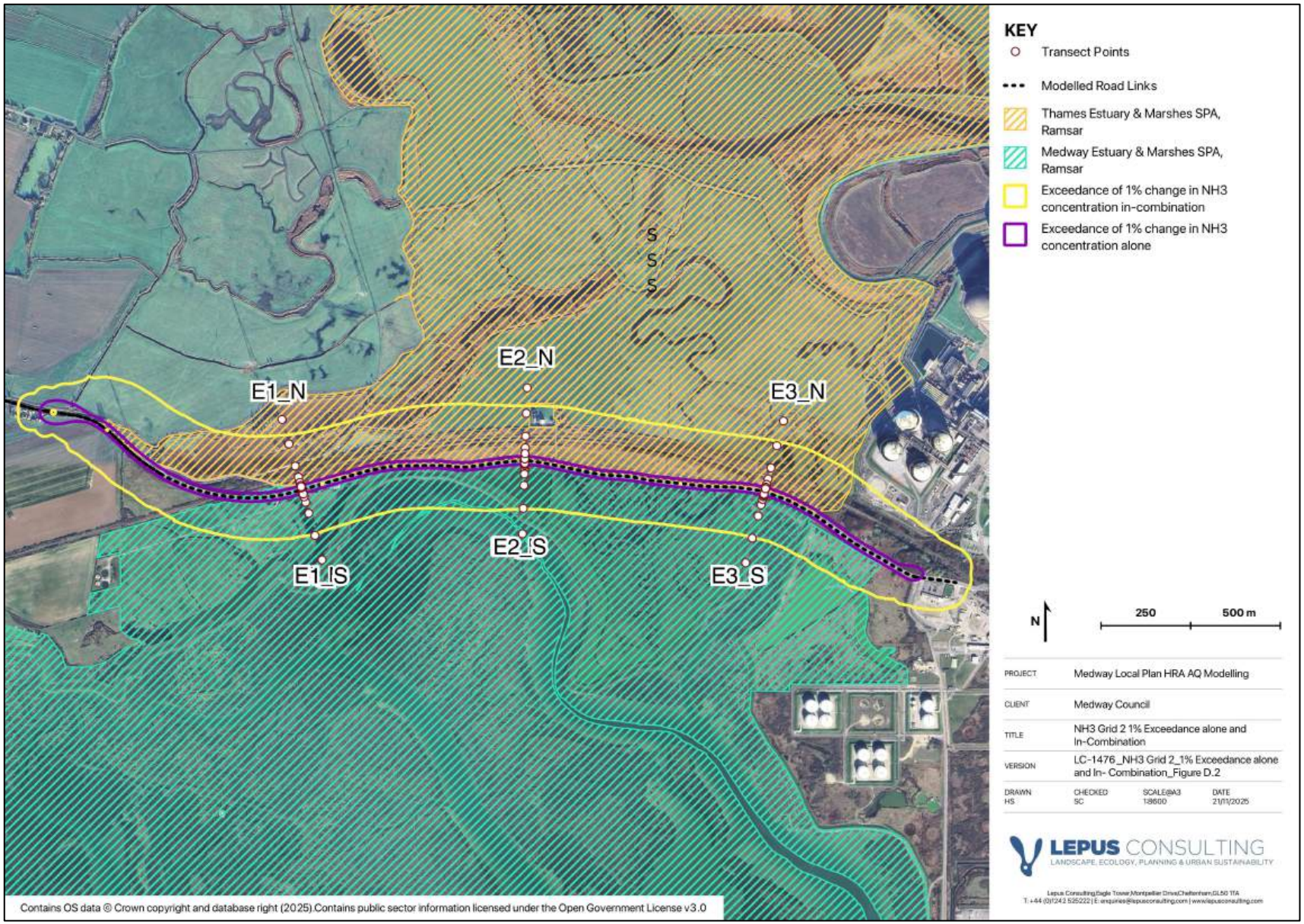
E1_N
E2_N
E3_N
E1_S
E2_S
E3_S
KEY
Transect Points
Modelled Road Links
Thames Estuary & Marshes SPA, Ramsar
Medway Estuary & Marshes SPA, Ramsar
Exceedance of 1% change in NH3 concentration in-combination
Exceedance of 1% change in NH3 concentration alone
N
250
500 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
NH3 Grid 2 1% Exceedance alone and In-Combination
VERSION
LC-1476_NH3 Grid 2_1% Exceedance alone and In- Combination_Figure D.2
DRAWN
HS
CHECKED
SC
SCALE@A3
1:8600
DATE
21/11/2025
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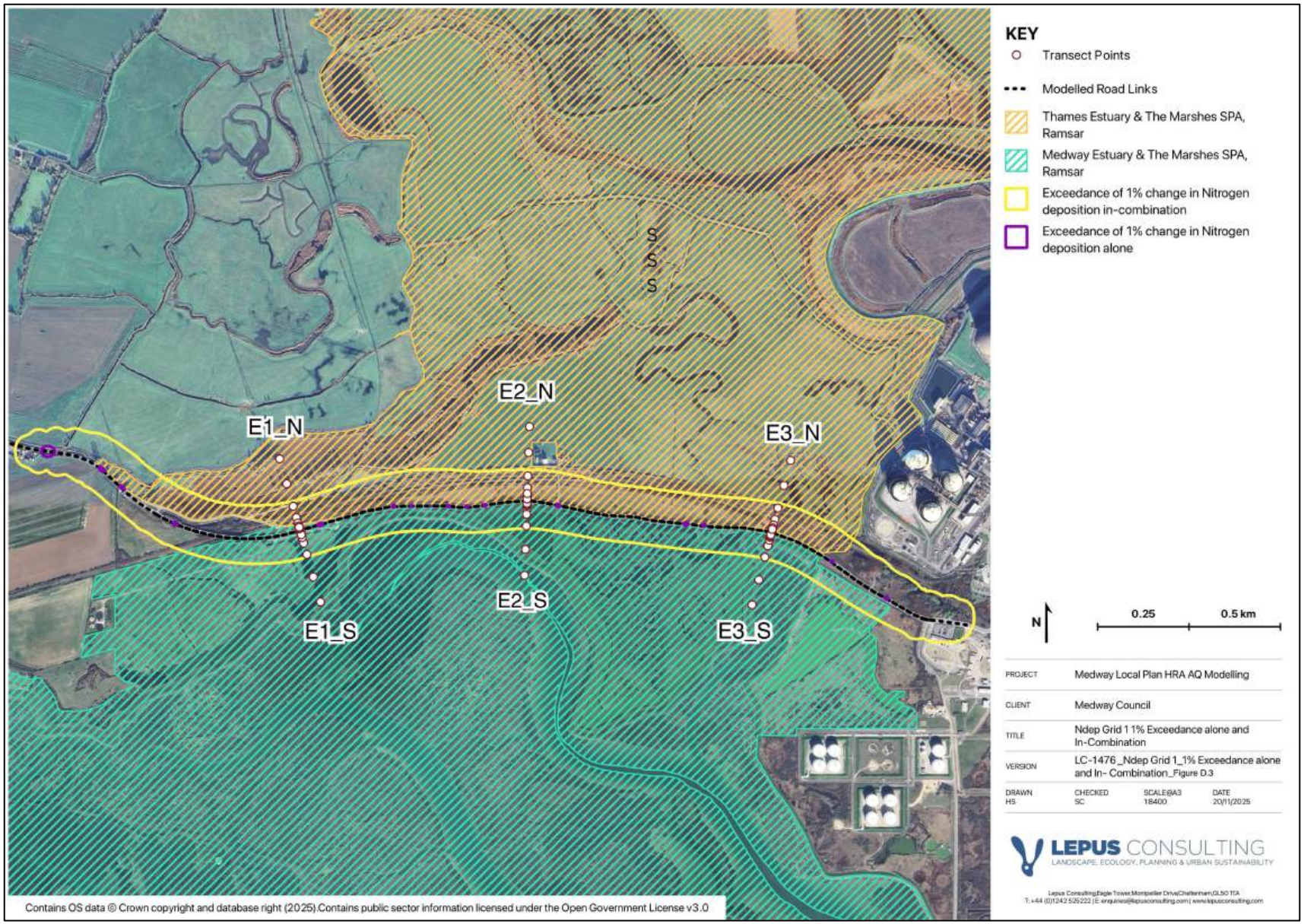
KEY
Transect Points
Modelled Road Links
Thames Estuary & The Marshes SPA, Ramsar
Medway Estuary & The Marshes SPA, Ramsar
Exceedance of 1% change in Nitrogen deposition in-combination
Exceedance of 1% change in Nitrogen deposition alone
E1_N
E2_N
E3_N
E1_S
E2_S
E3_S
N
0.25
0.5 km
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE Ndep Grid 1 1% Exceedance alone and In-Combination
VERSION LC-1476 _Ndep Grid 1_1% Exceedance alone and In- Combination_Figure D.3
DRAWN HS
CHECKED SC
SCALE@A3 18400
DATE 20/11/2025
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KEY
Transect Points
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
Exceedance of 1% change in NH3 concentration in-combination
Exceedance of 1% change in NH3 concentration alone
E4_N
E5_N
N
100
200 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
NH3 Grid 2 1% Exceedance alone and In-Combination_Figure D.4
VERSION
LC-1476 _NH3 Grid 2_1% Exceedance alone and In- Combination
DRAWN
HS
CHECKED
SC
SCALE@A3
1:3600
DATE
20/11/2025
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KEY
Transect Points
Modelled Road Links
Medway Estuary & The Marshes SPA, Ramsar
Exceedance of 1% change in Nitrogen deposition in-combination
Exceedance of 1% change in Nitrogen deposition alone
E4_N
E5_N
N
100
200 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Ndep Grid 2 1% Exceedance alone and In-Combination
VERSION
LC-1476 _Ndep Grid 2_1% Exceedance alone and In- Combination_Figure D.5
DRAWN
HS
CHECKED
SC
SCALE@A3
1:3600
DATE
20/11/2025
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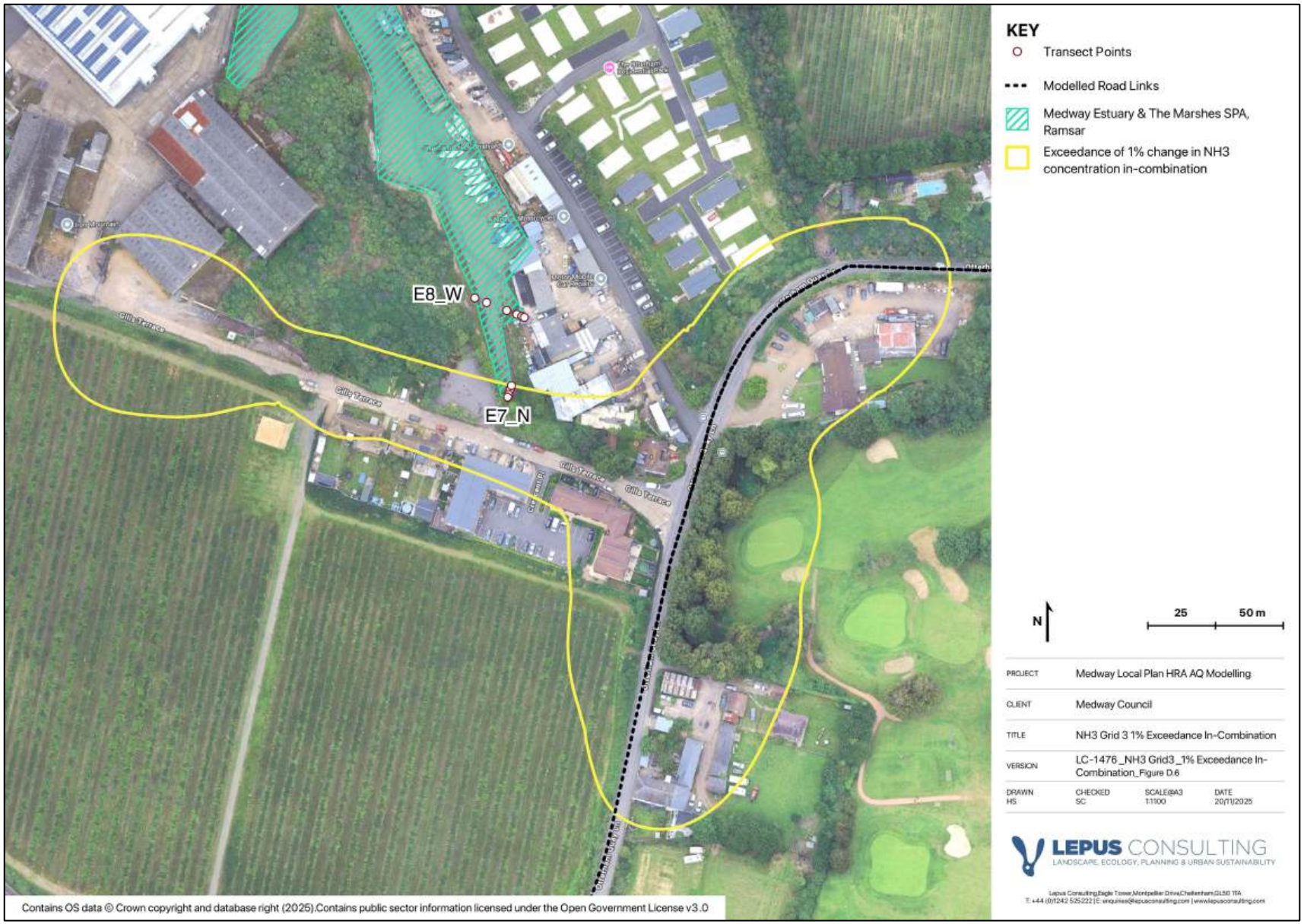
E8_W
E7_N
KEY
Transect Points
Modelled Road Links
Medway Estuary & The Marshes SPA, Ramsar
Exceedance of 1% change in NH3 concentration in-combination
N
25
50 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
NH3 Grid 3 1% Exceedance In-Combination
VERSION
LC-1476_NH3 Grid3_1% Exceedance In-Combination_Figure D.6
DRAWN
HS
CHECKED
SC
SCALE@A3
1:1100
DATE
20/11/2025
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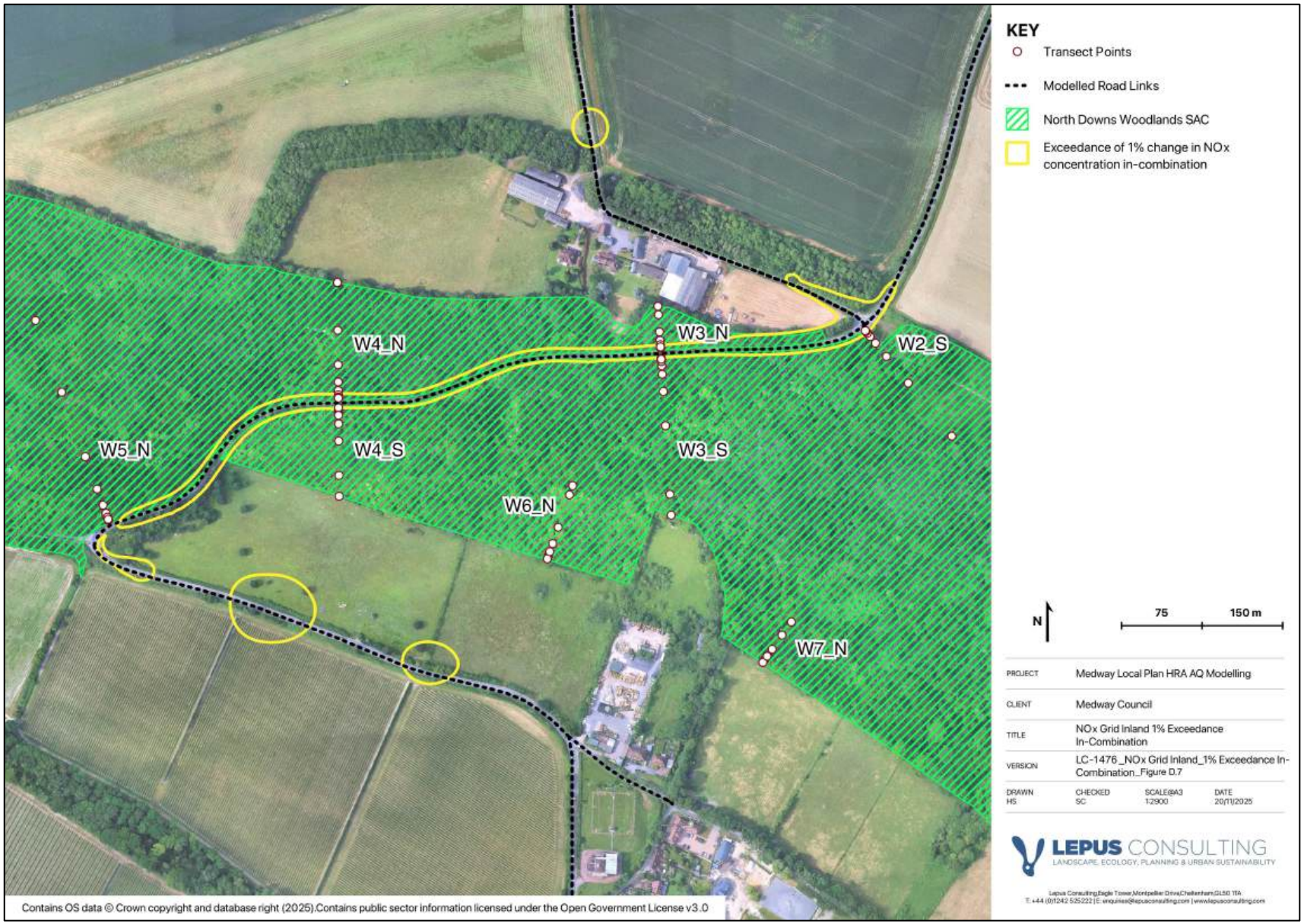
KEY
Transect Points
Modelled Road Links
North Downs Woodlands SAC
Exceedance of 1% change in NOx concentration in-combination
W4_N
W3_N
W2_S
W5_N
W4_S
W3_S
W6_N
W7_N
N
75
150 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
NOx Grid Inland 1% Exceedance In-Combination
VERSION
LC-1476_NOx Grid Inland_1% Exceedance In-Combination_Figure D.7
DRAWN
HS
CHECKED
SC
SCALE@A3
1:2900
DATE
20/11/2025
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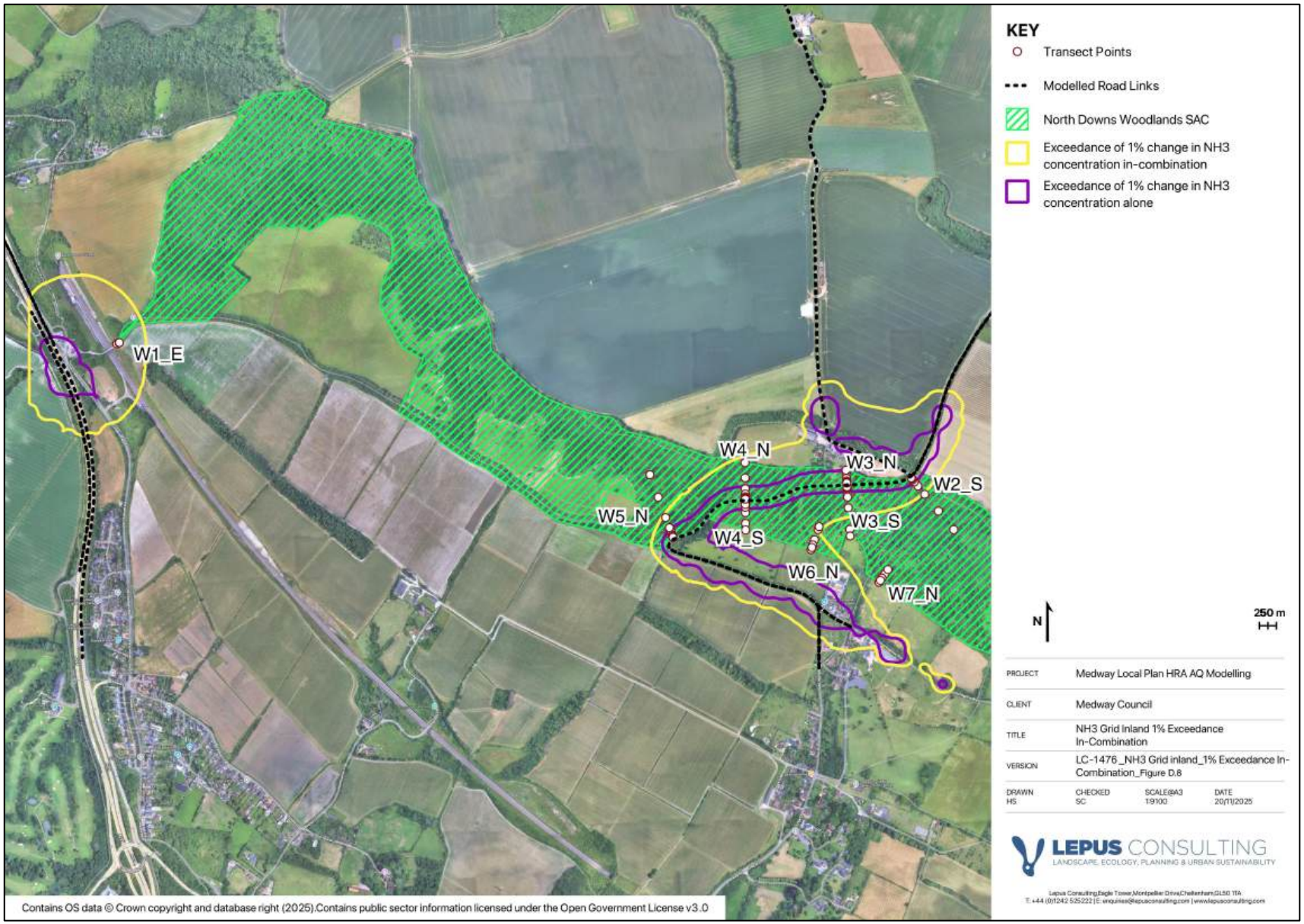
KEY
Transect Points
Modelled Road Links
North Downs Woodlands SAC
Exceedance of 1% change in NH3 concentration in-combination
Exceedance of 1% change in NH3 concentration alone
W1_E
W4_N
W3_N
W2_S
W5_N
W3_S
W4_S
W6_N
W7_N
N
250 m
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE NH3 Grid Inland 1% Exceedance In-Combination
VERSION LC-1476_NH3 Grid inland_1% Exceedance In-Combination_Figure D.8
DRAWN HS
CHECKED SC
SCALE@A3 1:9100
DATE 20/11/2025
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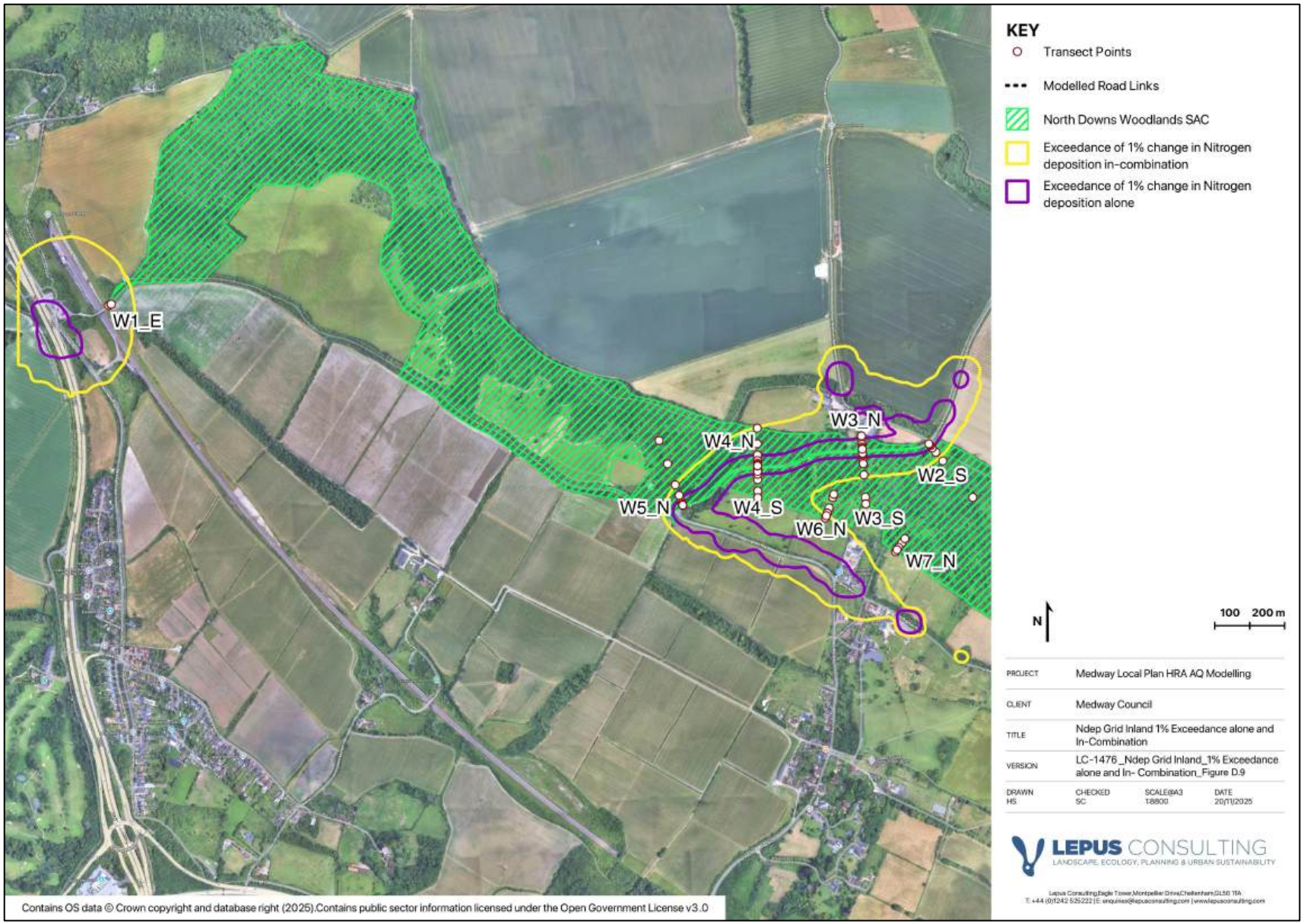
KEY
Transect Points
Modelled Road Links
North Downs Woodlands SAC
Exceedance of 1% change in Nitrogen deposition in-combination
Exceedance of 1% change in Nitrogen deposition alone
W1_E
W3_N
W4_N
W2_S
W5_N
W4_S
W3_S
W6_N
W7_N
N
100 200 m
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE Ndep Grid Inland 1% Exceedance alone and In-Combination
VERSION LC-1476 _Ndep Grid Inland_1% Exceedance alone and In- Combination_Figure D.9
DRAWN HS
CHECKED SC
SCALE@A3 1:8000
DATE 20/11/2025
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KEY
Transect Points
Modelled Road Links
North Downs Woodlands SAC
Exceedance of 1% change in acid deposition in-combination
Exceedance of 1% change in acid deposition alone
W4_N
W3_N
W2_S
W5_N
W4_S
W3_S
W6_N
W7_N
N
100
200 m
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE Adep Grid Inland 1% Exceedance alone and In-Combination
VERSION LC-1476_Adep Grid Inland_1% Exceedance alone and In- Combination_Figure D.10
DRAWN HS
CHECKED SC
SCALE@A3 13800
DATE 20/11/2025
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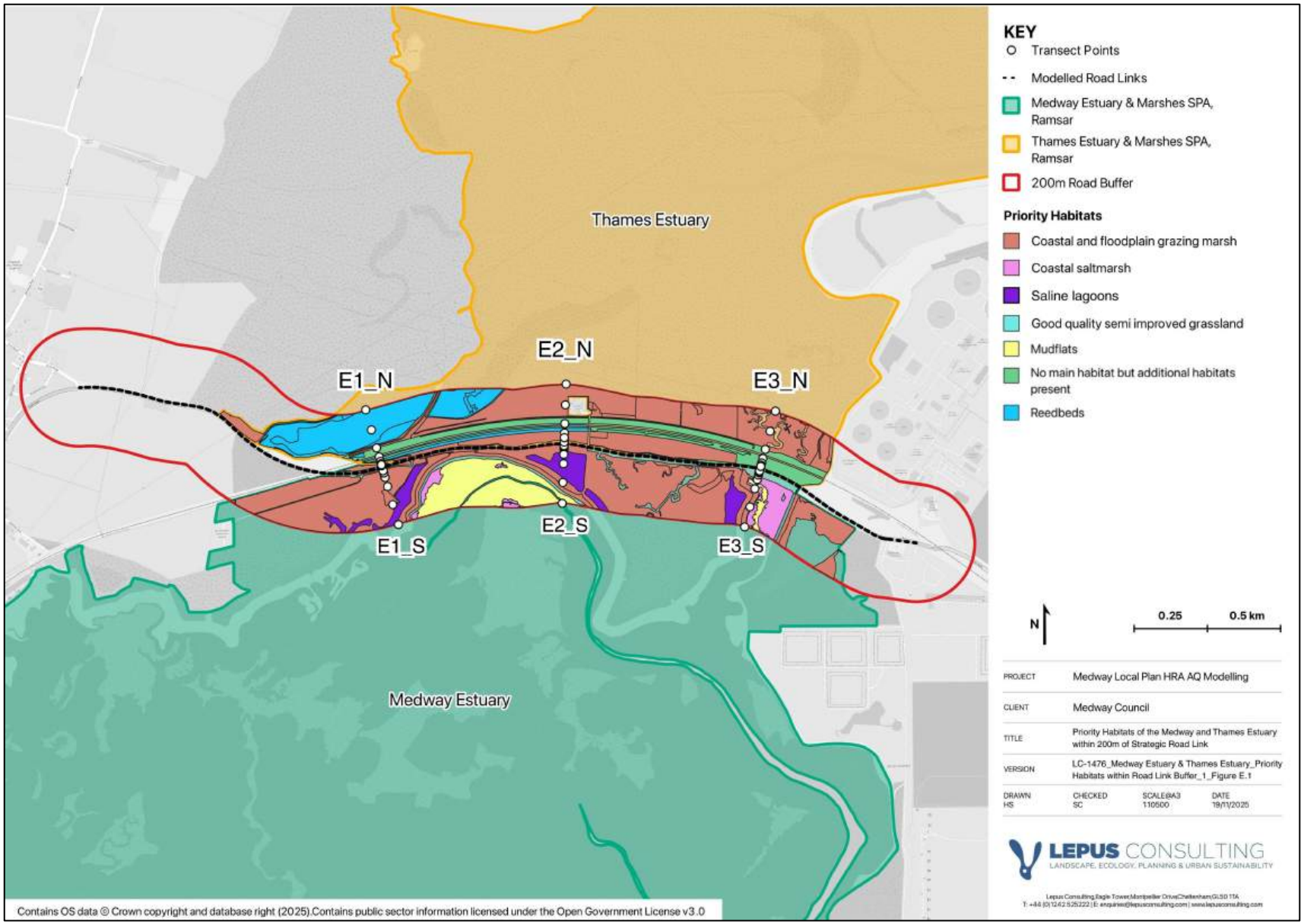
Appendix E: Habitat mapping data


Thames Estuary
E1_N
E2_N
E3_N
E1_S
E2_S
E3_S
Medway Estuary
KEY
Transect Points
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
Thames Estuary & Marshes SPA, Ramsar
200m Road Buffer
Priority Habitats
Coastal and floodplain grazing marsh
Coastal saltmarsh
Saline lagoons
Good quality semi improved grassland
Mudflats
No main habitat but additional habitats present
Reedbeds
N
0.25
0.5 km
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE Priority Habitats of the Medway and Thames Estuary within 200m of Strategic Road Link
VERSION LC-1476_Medway Estuary & Thames Estuary_Priority Habitats within Road Link Buffer_1_Figure E.1
DRAWN HS
CHECKED SC
SCALE@A3 1:10500
DATE 19/11/2025
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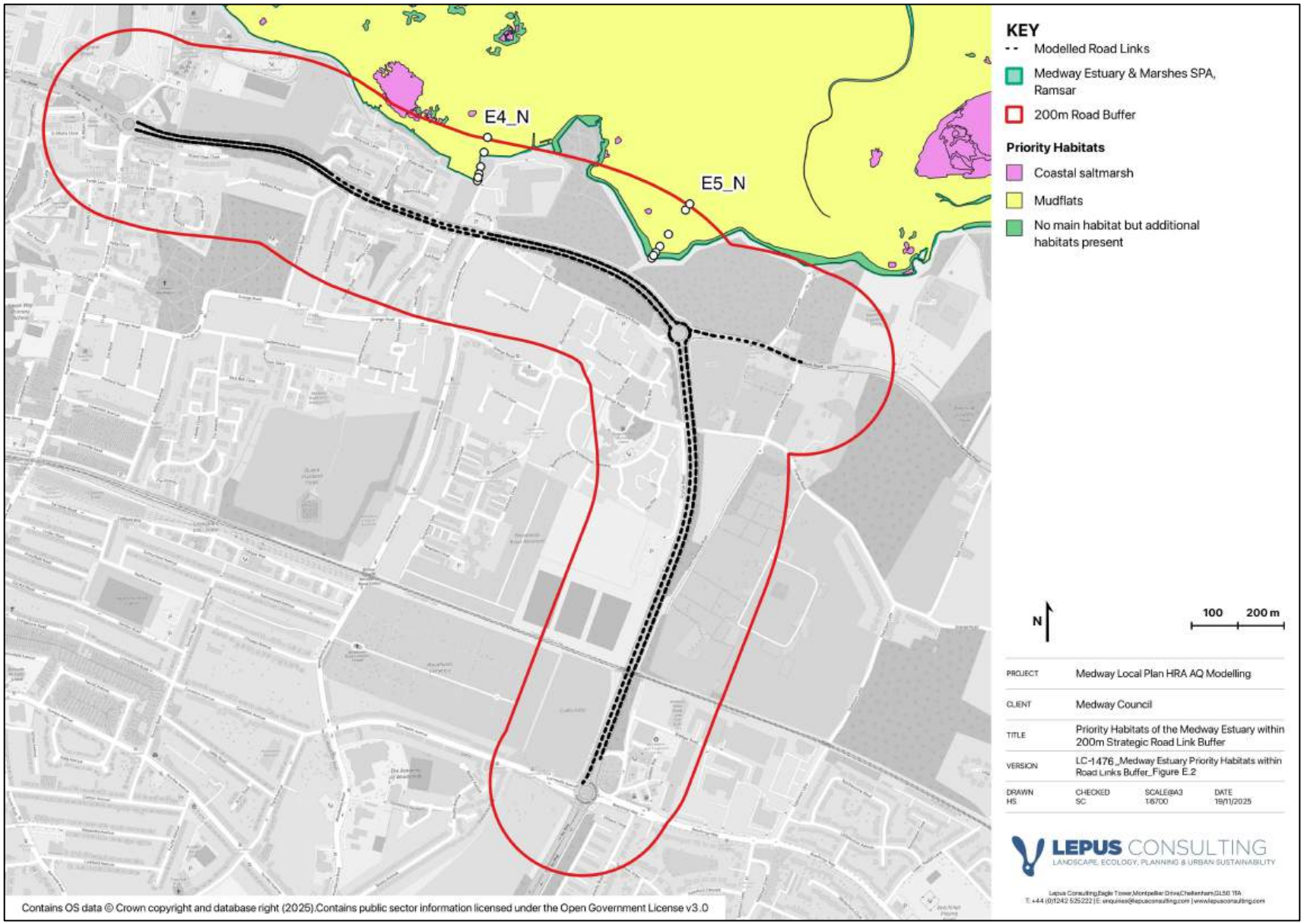
E4_N
E5_N
KEY
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
200m Road Buffer
Priority Habitats
Coastal saltmarsh
Mudflats
No main habitat but additional habitats present
N
100
200 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Priority Habitats of the Medway Estuary within 200m Strategic Road Link Buffer
VERSION
LC-1476_Medway Estuary Priority Habitats within Road Links Buffer_Figure E.2
DRAWN
HS
CHECKED
SC
SCALE@A3
1:6700
DATE
19/11/2025
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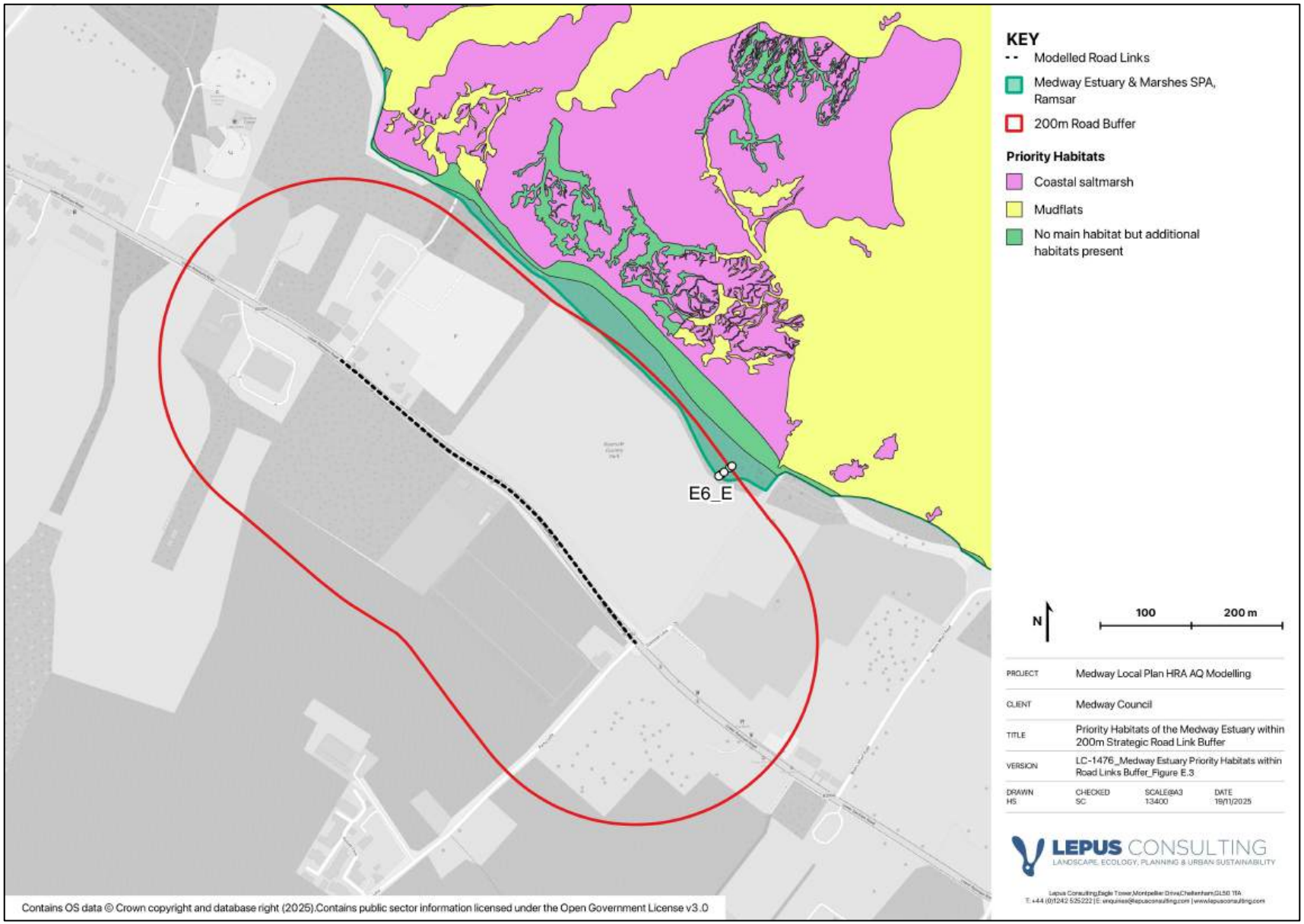
KEY
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
200m Road Buffer
Priority Habitats
Coastal saltmarsh
Mudflats
No main habitat but additional habitats present
E6_E
N
100
200 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Priority Habitats of the Medway Estuary within 200m Strategic Road Link Buffer
VERSION
LC-1476_Medway Estuary Priority Habitats within Road Links Buffer_Figure E.3
DRAWN
HS
CHECKED
SC
SCALE@A3
1:3400
DATE
19/11/2025
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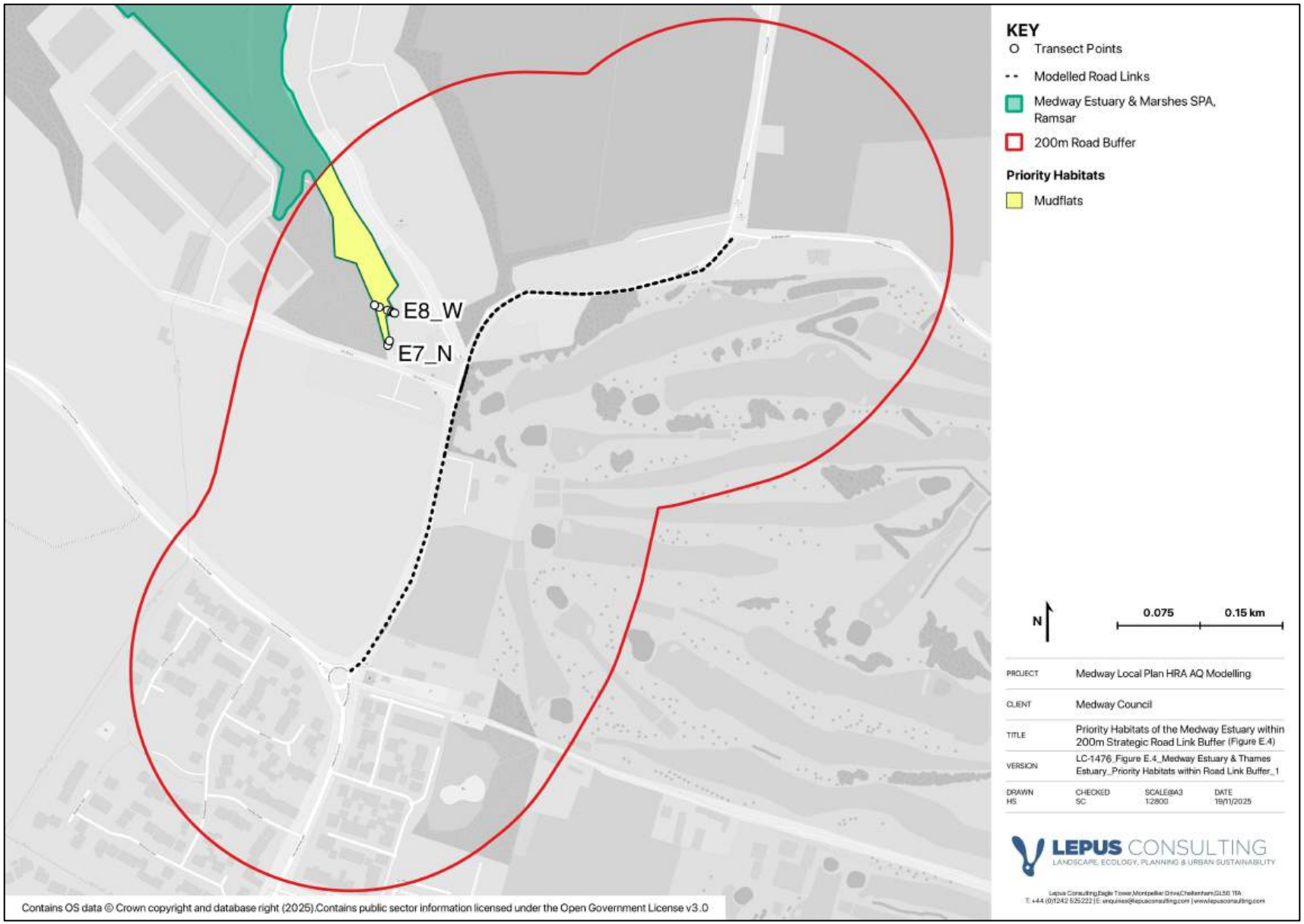
E8_W
E7_N
KEY
Transect Points
Modelled Road Links
Medway Estuary & Marshes SPA, Ramsar
200m Road Buffer
Priority Habitats
Mudflats
N
0.075
0.15 km
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Priority Habitats of the Medway Estuary within 200m Strategic Road Link Buffer (Figure E.4)
VERSION
LC-1476_Figure E.4_Medway Estuary & Thames Estuary_Priority Habitats within Road Link Buffer_1
DRAWN
HS
CHECKED
SC
SCALE@A3
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DATE
19/11/2025
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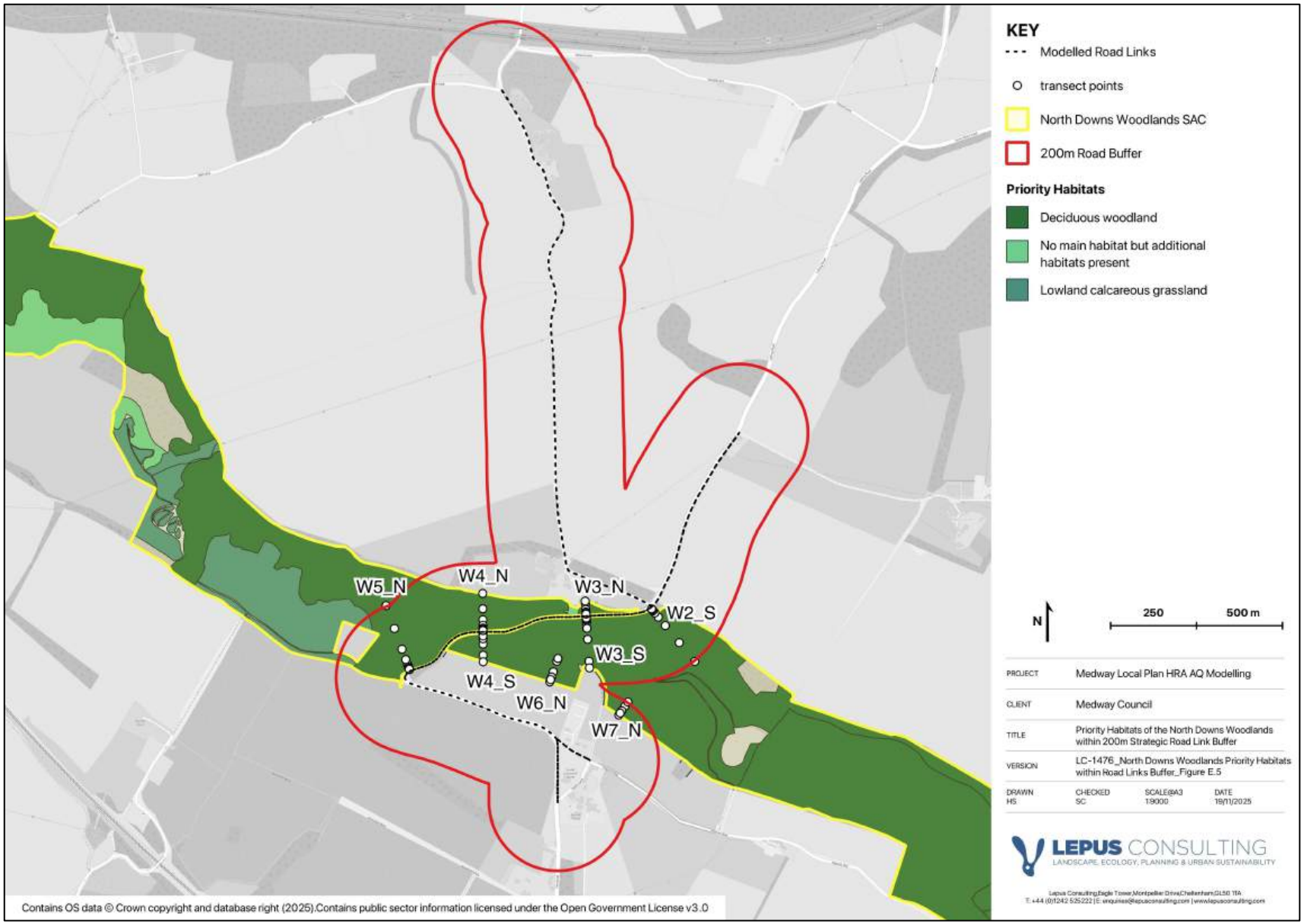
KEY
Modelled Road Links
transect points
North Downs Woodlands SAC
200m Road Buffer
Priority Habitats
Deciduous woodland
No main habitat but additional habitats present
Lowland calcareous grassland
W5_N
W4_N
W3_N
W2_S
W3_S
W4_S
W6_N
W7_N
N
250
500 m
PROJECT Medway Local Plan HRA AQ Modelling
CLIENT Medway Council
TITLE Priority Habitats of the North Downs Woodlands within 200m Strategic Road Link Buffer
VERSION LC-1476_North Downs Woodlands Priority Habitats within Road Links Buffer_Figure E.5
DRAWN HS
CHECKED SC
SCALE@A3 1:9000
DATE 19/11/2025
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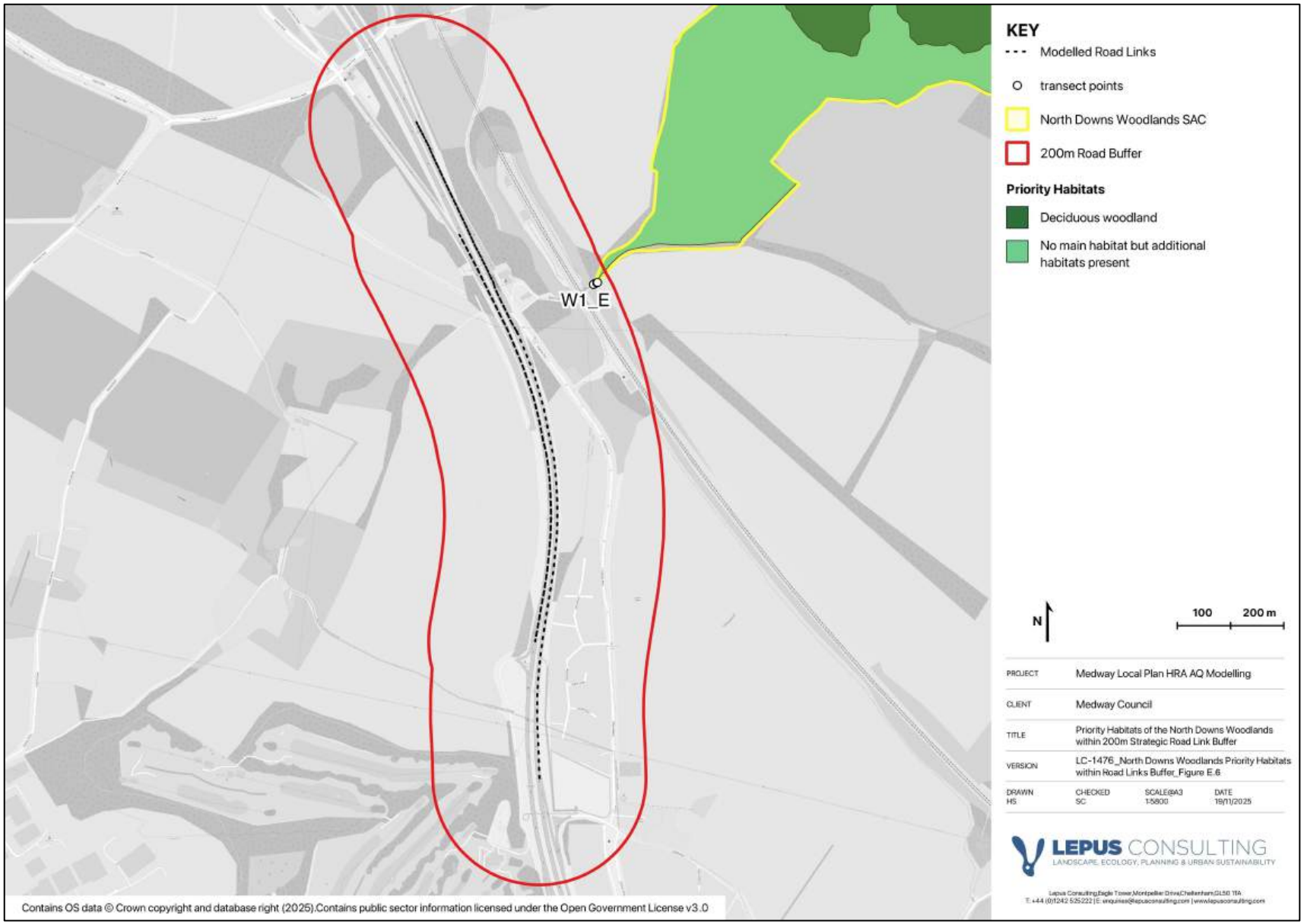
W1_E
KEY
Modelled Road Links
transect points
North Downs Woodlands SAC
200m Road Buffer
Priority Habitats
Deciduous woodland
No main habitat but additional habitats present
N
100
200 m
PROJECT
Medway Local Plan HRA AQ Modelling
CLIENT
Medway Council
TITLE
Priority Habitats of the North Downs Woodlands within 200m Strategic Road Link Buffer
VERSION
LC-1476_North Downs Woodlands Priority Habitats within Road Links Buffer_Figure E.6
DRAWN
HS
CHECKED
SC
SCALE@A3
1:5800
DATE
19/11/2025
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Habitats Regulations Assessments

Sustainability Appraisals

Strategic Environmental Assessments

Landscape Character Assessments

Landscape and Visual Impact Assessments

Green Belt Reviews

Expert Witness

Ecological Impact Assessments

Habitat and Ecology Surveys

Biodiversity Net Gain

Eagle Tower

Montpellier Drive

Cheltenham

GL50 1TA

T: 01242 525222

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