

Appendix 5P

Habitats Regulations Assessment Screening Report

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Executive Summary

Purpose of this Report

Cadent Gas Ltd (Cadent) (the Applicant) intends to submit a Development Consent Order application for the proposed HyNet North West Hydrogen Pipeline Project ('the Project') to the Planning Inspectorate.

Under Regulation 63 of the Habitats Regulations, a person applying for any consent, permission or other authorisation for a plan or project must provide such information as the competent authority may reasonably require for the purposes of the assessment or to enable them to determine whether an appropriate assessment is required. Thus, the Applicant is responsible for assembling and describing all the relevant information required to enable the competent authorities to carry out their Habitats Regulations Assessment (HRA) responsibilities.

This HRA Stage 1 Screening Report details the scope, approach and conclusions of the HRA screening in respect to the impact of the Project on the qualifying interest features of all European sites screened into the assessment, either alone or in combination with other plans or projects. The survey findings from Year 2 have shown that there is potential FLL (e.g. areas of habitat outside of a European Site used by significant numbers of qualifying/assemblage species on a regular basis) relating to a European site within 500m of the Project, and also that transport links to/from the Project pass within 200m of a further two European sites. This updated report now concludes that there is potential for Likely Significant Effects (LSE) on qualifying and/or assemblage interest features of four sites within the new national site network, namely:

- Mersey Estuary SPA;
- Mersey Estuary Ramsar Site;
- Manchester Mosses SAC; and
- Rostherne Mere Ramsar Site.

Additionally, the following developments in proximity to the Project were also identified as having the potential for LSE on European sites:

- HyNet Hydrogen Production Plant;
- ENCIRC Automated Warehouse;
- Protos Carbon Dioxide Spur Pipeline;
- Protos ERF Carbon Capture Facility;
- Protos Plastics Park;
- Hynet CO₂ Pipeline DCO; and
- Sandymoor South Phase 2.

As there are LSEs for qualifying (and assemblage) features of four European sites and potential for in-combination effects with other developments, Stage 2 of HRA – Appropriate Assessment will be undertaken and appended to the Final ES submission.

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Annex 5P1 Screening Matrices

1. Introduction

- 1.1.1 This report forms one of a suite of documents related to the Draft ES, which together support and explain in detail the content and nature of the Applicant's HyNet North West Hydrogen Pipeline Project ('the Project') Development Consent Order (DCO) Application.

1.2 Background to and Purpose of this report

- 1.2.1 An outline of the Project is provided in **Section 2.2** and is shown in **Figure 5P.1 – The Project**.
- 1.2.2 There is a requirement under The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations') to undertake a Habitat Regulations Assessment (HRA).
- 1.2.3 Council Directives 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora ("the Habitats Directive") and 2009/147/EC on the conservation of wild birds ("the Birds Directive") provide for the designation of sites for the protection of certain species and habitats. The sites designated under these Directives are collectively termed European sites and form part of a network of protected sites across Europe, known as the Natura 2000 network. In the UK the Habitats Regulations transposed these Directives into national law and applied them up to the 12 nautical mile limit of territorial waters.
- 1.2.4 Changes made by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (the 2019 Regulations). Special Area of Conservation (SACs) and Special Protection Areas (SPAs) in the UK no longer form part of the EU's Natura 2000 ecological network. The 2019 Regulations have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK. The national site network includes existing SACs and SPAs, plus new SACs and SPAs designated under the 2019 Regulations.
- 1.2.5 Any references to Natura 2000 in the Habitats Regulations and in guidance now refers to the new national site network, although for the purposes of this HRA all sites will still be referred to as European sites.
- 1.2.6 The UK Government is also a signatory to the Convention on Wetlands of International Importance 1972 ("the Ramsar Convention"). The Ramsar Convention provides for the listing of wetlands of international importance. UK Government policy is to give sites listed under this convention ("Ramsar Sites") the same protection as European sites and the new national site network.
- 1.2.7 For the purposes of this HRA Screening Assessment, in line with the Habitats Regulations and relevant Government policy, the term "European sites" and new national site network includes SACs, candidate SACs ("cSAC"), possible SACs ("pSAC"), SPAs, potential SPAs ("pSPA"), listed and proposed Ramsar Sites and sites identified or required as compensatory measures for adverse effects on any of these sites.

1.2.8 The Project is in close proximity to several European sites¹, notably:

- Mersey Estuary SPA/Ramsar Site;
- Midland Meres and Mosses Phase 1 and 2 Ramsar Site(s);
- West Midlands Mosses SAC;
- Rostherne Mere Ramsar Site;
- Rixton Clay Pits SAC;
- Manchester Mosses SAC;
- Oak Mere SAC; and
- River Dee and Bala Lake SAC.

1.2.9 Amongst other things, the Habitat Regulations define the process for the assessment of the implications of plans or projects on European sites. This process is termed the HRA.

1.2.10 HRA can involve up to three stages:

- **Stage 1 – Screening:**
 - ▶ This stage identifies the likely impacts upon a European site of a project or Plan, either alone or ‘in combination’ with other projects or plans and considers whether these impacts are likely to be significant.
- **Stage 2 – Appropriate Assessment (AA):**
 - ▶ Where there are likely significant impacts, this stage considers the impacts of the Plan or project on the integrity of the relevant European sites, either alone or ‘in combination’ with other projects or plans, with respect to the sites’ structure and function and their conservation objectives. Where there are adverse impacts, it also includes an assessment of the potential mitigation for those impacts.
- **Stage 3 – Derogation:**
 - ▶ Consideration of whether proposals that would have an adverse effect on the integrity of a Habitats Site (after mitigation) qualify for an exemption. This stage requires three legal tests to be met:
 - There are no feasible alternative solutions that would be less damaging or avoid damage to the Habitats Site;

¹ Under The Conservation of Habitats and Species Regulations 2017, European sites are defined as Special Areas of Conservation (SACs), candidate SACs, Sites of Community Importance, Special Protection Areas (SPA) and European Marine Sites (EMS), which are marine areas designated as SACs and SPAs. UK policy extends the requirements pertaining to European sites to include Ramsar Sites and potential SPAs, and this would include proposed extensions or alterations to existing SPAs.

- The proposal needs to be carried out for Imperative Reasons of Overriding Public Interest (IROPI); and
- The necessary compensatory measures can be secured.

- 1.2.11 Stages 1 and 2 are covered by Regulation 63 and Stage 3 is covered by Regulation 64 and 68 of the Habitat Regulations. Stage 3 is the derogation process, which can allow a proposal to go ahead even if it has failed Stage 2 integrity test.
- 1.2.12 With respect to Stage 2, the integrity of a European Site relates to the site's conservation objectives and has been defined in guidance as "*the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated*"². An adverse effect on integrity, therefore, is likely to be one which prevents the site from making the same contribution to favourable conservation status for the relevant feature as it did at the time of designation. The HRA screening process uses the threshold of LSE to determine whether effects on European sites should be the subject of further assessment. The Habitats Regulations do not define the term LSE. However, in the Waddenzee case (Case C-127/02)³ the European Court of Justice found that an LSE should be presumed, and an Appropriate Assessment (AA) carried out if it cannot be excluded on the basis of objective information that the plan or project will not have significant effects on the conservation objectives of the site concerned, whether alone or in-combination with any other project.. The Advocate General's opinion of the Sweetman case (Case C-258/11)⁴ further clarifies the position by noting that for a conclusion of an LSE to be made "*there is no need to **establish** such an effect... it is merely necessary to determine that there **may** be such an effect*" (original emphasis).
- 1.2.13 For the reasons highlighted above the assessment process follows the precautionary principle throughout and the word 'likely' is regarded as a description of a risk (or possibility) rather than in a legal sense an expression of probability.

² European Commission (2018). Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, at section 4.6.3 (Updated Version, November 2018). (online) Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0125\(07\)&rid=2](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52019XC0125(07)&rid=2) (Accessed July 2024).

³ Judgment of the Court (Grand Chamber) of 7 September 2004. Landelijke Vereniging tot Behoud van de Waddenzee and Nederlandse Vereniging tot Bescherming van Vogels v Staatssecretaris van Landbouw, Natuurbeheer en Visserij. Reference for a preliminary ruling: Raad van State - Netherlands. Case C-127/02. (online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62002CJ0127&from=EN> (Accessed July 2024).

⁴ Judgment of the Court (Third Chamber), 11 April 2013 Peter Sweetman and Others v An Bord Pleanála. Request for a preliminary ruling from the Supreme Court (Ireland) Case C-258/11. (online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62011CJ0258&from=en> (Accessed July 2024).

- 1.2.14 Screening can however be used to screen-out European sites and elements of works from further assessment, if it is possible to determine that significant effects are unlikely (e.g., if sites or interest features are clearly not vulnerable (exposed and/or sensitive) to the outcomes of the proposal due to the absence of any reasonable impact pathways.
- 1.2.15 The screening process has two potential conclusions, namely that the Project, alone or in combination with other developments, could result in:
- No LSE on any of the designated features of the site; or
 - An LSE is identified that may have significant adverse effect on one or more of the qualifying features of the site and hence a significant effect on site integrity.
- 1.2.16 Only the last of these outcomes will trigger an AA. If one or more LSE are identified, or cannot be ruled out, it is then necessary to proceed to Stage 2 and produce an AA.
- 1.2.17 On 12 April 2018, the Court of Justice of the European Union (CJEU) issued a judgment on Case C323/17 (People over Wind, Peter Sweetman v Coillte Teoranta) which stated (at paragraph 41):
- “Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects [mitigation] of the plan or project on that site.”*
- 1.2.18 This means that any mitigation relating to protected sites under Regulation 63 (1) of the Habitat 2017 Regulations will no longer be considered at the screening stage but taken forward and considered at the AA stage to inform a decision on whether no adverse effects on site integrity can be demonstrated.
- 1.2.19 The screening assessment provided within this HRA takes into account the CJEU ruling on ‘People over Wind’. It has also adopted a strong precautionary approach in line with the precautionary principle, such that if a pathway (defined as a course of action, or route/way) for any effect is established between the Project and a European Site, then that site is taken through to AA. This ensures all effects are captured, including *de minimis* effects.
- 1.2.20 The subject of this report is HRA Stage 1, which examines whether the Project is likely to have significant effects on any European sites.
- 1.2.21 If one or more significant effects are likely to occur, it is then necessary to proceed to HRA Stage 2.

1.3 Structure of this Report

- 1.3.1 This HRA Screening Report has been produced to cover HRA Stage 1 - Screening only.

HRA Stage 1 – Screening

- 1.3.2 Screening aims to determine whether the Project will have any LSE on any European site, as a result of its implementation. It is intended to be an informed coarse filter for identifying effects (positive and negative) that may occur, to allow the assessment stage to focus on the most important aspects.
- 1.3.3 PINS Advice Note 10⁵ details the process for which HRA is undertaken in relation to applications for Nationally Significant Infrastructure Projects (NSIPs) and provides advice for Applicants in relation to the preparation of the HRA. The advice note details that *"Anyone applying for development consent for a NSIP must provide the competent authority with such information as may reasonably be required 'for the purposes of the assessment' or 'to enable them to determine whether an appropriate assessment is required'. This information normally takes the form of a No Significant Effects Report (NSER) or a Habitats Regulations Assessment Report (HRA Report)."*
- 1.3.4 As well as the advice within PINS Advice Note 10, this report follows the procedures for screening described by the European Commission in the guidance document 'Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC'. These steps are:
- Step 1: Determining whether the project or plan is directly connected with or necessary for the management of the site.
 - Step 2: Describing the project (or plan).
 - Step 3: Identifying the potential effects on European sites.
 - Step 4: Assessing the presence of Likely Significance Effects on European sites.

Step 1

- 1.3.5 Regulation 63 of the Habitats Regulations applies to plans or projects that are not directly related to the conservation management of a European site. This first step of the screening process is therefore to identify whether the plan or project in question is related to the conservation management of any European sites.

⁵ PINS (2022). Nationally Significant Infrastructure Projects – Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects. Republished August 2022, Version 9. See: [Nationally Significant Infrastructure Projects - Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/103111/pins-advice-note-ten-habitats-regulations-assessment-relevant-to-nationally-significant-infrastructure-projects.pdf) – accessed on 10 September 2024.

- 1.3.6 The European Commission guidance makes it clear that, for a project or plan to be 'directly' connected with or necessary to the management of a European site, the management must refer to measures that are for conservation purposes, with the 'directly' element referring to measures that are solely conceived for the conservation management of a site and not direct or indirect consequences of other activities.
- 1.3.7 The Project is a 'plan or project', for the purpose of the Habitat Regulations, but is not directly connected with or necessary for the management of any European site. An AA may, therefore, still be required and so it is necessary to proceed to Step 2 of the Screening Process.

Steps 2 - 4

- 1.3.8 **Sections 2- 4** of this report deal in turn with Steps 2 - 4 of the screening process. **Section 5** sets out the conclusions from the screening process.

2. HRA Screening Step 2: Project Description

2.1 Introduction

- 2.1.1 This step requires an understanding of the location and description of the elements of the Project that could result in effects on a European site or land functionally linked to that site. The description must identify the elements of the Project that may directly affect a European site (e.g., land-take), those that may indirectly affect a European site (e.g., emissions to air) and those that may act in combination with other plans or projects.

2.2 The Project

The Site and its surroundings

- 2.2.1 The proposed key components of the Project are shown in **Figure 5P.1 – The Project** and can be summarised as follows:
- Hydrogen Pipeline Network (HPN) across the North West region:
 - ▶ West Corridor: Stanlow Hydrogen Production Plant (HPP) to Central Hub HAGI, incorporating Rocksavage HAGI; spurs to customers at Interigen, Rocksavage.
 - ▶ North Corridor: Central Hub HAGI to St Helens, incorporating HAGIs at Higher Walton and Clock Face; spurs to customers at Ingevity, Warrington; Novelis, Warrington; NGF Europe Ltd., Clock Face; NSG Pilkington Greengate Works, St Helens; and Glass Futures, St Helens.
 - ▶ East Corridor: Central Hub HAGI to Partington HAGI, incorporating a HAGI at Warburton and BVI near Sworton Heath; spurs to Cadent AGI, Warburton; and customers at Partington Cadent AGI; and Basell Polyolefins, Partington. Work is ongoing with other potential customers in Partington who would construct their own pipelines to the HAGI.
 - ▶ South Corridor: Central Hub HAGI to Hydrogen Storage Facility (HSF) at salt caverns located north of Middlewich, incorporating a HAGI at the HSF and a BVI near the A556 (Chester Road).

Description of the Project

Introduction

- 2.2.2 The Project includes the construction and operation of approximately 100km of new pipeline to distribute hydrogen to industry in the North West. A number of Hydrogen Above Ground Installations (HAGIs), including Block Valve Installations (BVIs) are required to control the flow and pressure of hydrogen at key points along the proposed pipeline.
- 2.2.3 The Project connects the Hydrogen Production Plant at the Stanlow site, as the source of hydrogen, for onward distribution to the network. The pipeline transports hydrogen to the Central Hub at the centre of the network, which then serves as the connection and onward distribution point to the North, East and South corridors, which would extend to St. Helens, Partington and Northwich respectively. Branching off from each main corridor would be pipeline spurs connecting hydrogen customers to the main pipeline. Infrastructure has also been included which supports the potential blending of hydrogen with methane in the existing gas network.
- 2.2.4 The pipelines that make up the network would vary in diameter between approximately 6" and 42" dependent on which corridor or spur they create. The two main types of pipe expected to be used are Carbon Steel (CS) and Polyethylene (PE) pipes. The pipeline would be buried along the entire route apart from short sections within secure compounds at locations where HAGIs and BVIs are required. It is currently envisaged that nine HAGIs and two BVIs would be required at points along the network. The description of a typical HAGI and a BVI, and further details on operation, are provided in **Section 2.2**.
- 2.2.5 The pipeline would be constructed predominantly using open cut techniques. However, where open cut is not practicable trenchless crossing techniques (such as Horizontal Directional Drill (HDD) or micro-tunnelling) will be used at key locations including motorways and major highways, rail, rivers (typically those classed as main rivers, but some may be ordinary watercourses) and canals. These techniques are described in **Section 2.2**.
- 2.2.6 A Crossing Schedule is provided in **Appendix 2B** and illustrated in **Figure 2.3** which includes the location and grid reference, the type of feature being crossed and the proposed crossing methodology. Note, due to the linear nature of the corridors and spurs on the Project and also the features being crossed, some features may be crossed more than once.
- 2.2.7 In some locations it has been necessary to retain optionality (e.g. route options for complex trenchless crossing locations). These options will be subject to further analysis and design development through ground investigation, environmental surveys and landowner/stakeholder consultation.
- 2.2.8 Where optionality remains, these are detailed in the following descriptions. The assessment of optionality is described in the technical chapters of this Draft ES. The optionality will be refined as part of the ongoing design, assessment and consultation process, with the refined design presented in the DCO application and assessed in the accompanying ES.

Central Hub HAGI

- 2.2.9 The Central Hub HAGI is the common connection point on each corridor and would be located approximately 380m from the A553, in an agricultural field that is bound with hedgerows and occasional mature trees. The location is adjacent to an existing area of hardstanding used for plant storage, accessed via an existing hardstanding track.

West Corridor

- 2.2.10 The West Corridor of the Draft Order Limits (Draft ES **Figure 2.2**, Sheet 1 to 8) is typically characterised by open fields separated by hedgerows and tree lines. The pipeline would be between approximately 1.5km and 2km from the Mersey Estuary SPA and Ramsar at the nearest point. The West Corridor includes eleven or twelve trenchless crossings, depending on the options chosen, as detailed in Draft ES **Appendix 2B**.
- 2.2.11 The West Corridor would start at the Hydrogen Production Plant HAGI (HPP HAGI) at Stanlow with the pipeline running approximately 9.7km northeast to the Rocksavage HAGI and then approximately 9.7km southeast to the Central Hub HAGI. The pipeline would be High Pressure and the diameter is anticipated to be 42".
- 2.2.12 The HPP HAGI (see Draft ES **Figure 2.2**, Sheet 1) would be located within the south-easterly extent of the Stanlow site, approximately 30m north of the A5117 and 180m west of Pool Lane.
- 2.2.13 The Rocksavage HAGI would be located in an area of woodland, on land bound by the M56 to the northwest, the Weaver Navigation to the northeast, the River Weaver to the southwest, and the railway viaduct to the southeast.
- 2.2.14 The pipeline section through potential functionally linked land (FLL) on the Western Corridor (i.e. from Hapsford Lane to the River Weaver) would be constructed via the open cut method, with HDD used to cross the River Weaver at the northern extent of the FLL to the Rocksavage HAGI. A proposed access track running from Marsh Lane to Moorditch Lane via Lordship Lane (and Rake Lane), lies immediately adjacent to areas of potential FLL.

North Corridor

- 2.2.15 The North Corridor of the Draft Order Limits (Draft ES **Figure 2.2**, Sheet 8 to 21) is typically characterised by open fields with hedgerows and tree lines separating them before Sutton Heath, where the route is more typically adjacent to residential areas and proceeds to the more industrial setting around Ravenhead. The North Corridor includes nine trenchless crossings as detailed in Draft ES **Appendix 2B**. The pipeline diameter on the North Corridor is expected to be between 10" to 18".
- 2.2.16 The North Corridor would start at the Central Hub HAGI with the High Pressure pipeline running approximately 9.2km north to the Higher Walton HAGI. There are two options for the location of the Higher Walton HAGI (Draft ES **Figure 2.2**, Sheet 12); HWH2 located on land north of the Manchester Ship Canal and the southern edge of the Moore Nature Reserve (as presented in the PEIR), or a new HWH8 option in an agricultural field to the south east of the Manchester Ship Canal.

- 2.2.17 From the Higher Walton HAGI, the corridor runs approximately 9.7km northwest to the Clock Face HAGI. Owing to a new housing allocation in the likely adopted Local Plan and the associated redevelopment of the area immediately to the east of Fiddler's Ferry Power Station the route considered in the PEIR is no longer viable; alternative pipeline routes NP6 and NP7 have therefore been identified and are included in the Draft Order Limits and assessed in this Draft ES (**Draft ES Figure 2.2**, Sheet 17).
- 2.2.18 NP6 would proceed in a north-westerly orientation from Moore Nature Reserve, facilitating a trenchless crossing of the River Mersey, canal and railway line before proceeding along the northern edge of Fiddler's Ferry Golf Course and re-joining the route presented in the PEIR, after crossing the A562 via a trenchless technique. NP7 would head westwards across the Golf Course after crossing the River Mersey, canal and railway, utilising the route of an existing ethylene pipeline, before re-joining the route presented in the PEIR north of the A562.
- 2.2.19 The proposed location for the Clock Face HAGI (Draft ES **Figure 2.2**, Sheet 19) is in an agricultural field bound by the M62 approximately 20m to the north and the B5419 approximately 30m to the east (both measured to the nearest point).

East Corridor

- 2.2.20 The East Corridor of the Draft Order Limits (Draft ES **Figure 2.2**, Sheet 8, and 22 to 30) is typically characterised by open fields separated by hedgerows and tree lines and includes eight trenchless crossings as detailed in Draft ES **Appendix 2B**.
- 2.2.21 The East Corridor would start at the Central Hub HAGI with the pipeline running approximately 18km northeast to the Warburton HAGI. A BVI is required between the Central Hub HAGI and the Warburton HAGI, located in an agricultural field bound by hedgerows off the A50, west of High Legh.
- 2.2.22 The Warburton HAGI (Draft ES **Figure 2.2**, Sheet 28) would be located adjacent to the existing Cadent Above Ground Installation (AGI) facility at Carr Green Lane. The HAGI would be located in a field with existing established hedgerows and trees, to the southeast of the B5160 (Dunham Road). While some of the vegetation may need to be removed temporarily for access and pipeline connection, the majority would be maintained as visual screening. A thicker belt of woodland to the south of the HAGI location would provide visual screening for the TransPennine Trail/Bollin Valley Way.
- 2.2.23 The pipeline then continues northwards across open fields for approximately 3.8km to the Partington HAGI. There are two options for the location of the Partington HAGI, PH1 located west of the junction of Ashton Road and Townsend Farm Lane on an existing disused brownfield site as shown in the PEIR, or a new PH2 option located in an agricultural field to the east (Draft ES **Figure 2.2**, Sheet 30).
- 2.2.24 The Warburton and Partington HAGIs would connect to existing Cadent AGI facilities to allow potential Hydrogen Injection Blending (HIB) of the hydrogen supply into the wider gas supply. Information on the spurs is provided in the sections below.

South Corridor

- 2.2.25 The South Corridor of the Draft Order Limits (Draft ES **Figure 2.2**, Sheet 8, and 31 to 38) would start at the Central Hub HAGI with the pipeline running approximately 17.9km south to the Hydrogen Storage Facility (HSF) HAGI. The pipeline is expected to be High Pressure and 42" diameter and includes thirteen trenchless crossings as detailed in Draft ES **Appendix 2B**.
- 2.2.26 Two options are being considered where the corridor approaches the Trent and Mersey Canal near Bartington; the route considered in the PEIR (now known as SP5) and a new SP6 option which runs slightly further west, passing to the other side of the residential property in this location (Draft ES **Figure 2.2**, Sheet 31).
- 2.2.27 A BVI would be required, located in an agricultural field to the north of the A556 (Chester Road) (Draft ES **Figure 2.2**, Sheet 34).
- 2.2.28 The HSF and associated infrastructure are subject to a separate consent application by Inovyn, which is considered as part of the inter-project cumulative effects assessment. It has previously received consent for natural gas storage. The Project considered in this Draft ES involves provision of the pipeline to supply the site with hydrogen, a HAGI and an access road. The HSF HAGI would be located approximately 250m to the east of the A530 in a field currently bounded by hedgerow and mature trees.

Spurs

Runcorn/Rocksavage Spur

- 2.2.29 The Runcorn/Rocksavage Spur (see Draft ES **Figure 2.2**, Sheet 5) would start at the Rocksavage HAGI and run north to the Runcorn HAGI. From the Runcorn HAGI it would continue broadly southwest to connect the following customers:
 - Intergen (Rocksavage).
- 2.2.30 The Runcorn/Rocksavage Spur would also facilitate a connection to Inovyn, Runcorn for which the pipeline connection would be provided by the customer.
- 2.2.31 The Runcorn HAGI would be located on land between the Weaver View (minor road, approximately 100m to the south) and A5126 (approx. 300m to the north).
- 2.2.32 The Rocksavage HAGI to Runcorn HAGI spur would include approximately 1.3km of 24" diameter pipeline and one trenchless crossing as detailed in Draft ES **Appendix 2B**.
- 2.2.33 There would be an approximately 0.4km 24" High Pressure spur from Runcorn HAGI to Intergen (Rocksavage), with no major crossings required.

Warrington Spurs

- 2.2.34 The Warrington Spur(s) (see Draft ES **Figure 2.2**, Sheet 12 to 15) would be approximately 6km in length and include two trenchless crossings as detailed in Draft ES **Appendix 2B**. The spur would start at the Higher Walton HAGI and run northeast with a High Pressure 8" spur to provide connection to Ingevity, Warrington.

- 2.2.35 A second spur of 10" diameter Medium Pressure pipeline would remain south of the River Mersey and cross under the railway underpass then proceed as street works along Eastford Road to Morely Common. To reduce interaction with the Trans Pennine Trail and the proposed Warrington Western Link road scheme and minimise effects on the Walton Locks Local Wildlife Site, it is proposed to utilise a trenchless crossing technique in this location rather than open cut north-eastwards from Eastford Lane to the A5060/Gainsborough Road. A trenchless crossing entry compound would be located on part of Morley Common and would exit at either Gainsborough Road or Cranbourne Avenue. From here the route will continue as street works along Gainsborough Avenue (WSp1) or along Cranbourne Avenue (WSp3).
- 2.2.36 The route would then proceed broadly north-east, crossing the disused Runcorn and Latchford Canal and the A50 and proceed with street works for approximately 4.8km to Novelis.

Clock Face Spur

- 2.2.37 The Clock Face Spur (see Draft ES **Figure 2.2**, Sheet 19 to 20) starts at the Clock Face HAGI and runs northeast to connect to NGF Europe Ltd.
- 2.2.38 This Medium Pressure spur would include approximately 4.8 km of 8" diameter pipeline through areas of fields adjacent to Chapel Lane and continue into the existing industrial area along Lea Green Road. There would be one trenchless crossing as detailed in Draft ES **Appendix 2B**.

St Helens Spurs

- 2.2.39 From the Clock Face HAGI, the corridor continues broadly north for 6.4km to connect to the following customers (Draft ES **Figure 2.2**, Sheet 19 to 21):
- Pilkington UK's Greengate Works.
 - Glass Futures.
- 2.2.40 The Intermediate Pressure 8" diameter spur to Pilkington UK's Greengate Works would run along Burtonhead Road to the northwest for approximately 0.25km.
- 2.2.41 The Intermediate Pressure Glass Futures 8" diameter spur would run along Burtonhead Road with Ravenhead Nature Park to the southwest then turn north and cross the A570 (St Helen's Linkway) into the Glass Futures site to the north of Sherdley Road Industrial Estate. This would be approximately 0.85km of spur.

Warburton Spur

- 2.2.42 The Warburton Spur (see Draft ES **Figure 2.2**, Sheet 28) starts at the Warburton HAGI and runs approximately 0.2km west to connect to the existing Cadent AGI on Carr Green Lane to facilitate Hydrogen Injection Blending (HIB) of the hydrogen supply into the wider gas supply. This spur is expected to be an 8" diameter pipeline. No trenchless crossings are required.

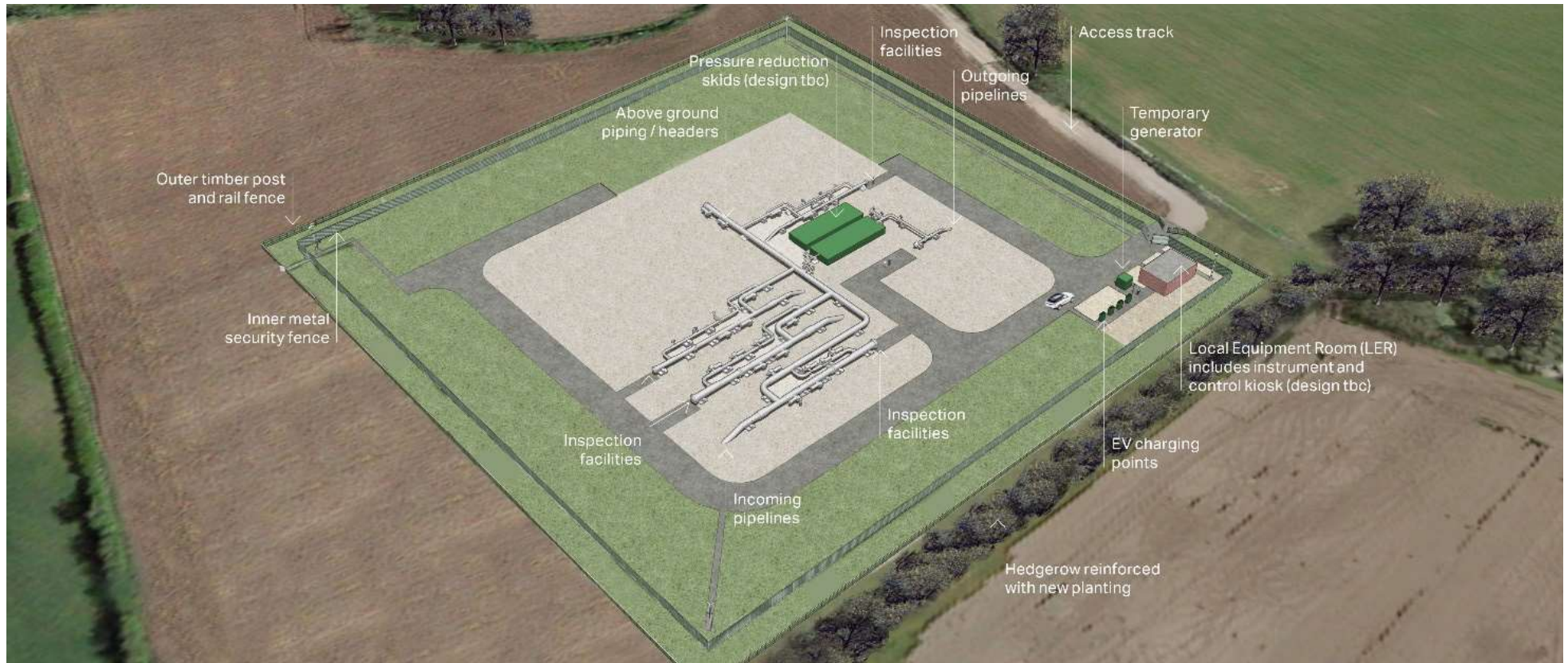
Partington Spur

- 2.2.43 The Partington Spur(s) (see Draft ES **Figure 2.2**, Sheet 30) start at the Partington HAGI and connect to the following:
- Partington Cadent AGI.
 - Basell Polyolefins.
- 2.2.44 The Partington Spur would also facilitate a connection to ESB Power, for which the pipeline connection would be provided by the customer.
- 2.2.45 The High Pressure spur would run northwest to the existing Cadent AGI at Partington and is expected to be approximately 0.3km and up to 8" diameter pipeline. This would facilitate HIB of the hydrogen supply into the wider gas supply.
- 2.2.46 The High Pressure spur to Basell Polyolefins would run north for approximately 0.4km and is expected to be up to 8" diameter.

Hydrogen Above Ground Installations (HAGIs)

- 2.2.47 The HAGIs are required to facilitate connections to the network producers, customers and storage and to be able to monitor, operate, maintain and inspect the network during operation.
- 2.2.48 HAGI sites will include a range of permanent above ground components for which further description is provided under the headings below. The above ground components described will be kept at low level due to the nature of the equipment and to reduce visual impact. This infrastructure would typically be approximately up to 3m in height, subject to final design. Other features including fencing, general telecommunications equipment and lighting may vary as described below. The HAGIs will require connection to the local distribution network operator's (DNO) electrical distribution network and telecommunication systems. The DNO supply will support electric vehicle charging by Cadent maintenance staff visiting the site. In addition to the DNO electrical supply, alternative sources of power including use of renewables are currently under consideration for use on the HAGI site, including hydrogen generators as detailed below. An illustrative layout for a HAGI is provided in **Graphic 5P 2.1**. A photo of an example above ground installation as part of the existing gas network is shown in **Graphic 5P 2.2**.

Graphic 5P 2.1 Illustrative HAGI layout



Note: The figure illustrates the types of equipment required and the final equipment and layout at each HAGI will vary.

Graphic 5P 2.2 Above Ground Installation Example



- 2.2.49 The sites would require security fencing, typically 2.4m to 3.6m high with double-leaf access gates for vehicles. Access would be required from the adjacent road network, access tracks or similar. There would also need to be space for maintenance operatives to safely park their vehicle(s) off the highway and open the gates.
- 2.2.50 The HAGI sites footprint would vary; typically ranging between 0.5ha to 1.5ha.
- 2.2.51 For the purposes of the environmental assessment, assessment of HAGI sites up to 2ha have been undertaken to allow for further design development including requirements for access, security, and associated landscaping such as planting or bunds to provide screening. The HAGIs would generally be unlit except during maintenance or potential breakdown/emergency requirements, at which point permanent task lighting mounted on columns (approximately 3-5m high) would be switched on for the duration of the works.
- 2.2.52 Some of the customer connections will require a small amount of equipment to manage the pipeline connection appropriately. The area required for such connections will be <0.1ha and equipment will be less than 3m high. The equipment required will be within the customers land, usually close to other industrial infrastructure and on brownfield land. The equipment area is usually known as a 'pigging compound' and these areas are included within the Draft Order Limits. Work is ongoing to assess the requirement for these facilities at each

customer site, however they have been included in the Draft ES in case they are a requirement of the Project's operations going forward.

Pressure Reduction Units

- 2.2.53 Pressure Reduction Units (PRU) are included within the HAGI footprints and used to control the flow or pressure off the network for end users, and consists of above ground components including pipework. Above ground pipework (for PRUs as well as metering and inspection facilities) will vary in diameter with the maximum piping sizes approximately the same diameter as the adjacent buried pipeline, but many of the associated pipes would be much smaller.
- 2.2.54 A typical PRU will be skid mounted i.e., mounted to a frame at the point of manufacture and delivered to site for connection.

Metering facilities

- 2.2.55 Metering facilities are required for volume measurements of the hydrogen gas flow for control and fiscal purposes, they will be located inside the HPP and HSF HAGIs. As with a PRU, these consist of above ground pipework and components and can be skid-mounted. The facilities are installed above ground along a 15m section of pipeline and measure approximately 4m wide and up to 2.5m in height.

Inspection facilities

- 2.2.56 Inspection facilities support future In-Line Inspection (ILI) of the pipeline network. The ILI is undertaken by passing a device known as a 'pig' or Inline Inspection Tool through the pipeline which is propelled by the flowing gas without interruption to the gas supply. The facilities include above ground pipework from which to launch and receive the pig as well as operating equipment including valves. Inspection facilities will be located inside the HAGIs.

Instrumentation and Control Local Equipment Rooms (LERs)

- 2.2.57 Instrumentation and Control (I&C) LERs, to be located within the HAGI and BVI compounds, will house the equipment that monitors key parameters (including the flow, pressure and temperature). Field instrumentation located on pipework will connect to the equipment in the kiosk with these signals being sent to the Energy Control Centre (ECC) via satellite link or similar. The electrical distribution board(s) and uninterruptible power supply (UPS) are to also be housed within the LER.
- 2.2.58 The LERs are typically prefabricated Glass Reinforced Plastic (GRP) units of approximately 2.4m height placed on a concrete base that is cast in situ.

Hydrogen Generators

- 2.2.59 Alternative sources of energy supply are being considered by the Applicant, including the use of Hydrogen Power Units (HPU). HPU technology provides an opportunity to further utilise hydrogen on site to power the HAGI, by converting hydrogen into electrical energy. This energy can then be used to support on-site EV charging units and power for the control systems within the HAGI. The use of on site HPU's could be an alternative to the electrical supply from the Grid or to

reduce the electrical drain from the grid by supporting the EV charging. Permanent and any temporary HPU's would be sited within the footprint of the HAGI compound. Use of the HPU would not however remove the DNO connections from the Project design but could significantly reduce the required load from the Grid.

Block Valve Installations (BVIs)

- 2.2.60 These sites are separate facilities to the HAGIs and would be housed in a compound less than 0.5ha in size, with fencing approximately 2.4m high, an access track, facilities for turning vehicles. and an access gate. Access would be required for maintenance vehicles, typically Light Goods Vehicles (LGV).
- 2.2.61 The main valve will be in-line with the buried pipeline. The bypass and bypass valves will be buried with extended stems for valve operation. The valve actuator would also extend a short height (approximately 1.5m) above ground. The valves will be operated locally for which the necessary equipment on site will be housed in an I&CLER (similar to those described above).

Cathodic Protection

- 2.2.62 A Cathodic Protection (CP) system will be required as part of the pipeline system. This protects the pipeline from corrosion by imposing a small electrical current, which inhibits the electrochemical process of corrosion. This requires the placement of Transformer Rectifier (TR) units and groundbeds at strategic locations around the network. These would typically be included within the HAGI sites with the required electrical supplies. The CP system will have signals connected to the telecommunication system within the HAGI LER. CP monitoring points would be installed at regular intervals along the pipeline (approximately every 1 - 2km). These are housed within marker posts typically at selected road crossings and field boundaries and do not require any other above ground infrastructure such as a compound or kiosk.

Marker Posts

- 2.2.63 Markers would also be required at crossings and field boundaries. CP posts and marker posts are small posts and approximately 1m high. Aerial markers are required (to assist in ease of route identification) during aerial surveys of the pipeline and are typically 2m high and made of plastic.

Fibre Optics

- 2.2.64 Fibre optic cabling would be required along the length of the pipeline route. It is anticipated that a conduit for the fibre optic cable would be buried at the same time as the pipeline, within the same trench. The fibre optic cable would then be installed by blowing it through the ducting. Chambers are required for this process, at spacings of between 2km and 3km depending on the equipment used. These chambers are only needed for the cable installation and have no use during operation unless there is ever a need to replace the fibre optic cable. It is therefore likely that these chambers would be buried below ground at locations indicated with a marker post. Generally, above ground manholes are not anticipated to be required, although there may be a requirement for junction boxes either side of

trenchless crossing sections. Above ground splice boxes may also be required at major crossings. These would be housed within marker posts or buried chambers.

Construction

- 2.2.65 The following section provides an overview of the typical form and sequencing of construction for both the pipeline and HAGIs. The pipeline would predominantly be constructed by the open cut installation technique. A range of options are identified for the trenchless crossings and are described in **Section 2.5**, paragraph 2.5.50 to 2.5.65.
- 2.2.66 The proposed pipeline network would be a multi-diameter pipeline transportation network and as such each section would have a specific working width. For a 42" pipeline the working width would be expected to be up to 36m. **Table 5P 2.1** provides an indicative working width for each diameter of pipeline.

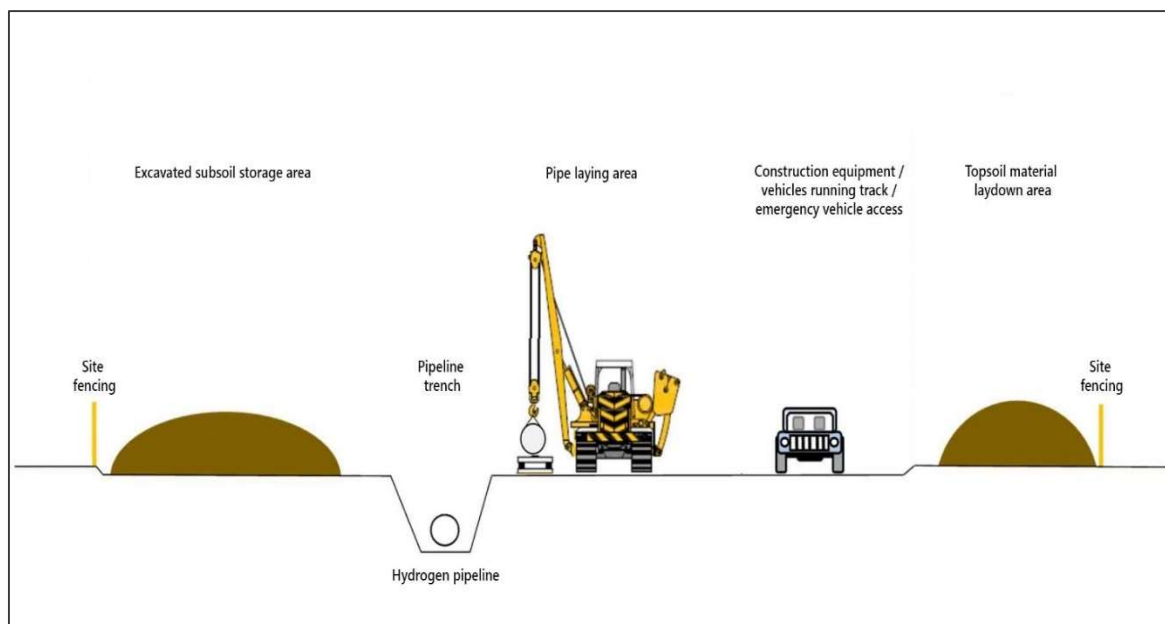
Table 5P 2.1 Indicative working widths for different pipeline diameters

Pipeline diameter range (inches)	Typical construction working widths (m)
36 – 42"	36
24 – 30"	28
16 – 20"	22
4 – 14"*	Within Highway boundary*

* Note: Exceptions to this are the West and North Corridor spurs, which vary from 8-10" diameter pipeline and would generally use the working width applicable for 16-20" if routed cross country

- 2.2.67 The working width is divided into work, transport and laydown areas. It typically comprises topsoil and subsoil laydown areas, the trench area, pipe string and construction equipment area and a running track for through access of construction related personnel. A typical cross-section is shown in **Graphic 5P 2.3**.

Graphic 5P 2.3 Typical layout of a working width for pipe laying



- 2.2.68 A wider working width, known as a box out section, will be required e.g., at crossings including trenchless crossings, where the pipeline route changes direction and before / after sections of narrowed working width. This is to facilitate safe working, additional spoil storage and equipment laydown.
- 2.2.69 Temporary construction site accesses have also been identified across the Project and are shown in Draft ES **Figure 2.2**. There are three categories of access routes, one for all construction traffic including plant and Heavy Goods Vehicles (HGVs), those that are limited to use by Light Goods Vehicles (LGVs) only and 'Light Construction Access' where a reduced number of HGV vehicles are expected. Third party assets that are unable to be crossed by construction traffic e.g. 'block points' are also identified at major highways and navigable canals.
- 2.2.70 The Draft Order Limits have also been developed to include areas for temporary construction equipment, pipe and other material storage ('temporary construction compounds') along the corridors. These include sections of pipe of approximately 12 – 18m in length and are typically stacked on sand berms up to a maximum of 4m high.

Construction phasing and indicative timescales

- 2.2.71 Construction is expected to commence in Q1 2027 ready for commissioning Q1 2030. The Project would be operational by Q2 2030.
- 2.2.72 Pipelines are constructed within the pipeline "spread" or temporary working width which is a corridor of land extending along the route. Pipe laying can be likened to a production line with successive activities moving along the spread. Activities include site preparation, pipeline stringing, welding, inspection, laying and testing. Once complete, reinstatement would be undertaken across the temporary working width.

- 2.2.73 Pipeline construction is generally focused on the spring and summer months (March to September) with an aim to reduce impacts on agricultural land. Based on the current programme, survey and early works will take place in 2025 and 2026 followed by two pipelaying seasons in 2027 and 2028. Some crossings, reinstatement works and pre-commissioning will continue into 2029. The works for crossings and pipelines in the streets may occur outside the typical pipelaying season and throughout the year. The Applicant will work with consultees e.g., Statutory Nature Conservation Bodies (SNCBs) to determine the timing of sensitive works. It is expected that each corridor would take 12-18 months to construct, with works focused on a geographical area for a shorter period of time, as below.
- 2.2.74 Once a section is prepared the installation of fabricated sections can typically advance at 150m – 350m per day depending on diameter and local conditions. In more congested areas, and when pipe diameter and weights are larger, progress is slower and the advance may be only tens of metres per day.
- 2.2.75 Independent construction crews would work on the main pipeline spread plus road, rail and watercourse crossings. Work crews would be located at several locations at any one time and move forward as the work progresses across the section they are working on. Equally at times during the construction period there would be no active work at particular locations. Each crew would typically have 30 persons and the total workforce would be up to 1,000 personnel split across all project spreads.
- 2.2.76 Different plant and vehicles are required according to the activities of pipe laying, making trenchless crossings, HAGI or BVI construction and temporary construction compounds. These will include plant of varying height such as mobile telescopic and crawler cranes, 360 tracked excavators and side booms for pipelaying. Use of larger equipment such as cranes would be temporary and generally short-term dependent on the task, plant suitability and availability. Draft **ES Chapter 10: Noise and Vibration** provides indicative information on plant associated with the construction.
- 2.2.77 Construction of a HAGI typically takes from six to twelve months and may be in progress at any point during the year, subject to any local constraints. Construction of BVIs would typically take up to four months.
- 2.2.78 Standard construction working hours would be 10 hours per day (08:00 to 18:00) from Monday to Saturday, with no works on Sundays or Bank Holidays. There may be the need for some extended working hours, for instance, night working to minimise traffic disruption at road crossings, but this would be subject to agreement with the Local Planning Authority.
- 2.2.79 There would be the need for continuous (24-hour) working for some activities, due to the need to work continuously on specific construction activities and reduce impacts on third party assets/ statutory undertakers. Such activities include:
- Tunnelling and Horizontal Directional Drilling;
 - Pipe pulling at trenchless crossings; and
 - Pipeline testing.

- 2.2.80 A number of works would be expected to occur in parallel, however, the exact phasing of the works has yet to be determined. Further details of the construction programme and phasing will be developed for the Final ES.

Pipeline Construction

Construction site preparation

- 2.2.81 Following survey of the construction site, including utilities and Unexploded Ordnance (UXO) checks, work would commence to prepare the pipeline corridor. This would include any installation of site fencing, the type of which would be determined based on key factors including security and land use. For example, demarcation fencing may be used in arable fields or where livestock is present, stock fencing appropriate to the type of livestock e.g., cattle, sheep, deer etc. Where the surrounding land is publicly accessible, then requirements would be enhanced for safety and security e.g., 2.4m Heras fencing or similar.
- 2.2.82 Safe crossing points would be implemented e.g., where a Public Right of Way (PRoW) crosses the working width. Where necessary, a temporary closure and diversion will be put in place and signage provided. An Outline Public Rights of Way Management Plan (OPRoWMP) will be developed for submission with the application for development consent, detailing the locations of crossings, closures /diversions and the proposed method for their implementation. A draft version of this document is provided in **Appendix 11B**.
- 2.2.83 The accesses and the need for improvements at these points e.g., visibility splays, bell mouths and widening will be subject to further design and consultation with the appropriate Highways Authority, the outcome of which along with the results of further environmental surveys will inform the required assessments in the EIA. Construction access points are discussed further in the Draft Construction Traffic Management Plan (**Appendix 11A**). Where an access point is required along a PRoW, the OPRoWMP will consider options including creation of a temporary shared route with users.
- 2.2.84 Once access is achieved from the highway, the access track would be based on the particular terrain conditions on the access route. This would vary from stripping the topsoil to allow vehicles to run on the subsoil, limited grading (if required), and use of track mats or overlaying crushed stone on a geotextile membrane (floating roads).
- 2.2.85 Site clearance including hedgerow and tree removal (outside the bird nesting season) and localised re-grading would take place. Earthworks would be limited due to the generally gentle undulation of the terrain. Some levelling or cut and fill works may be required on a limited number of steep slopes or banks. Benching (terracing) may be required in a small number of locations where side slopes exist. The earthworks are not expected to require large amounts of import. Some limited export and disposal of excavated material may be required, in relation to trenchless crossings and HAGI construction sites or export of material from the site. All suitable excavated materials would be reused in reinstatement and restoration of ground levels (see Reinstatement in paragraph 2.2.98 to 2.2.100). It is envisaged that running track access stabilisation will be required in areas that

are soft, wet, boggy and in peat areas (if necessary). Stable accesses will be made either by use of installed track matting, floating road or with use of imported aggregates is expected in wet / boggy areas and at some temporary access locations. Track matting and floating roads are typically placed directly over topsoil to avoid stripping or may be used directly on subsoil following stripping if subsoil is unstable. The exact stabilisation method will be determined, as required, based on location specific soil conditions.

- 2.2.86 The requirements for clearance would be location specific but during the development of the Project a key consideration would be to retain and protect sensitive areas, including habitats and vegetation, where practicable.
- 2.2.87 Topsoil would be stripped across the required working area and stored at the edge of the works in accordance with industry best practice, to protect topsoil integrity for future reuse during reinstatement. The topsoil bunds would typically be in the order of 2m in height though may be higher subject to ensuring there is no excessive soil compaction and visibility restrictions. Topsoil bunds would be sited to avoid risk of top soil loss and impeding areas of surface water flow and gaps left between bunds to avoid waterlogging.
- 2.2.88 Other activities likely to be required during site preparation include:
- Site signage, service protection and other site safety requirements;
 - Establishment of temporary facilities for site personnel;
 - Establishing site environmental management requirements e.g., tree protection fencing and other site-specific pre-commencement activities;
 - Development of temporary site drainage, sediment management and any necessary temporary watercourse crossings; and
 - Creation of temporary accesses along the working width including opening field boundaries along the route.

Fabrication

- 2.2.89 Line pipes would be brought to site and stored in stacks prior to deployment along the pipeline route, before being transported to their final location along the route, where they would be placed on wooden supports or skids adjacent to the line of the trench. This process is known as pipe stringing. This process is known as pipe stringing.
- 2.2.90 Where necessary changes in horizontal direction and vertical profiling would be undertaken by employing cold bending. This would require mobilisation of associated plant on site.
- 2.2.91 For general cross country construction line pipes would be lifted onto skids and the pipes welded to form a continuous string. A range of welding techniques for CS pipes, including automatic, semi-automatic and manual welding techniques, would be employed along the route. All CS welded joints would be tested by Non-Destructive Test procedures. Once tested an anti-corrosion coating would be applied to the welded joints of steel pipes. Jointing of PE pipes would be undertaken using Butt Fusion or Electrofusion fittings. Mainlaying techniques may

be required in congested areas and in streetworks sections where the pipe is fabricated within or directly above the trench. Mainlaying typically comprises lowering of single or double jointed pipe sections directly into the trench where they are welded together in 'bell holes' or welding of supported pipes above the trench, avoiding the additional width required for a pipe stringing/ fabrication area. Mainlaying is typically supported by a pipe fabrication/ storage area within a construction compound where single or double joints can be transported in from.

Trenching

- 2.2.92 The pipe trench would generally be dug using mechanical excavators or trenching machines, which would normally straddle the trench. The depth and width would vary with pipeline diameter but would allow a minimum reinstated cover of 1.2m over the top of the pipeline. The subsoil material excavated would be stored separately from the topsoil to avoid mixing.
- 2.2.93 Dewatering of trenches may be required e.g., in the event that groundwater is present. Groundwater monitoring is to take place as part of ground investigation. The method of dewatering will be dependent on the ground conditions, however it is likely to include the use of mobile pumps.

Pipe laying

- 2.2.94 Welded pipe sections would be carefully lifted and lowered into the trench in a continuous operation using side booms, excavators or cranes dependent on the size of the pipeline. PE pipes may be lifted into position using lighter lifting equipment or may be pulled into the trench using a winch and rollers or pulled into the ground using trenchless methods. PE pipe may come to site in coils allowing much longer lengths of pipe without joints being necessary.
- 2.2.95 The pipe would generally be laid on bedding material and covered in padding material. This would typically be soft fill from excavated materials and would serve to protect and minimise movement of the pipe. Backfilling would be undertaken using subsoil from the temporary storage areas.

Testing

- 2.2.96 The internal bore of the pipeline would be cleaned using devices known as pigs which travel along the length of a pipeline test. The pipeline will be hydrostatically pressure tested, using a local water source, agreed and permitted by the Environment Agency and appropriate local authority as required. Disposal of test water would also be undertaken in accordance with the permit.
- 2.2.97 The pipeline would be further inspected by inspection equipment to ensure it is free of defects e.g., unacceptable dents, flat spots or areas of ovality. Final end to end drying and dew point testing would be undertaken.

Reinstatement

- 2.2.98 Reinstatement of the working area would be undertaken typically including regrading, subsoil ripping to relieve compaction and removal of debris. Topsoil would be reinstated to the former depth.

- 2.2.99 Where possible, previous land uses would be re-established e.g., agricultural areas and fencing established in accordance with agreements with landowners and in consideration of the necessary easements. Areas of landscaping and required habitat reinstatement, including tree and hedgerow planting, would be implemented through a landscaping scheme that would be prepared and delivered in accordance with a requirement of the DCO.
- 2.2.100 Drainage altered during construction would be reinstated and where necessary, new drainage would be laid. All temporary materials such as bog mats, road fill, temporary culverts and geotextile membrane will be removed during the reinstatement works.

Crossing techniques

- 2.2.101 A Crossing Schedule has been developed to inform the assessment in this Draft ES and is provided in Draft ES **Appendix 2B** and Draft ES **Figure 2.3**. The Crossing Schedule will be updated as necessary and be provided as part of the application for development consent and the draft DCO. A description of open cut installation and trenchless crossing techniques are provided below.

Open cut

- 2.2.102 Open cut installation involves the excavation of a trench across the feature to be crossed and the installation of the pipeline in the trench. A trench for the largest diameter pipe may be approximately 2.5m deep while crossings of features such as streams may require excavations of approximately 4 – 5m deep. This method is typically used for minor roads, tracks, streams and ditches. The features on the Project that would be expected to be installed using open cut techniques are outlined in the Crossing Schedule in Draft ES **Appendix 2B**.
- 2.2.103 Note, open cut installation may also be used for third party utilities, the details of which would be subject to agreement with the utility providers.
- 2.2.104 At each crossing point it is necessary to install the pipeline beneath the feature being crossed and provide a means of crossing for construction plant and vehicles.
- 2.2.105 Open cut installation at minor roads would typically involve the following stages:
- Implementation of traffic control measures (subject to agreement with the Highways Authority) to ensure safety and minimise disruption. Works would be undertaken in as short a timeframe as possible, typically five days or less;
 - Identification of services and protection as required;
 - Cutting of the road surface at the trench edges using a road saw;
 - Excavation of the trench to the required depth;
 - Installation of temporary access covers to maintain traffic flow, where necessary;
 - Installation of the pipe or a construction sleeve for installation of the pipeline at a later date; and

- Backfilling of the trench and resurfacing undertaken in accordance with the requirements of the Highways Authority.

2.2.106 Construction plant and vehicles must be able to cross from one side of a road for onward access to the route. This involves tracking major plant across the road for which traffic control measures and service protection would be undertaken as above. The road surface would be protected using rubber matting or similar, or by use of a temporary sacrificial tarmac surface. Measures would be put in place to ensure the highway is clear of debris and any restoration works would be subject to agreement with the highway authority.

2.2.107 The crossing point would be required for the duration of the construction period within the particular section. However, the crossing point would only be in operation when it is necessary to transfer plant or vehicles across. The highway would otherwise remain open to the public as normal for the majority of the time a crossing is in place.

2.2.108 Open cut installation of watercourses would typically be undertaken by one of two methods, either by fluming or damming and subject to the required consents. Fluming would typically include the following stages:

- Steel or plastic pipe is installed along the bed such that the water flows unimpeded through the flume. These would be sized to ensure that the total flow capacity includes any anticipated increase in flow due to wet weather plus a factor of safety.
- Excavation of a trench beneath the flume and the pipeline inserted beneath.
- Backfilling of the trench and removal of the temporary flume.
- Reinstatement of the feature crossed to pre-construction condition.

2.2.109 Damming would typically include the following stages:

- Damming at the proposed crossing location through installation of steel trench sheets, aggregate/sand bags or similar.
- Transfer of flowing water from upstream to downstream using pumps and hoses. Pumps and hoses would be suitably sized to ensure that the total flow capacity includes anticipated increase in flow due to wet weather plus a factor of safety. Note, this may not be necessary in drainage ditches where water flows in either direction.
- Excavation of the trench through the temporarily dammed area and installation of the pipeline.
- Backfilling of the trench and removal of the temporary dam.
- Reinstatement of the feature crossed to pre-construction condition

Note: a combination of pumping for flow transfer and fluming may also be used.

2.2.110 To maintain access either side of these features, temporary crossing points would be required subject to agreement with the appropriate authorities. This would typically include bridging where larger spans are required or fluming for smaller features. Bridging would typically be used on features including rivers, larger

streams/ ditches (note, this is for access only and the pipeline may still be installed using a trenchless crossing method). Bridging of navigable canals is not proposed.

- 2.2.111 For flumed temporary crossing points, these would include sizing and laying of a steel or plastic pipe as described above. To complete the installation of the crossing, a combination of geotextile and fill (e.g., stone, excavated materials) and/or bog mats would provide the surface for plant and vehicles to move over. At the end of construction, the materials and pipe would be removed and reinstatement undertaken to pre-construction condition.
- 2.2.112 There would also be the need for crossings of numerous hedgerows on the Project. Crossings of hedgerows would be undertaken in a manner to minimise the working width as far as possible and therefore minimise the impact on hedgerows across the Project. A typical crossing for a 42" pipeline would involve approximately 5m for pipe laying and approximately 4m for plant crossings as opposed to the standard 36m working width, this would vary for smaller diameter pipelines. For further measures to mitigate impacts at hedgerow crossings, please refer to Draft ES **Chapter 5, Section 5.7**.

Trenchless crossing techniques

- 2.2.113 There are a number of methods by which trenchless crossings would be undertaken, the choice of which is determined by a number of factors including the feature being crossed, agreements with third parties regarding asset protection, ground conditions and the length/depth of the crossing. It is not possible to determine which method would be used at each trenchless crossing prior to the establishment of these factors and appointment of the Contractor(s) to undertake the works.
- 2.2.114 Each trenchless crossing technique is characterised by the need for establishment of an entry and exit site. Temporary construction compounds will be required at entry and exit sites to support crossing construction activities. In order to assess a reasonable worst case, the typical footprint for each type of crossing has been established. **Table 5P 2.2** provides these parameters. Further information on how each topic has undertaken a reasonable worst-case assessment is provided in the topic Draft ES **Chapters 5 to 18**.

Table 5P 2.2 Typical parameters for trenchless crossing techniques

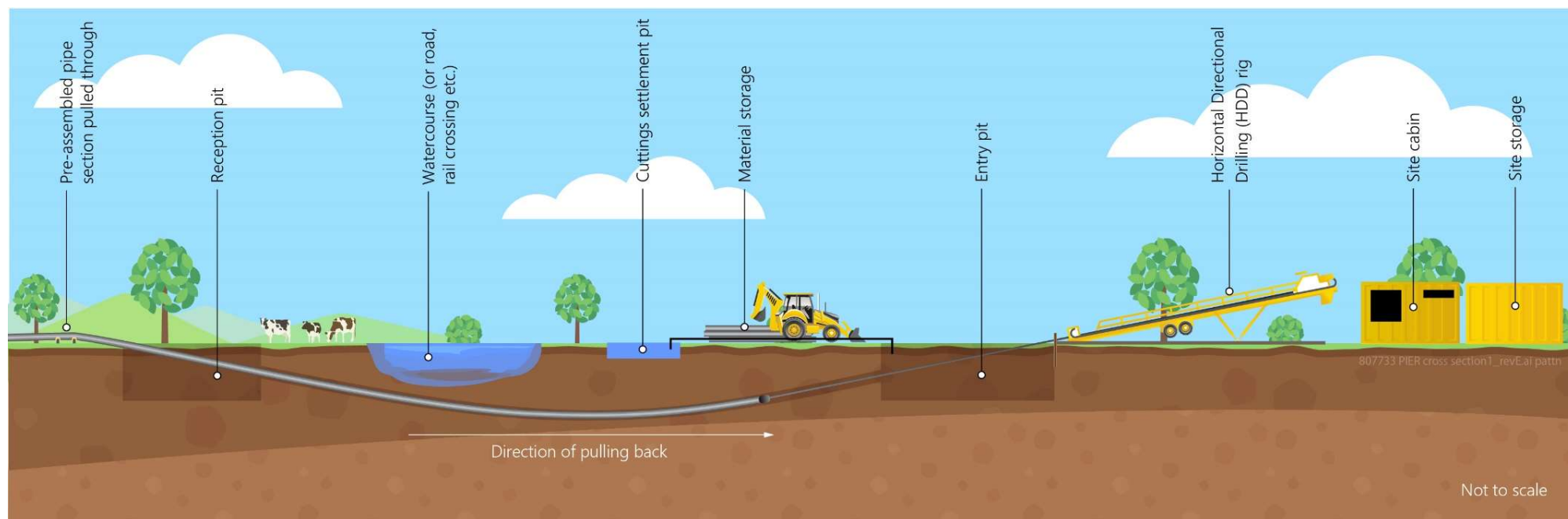
Trenchless crossing technique	Footprint entry site (ha)	Footprint exit site (ha)	Maximum Vertical Limit of Deviation (m)
HDD	0.3	0.2	60m
Auger bore (guided and unguided)	0.1	0.1	40m
Micro-tunnel	1	0.4	40m
Direct pipe	1	0.4	60m

- 2.2.115 The layout and equipment at each trenchless crossing temporary construction compound varies and would include site fencing such as Heras fencing (or other types between 2.4m to 3.6m high depending on security requirements) and lighting to support 24hr activities as required. Temporary construction compounds at crossings include areas for pit / shaft construction, excavated materials, soil processing plant, settlement pits (as required), drilling mud/ slurry processing, storage of materials and equipment, drilling rigs and ancillary equipment, generators, security and welfare facilities, temporary office, car parking, fuelling area, waste disposal etc. Equipment heights will vary but are typically expected to range between 1m and 4m. Some larger equipment individual elements including storage tanks and cranes are likely to be required during the works.
- 2.2.116 The length of time a trenchless crossing site would be in use varies depending on the technique, complexity, depth and length of crossing. This may vary between one to six months. Some continuous (24 hour) working may be required as defined in paragraph 2.2.79.

Horizontal Directional Drilling (HDD)

- 2.2.117 The HDD technique is typically used on longer trenchless crossings. HDD requires creation of an entry and exit pit on either side of the feature to be crossed and guiding a pilot hole along a pre-determined profile beneath the obstacle. **Graphic 5P 2.4** provides an illustrative example of an HDD site set-up. The depth of the drilled profile can be set to minimise risk to the obstacle being crossed and maximise protection of the pipeline.
- 2.2.118 Once the pilot hole is complete the bore is enlarged in stages using reamers (drill heads) in soft ground or hole openers in hard ground to a diameter approximately 1.5 times greater than the diameter of the pipeline to be installed.
- 2.2.119 Excavation takes place by rotating a cutting head at the front of the drill string and pumping drilling fluid from the surface, through the drill string, to the cutting head. During drilling, the bore is supported by drilling fluid which also performs functions such as drill bit cooling, lubrication and as a transport medium for the removal of drill cuttings. Settlement pits are used for the separation of excavated materials and recycling of the drilling fluid.
- 2.2.120 When the bore has been enlarged to the required diameter the pipeline is pulled through using the drilling rig. A stringing site that is equivalent to the length of the HDD crossing is required to fabricate the product pipeline in a single length allowing the installation operation to be completed without interruption.

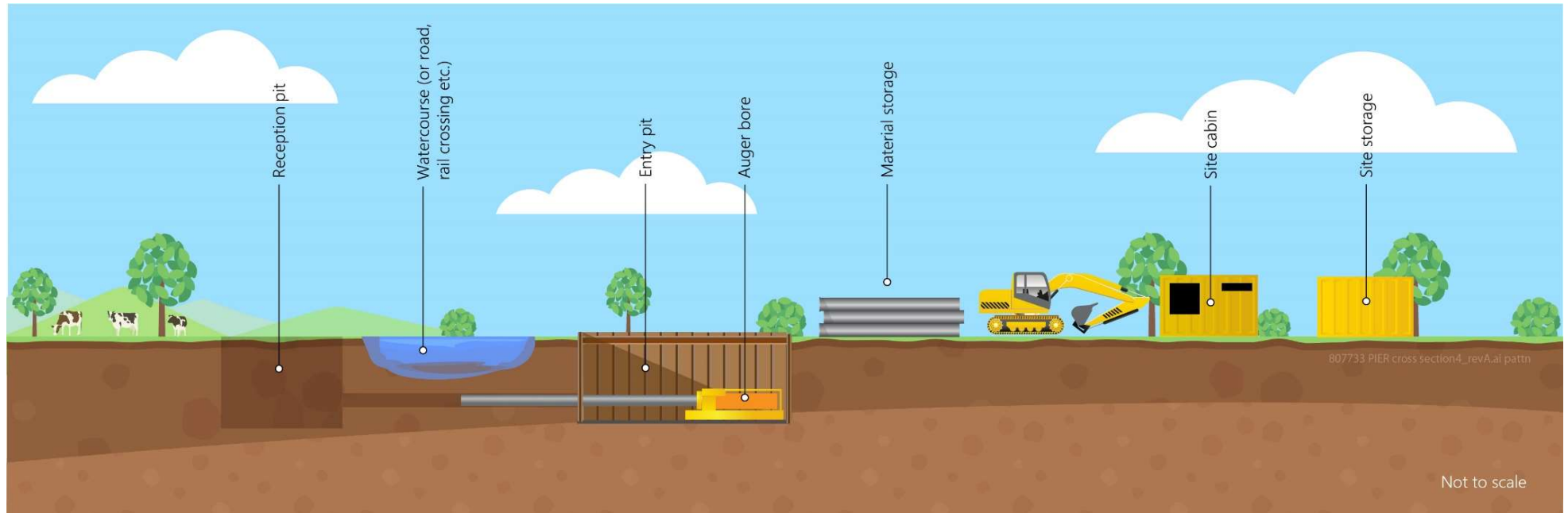
Graphic 5P 2.4 Illustrative HDD set-up



Auger Boring

- 2.2.121 Auger bores are typically used for shorter trenchless crossings. The auger bore process requires the establishment of a drive reception pit and boring the hole under the feature to be crossed. **Graphic 5P 2.5** provides an illustrative image of an unguided auger-bore set-up. The pipeline can be simultaneously installed in the bored hole as excavation takes place (uncased). Alternatively, a sacrificial pipe (steel or concrete) the same diameter as the pipeline is installed in the bored hole (cased) as excavation takes place, which is later displaced after the bored hole has been completed.
- 2.2.122 Excavation takes place by rotating a cutting head at the front of the pipe as it is pushed into the ground. Excavated material is removed from inside the pipe back to the drive pit by helical-wound auger flights inside the pipe.
- 2.2.123 Following reception of the auger, the cutting head is removed and the pipe is welded and pushed through to the reception pit.
- 2.2.124 Auger bores can be unguided or guided, each method generally follows the same excavation and pipe installation principles but guided auger boring uses more accurate guidance systems as conditions and the particular crossing may require.

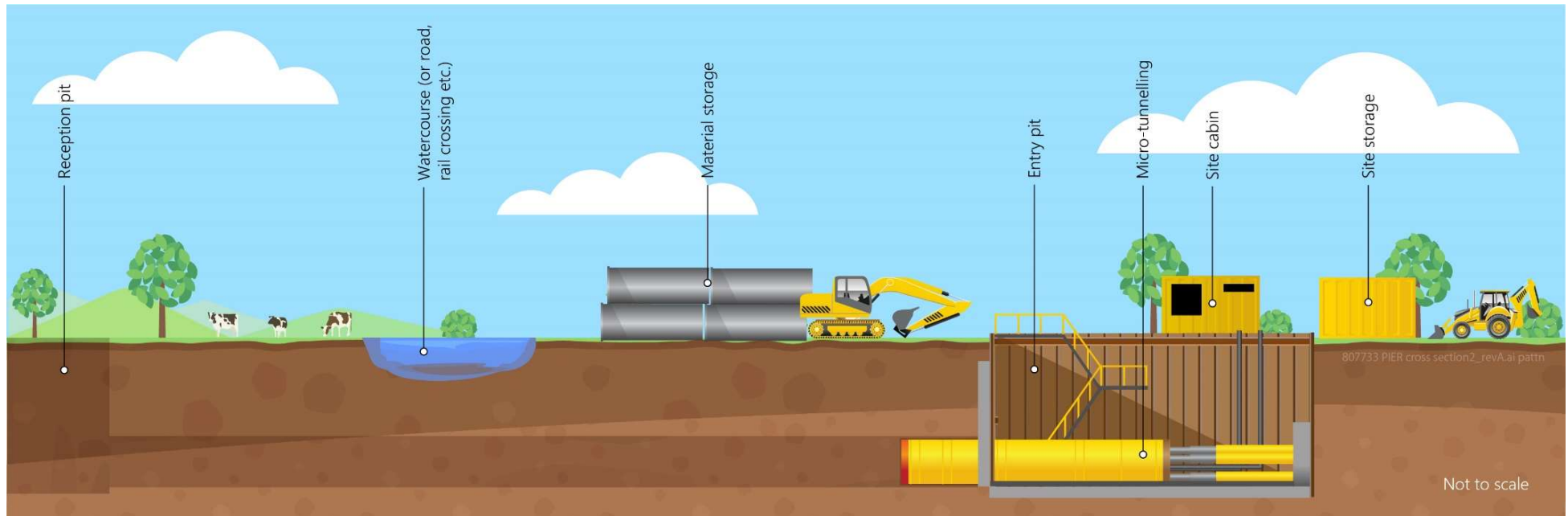
Graphic 5P 2.5 Illustrative unguided auger bore set-up



Micro-tunnelling

- 2.2.125 Micro-tunnelling can be used for short and longer crossings but generally requires a larger footprint including installation of drive and reception pits or shafts. A cutting tool/machine provides the mechanical excavation, generally controlled remotely from an above ground compound. **Graphic 5P 2.6** provides an illustrative example of a micro-tunnelling site set-up. There are a range of open and closed face tools/machines including: boring, earth pressure balance and pressurised slurry for use in the appropriate ground conditions. Excavated spoil is transported back to the surface at the drive shaft site for disposal.
- 2.2.126 A pre-cast concrete pipe is driven in behind the cutting machine using a hydraulic ram or jack placed within the drive shaft. A typical profile arrangement has a shaft at one end and a tunnel profile long radius at the other where the pipe exits and transitions to normal cover.
- 2.2.127 The pipes are then welded into a string pipe and gradually pushed or pulled into the casing or, where space is limited, the pipe may be welded at the base of a shaft. Following pipeline installation inside the tunnel, the remaining void between the tunnel and installed pipeline is typically filled with cementitious grout.

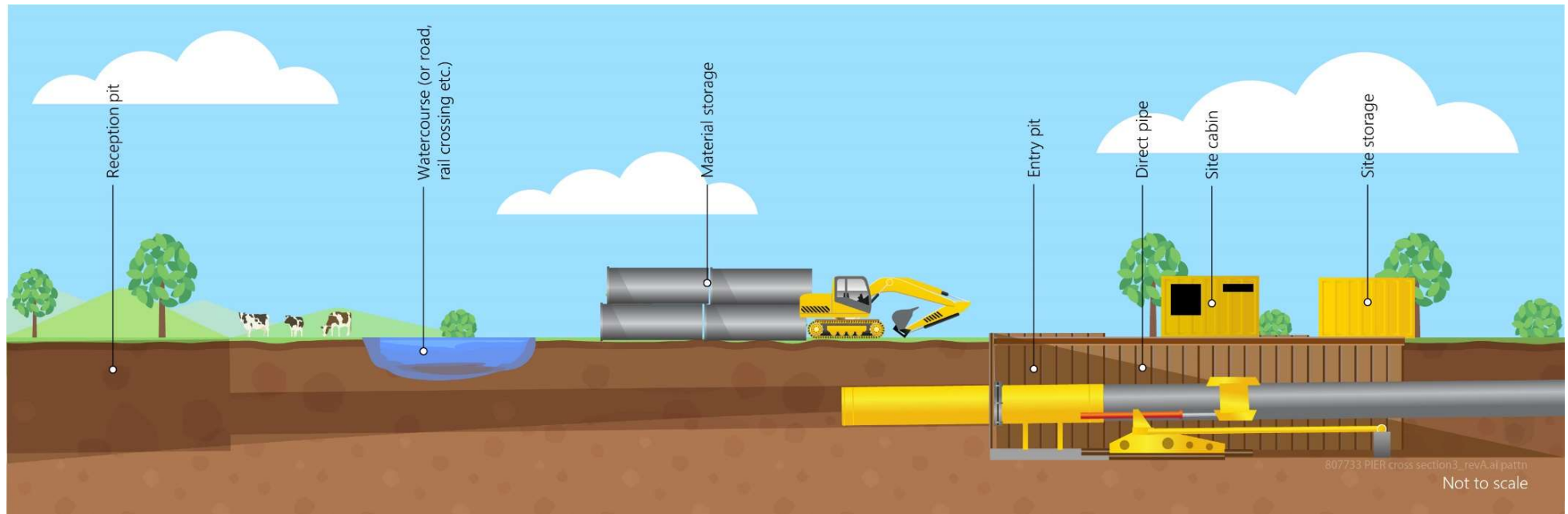
Graphic 5P 2.6 Illustrative micro-tunnelling site set-up



Direct Pipe

2.2.128 Direct pipe can be applied to short and longer trenchless crossings. This technique is similar in its method and set up as described for micro-tunnelling. However, the pipeline is installed directly into the ground behind the cutting machine, rather than being installed inside a completed tunnel. **Graphic 5P 2.7** provides an illustrative example of a micro-tunnelling site set-up.

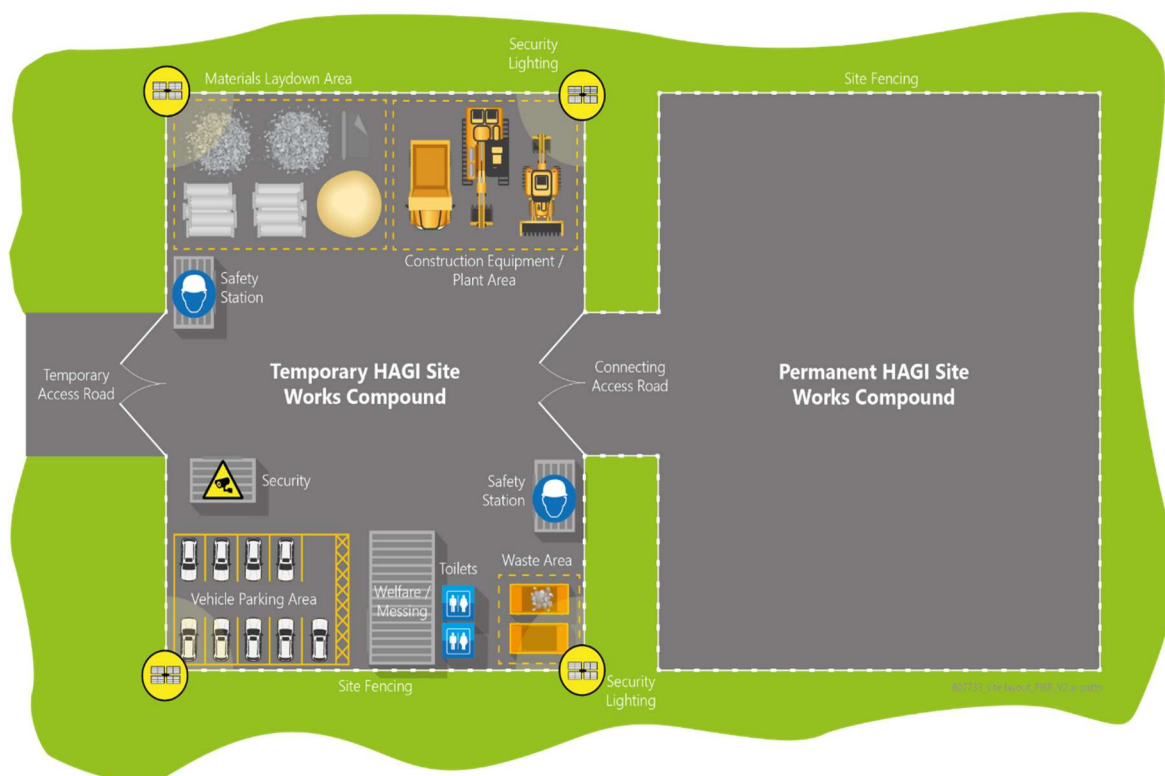
Graphic 5P 2.7 Illustrative direct pipe site set-up



Temporary Construction Compounds

- 2.2.129 Temporary construction compounds would be established to support the construction of the pipeline and HAGIs. The Draft Order Limits include areas identified for temporary construction compounds, which are located at various locations along the pipeline ROW, and adjacent to the HAGI sites. BVI Site construction areas fall within areas allocated for the wider trenchless crossing compounds and are therefore not discussed separately. See Draft ES **Chapter 2./ Section 2.5.51** for details of temporary construction compounds at trenchless crossing sites.
- 2.2.130 All temporary construction compounds will have a temporary drain system installed that will prevent any construction waste or pollution from entering watercourses or the mains sewerage system. Locations at high risk of chemical spillage will have dedicated bund systems put in place, where the spillage will be drained to a suitable containment vessel and treated offsite.
- 2.2.131 The temporary construction compounds would typically include:
- Secure fencing between 2.4m to 3.6m high and access for plant, vehicles and personnel.
 - Hard surfacing and drainage, using Sustainable Drainage Systems (SuDS).
 - Temporary connections to utilities.
 - Welfare facilities up to two storeys (approximately 6m).
 - Car parking, construction vehicle/plant storage and associated fuelling areas.
 - Storage for pipes in stacks, equipment and materials including piping bulks, valves and fittings, E&I equipment, aggregates, track matting, pre-cast concrete slabs, supports, marker posts, signage etc.
 - Lighting for the safety of personnel working during the hours of darkness (typically winter months), in the form of task lighting (erected temporarily for a specific task) or lighting maintained for the duration of the use of the compounds. This lighting would only be used whilst work is in progress. Lighting for security purposes may be required and it may be necessary for this to be on for extended periods. Lighting would be installed such that light spill outside the compound near residents and ecological receptors is limited e.g., through considering the height of the columns, lux levels and use of shields etc.
- 2.2.132 An illustrative temporary construction compound layout for a HAGI site is shown in **Graphic 5P 2.8** below.

Graphic 5P 2.8 Illustrative compound layout



2.2.133 Once the pipeline has been constructed and reinstated, the temporary construction compounds themselves will be decommissioned and land reinstated to its former condition. Landscaping would be implemented through a landscaping scheme that would be prepared and delivered in accordance with the DCO. Draft landscaping proposals are discussed in the Outline Landscape and Ecological Management Plan provided alongside the Draft ES.

Above Ground Infrastructure

2.2.134 Sizes of temporary construction compounds will vary depending on site specific location and available workspace. The temporary construction compound area would be adequate to accommodate all requirements described in the compound description above. The construction site for a HAGI would typically include the necessary temporary construction compound area to be co-located for maximum convenience. HAGI construction compounds as a minimum require a site not smaller than the permanent works site and may be larger depending on site specific arrangements and are expected to be up to approximately 3ha. Pipeline construction temporary compounds/ material storage areas are typically larger (up to 10ha) as they are required to accommodate large volumes of line pipe as well as accommodation of construction equipment and associated activities.

2.2.135 The typical site construction sequence would include:

- Site preparation, including typical activities for pipeline construction described above;

- Earthworks and civils, including establishment of concrete bases for permanent equipment;
- Installation of mechanical equipment and laying and connection of pipes;
- Installation of electrics, I&C and associated kiosk; and
- Testing and commissioning.

2.2.136 Reinstatement of temporary accesses, working areas and landscaping would be undertaken in accordance with a landscape scheme, prepared in accordance with the DCO.

Operation and Maintenance

2.2.137 The HAGIs would generally be monitored and operated remotely from an Energy Control Centre located off-site. The HAGIs will be operational continuously (24 hours a day). The frequency of periodic maintenance undertaken on-site has yet to be determined but would typically include the following for telemetered sites:

- Planned periods of maintenance every 6 months with a duration of up to 2 days.
- Pipeline inspection operations requiring ten personnel for approximately one week and undertaken every 1 to 5 years, subject to further development for hydrogen pipelines. Inspection operations involve an internal examination of the pipe undertaken by a “pig”, an inline inspection tool, which travels inside the pipeline from one HAGI to the next.
- Infrequent breakdown or urgent visits with access on a 24/7 basis if required.

2.2.138 Pipeline surveillance is undertaken by helicopter, drone and/or vantage surveys so access onto private land is not normally required. This would look for activities such as construction in proximity to the pipeline or potential visible issues such as disturbance to the land. Aerial surveys are typically undertaken every two weeks, but frequency will be determined during further design development and engagement with the Health and Safety Executive. There are some infrequent maintenance surveys (every 2 to 7 years) which may be required and would require access on foot (line walking) over the route of the pipeline, but do not require excavation or other intrusive activities. Landowners would be contacted to make arrangements for this work.

2.2.139 As described above, the inspection of the pipelines is undertaken internally from the inspection facilities at HAGIs with limited access to the buried pipeline route. It is anticipated that no pipeline maintenance would be required where excavation of the pipeline is required unless a defect is identified.

Decommissioning

2.2.140 The design life of the pipeline and HAGIs is 40 years but it is anticipated that the actual life of the pipeline could extend well over 40 years depending on ongoing monitoring of pipeline integrity and routine maintenance and upgrading where required. It is reasonably expected that a statutory framework will be developed

and agreed prior to any decommissioning. Similarly, technology and best practice would develop and provide new ways to undertake the process.

- 2.2.141 Decommissioning of the Project would likely involve removing the hydrogen and leaving the pipeline in situ thus avoiding removal and associated potential environmental effects. This would typically involve plugging the pipeline at intervals and stabilisation of major crossings including rail, road and watercourse crossings by grout filling where required. All above ground facilities including HAGIs and BVIs would be removed. The sequence of decommissioning these elements would be the reverse of the construction sequence (as described in **Section 2.2**) and would likely involve the application of similar construction plant and methods. All materials removed would be reused or recycled where possible or disposed of in accordance with relevant waste disposal requirements. Land would then be restored to its former use.
- 2.2.142 At the appropriate point in time a Decommissioning Plan will be developed by the Undertaker. The Decommissioning Plan will be a live document which is updated and refined as appropriate. The Plan would address the relevant statutory requirements at the time, any extant commitments with landowners/statutory authorities and take account of any developed technology and good practice at the time of decommissioning.

Above Ground Infrastructure

- 2.2.143 It is envisaged that HAGIs and BVIs would be removed by reversing the methods used for installation, with similar levels and types of equipment involved. Temporary decommissioning accesses may be required alongside compounds for the storage of equipment. HAGIs would be disconnected from the local electrical distribution and telecommunication systems, following which all electrical components would be removed. At this point the site buildings and mechanical equipment would be dismantled, disconnected and removed from the HAGI site. For HAGIs and BVIs, pipework would be removed to surface where it would be backfilled and capped.
- 2.2.144 Reinstatement of temporary accesses, compounds and landscaping would be undertaken in accordance with a landscape scheme, which would be defined in the decommissioning plan.
- 2.2.145 The decommissioning of the HAGIs is anticipated to take the same amount of time as construction (6 to 12 months), although this is indicative and may vary.

Crossings

- 2.2.146 It is envisaged that rail, road and watercourse crossings would be backfilled with grout if stabilisation is required and left in situ, the land above would be reinstated to pre-construction conditions.

3. HRA Screening Step 3: Identification of Potential Effects on European Sites

3.1 Scope of Screening Principles

- 3.1.1 The following sections outline the principles discussed with consultees, whereby potentially sensitive qualifying features, possible effects of the development, and their interactions, have been identified. The outcome of this HRA Screening stage is a list of SPAs, SACs, and Ramsar Sites and associated qualifying features for which the potential for LSE to arise as a result of works associated with the Project cannot be excluded.
- 3.1.2 In line with the ruling of the European Court of Justice in 2004, an LSE is one which cannot be excluded on the basis of objective information, either individually or in-combination with other plans or projects⁶.
- 3.1.3 In order to undertake a robust assessment, it has been essential to determine the linkages between bird species, the Draft Order Limits, and relevant European sites. For wintering birds, these linkages were determined based on, dispersal from roost sites, an understanding of foraging range and movement between inland foraging/roosting sites and low tide foraging sites.

3.2 European Sites included for Assessment

Approach

- 3.2.1 Each European site is designated as a SAC, classified as an SPA, or listed as a Ramsar Site in respect of specific 'qualifying features'. These 'qualifying features' (habitats, mosaics of habitats, species or assemblage of species, and combinations of these) are the reasons for which the site is to be protected and managed for conservation purposes.
- 3.2.2 For SPAs the qualifying features are the birds for which the SPA is classified, under either the Birds Directive:
- Article 4(1) rare and vulnerable species, species in danger of extinction or requiring particular attention because of their habitat needs, listed in Annex I; or
 - Article 4(2) regularly occurring migratory species (e.g., on passage or over-wintering or an internationally important assemblage of birds) not listed in Annex I.
- 3.2.3 The qualifying features of SACs are the habitats listed in Annex I of the Habitats Directive and the species listed in Annex II of the Directive. The 'qualifying features' of Ramsar Sites are the list of Criteria as set out in the Convention on

⁶ European Court of Justice, Case C-127/02³, Judgement of the Court, September 2004, paragraph 45.

Wetlands of International Importance (Ramsar Convention). All receptors that are qualifying features of European sites and/or Ramsar Sites (or support such features), and which may potentially be affected by the Project have been considered within this screening process.

Study Area

- 3.2.4 All European sites within 10km of the Project were considered. With respect to those sites featuring qualifying ornithological interests that could be affected by the Project, such sites were included if they fell within 20 kilometres (km) of the Draft Order Limits.
- 3.2.5 When considering the effects of the Project on European sites, consideration must be given to the effects on birds using land outwith the boundaries of the European sites as well as within. Such land can be deemed to be functionally linked to the European site, for example, significant numbers of golden plover regularly feeding on farmland outwith the boundary of the Mersey Estuary SPA. Therefore, some habitats outwith the SPA can be considered to be FLL.
- 3.2.6 FLL in this context is defined as:
- “Areas of land or sea outside of the boundary of a European site that may be important ecologically in supporting the populations for which the European site has been designated or classified. Occasionally impacts to such habitats can have a significant effect upon the species interest of such sites, where these habitats are considered to be functionally linked to the European site”⁷.*
- 3.2.7 A subsequent report by Bowland Ecology (2021)⁸ “developed and agreed” a definition of FLL with Natural England as:
- “Areas of land occurring within **20km of an SPA**, that are **regularly** used by **significant numbers** of qualifying bird species”.*
- 3.2.8 For ornithological features that utilise FLL of European sites, linkages were determined based on an understanding of potential connectivity with foraging range and movement between the roosting and foraging sites. The 20km search distance implemented in this HRA is generally considered to be the maximum distance most non-marine species of birds would regularly travel between foraging

⁷ Natural England. (2016). Functional linkage: How areas that are functionally linked to European sites have been considered when they may be affected by plans and projects - a review of authoritative decisions. Natural England Commissioned Report NECR207. (online) Available at: <http://publications.naturalengland.org.uk/publication/6087702630891520> (Accessed July 2022).

⁸ Bowland Ecology. 2021. Identification of Functionally Linked Land supporting SPA waterbirds in the North West of England. NERC361. Natural England.

and roost sites (e.g. in this case, pink-footed goose, with other species generally travelling shorter distances)⁹.

- 3.2.9 A significant number of birds was defined as 0.5% of the Great British (GB) population or 1,000 individuals. An area should therefore support at least 0.5% of the GB population of a qualifying species, or 1,000 birds, to be considered FLL¹⁰.
- 3.2.10 Regular usage in the report was defined as being used by significant numbers of birds for seven or more years since 2010. Stroud *et al* (2001)¹¹ defined 'regular' as when a threshold is met in two thirds of the season for which adequate data are available.
- 3.2.11 The Mersey Estuary SPA and Ramsar Site, Dee Estuary SPA and Ramsar Site, plus Ribble and Alt Estuaries SPA and Ramsar Site will all have FLL (habitats outwith their respective site boundaries used by qualifying species of waterbirds for roosting and/or feeding).
- 3.2.12 In accordance with the IAQM's Guidance on the assessment of dust from demolition and construction¹², the HRA and AQ analysis will consider the impacts of air emissions associated with the construction and operation of the Project on all European sites within 250m.
- 3.2.13 In accordance with the IAQM's (2020)¹³ guide to the assessment of air quality impacts on designated nature conservation sites and National Highways (2019)¹⁴ guidance, a quantitative air quality assessment is required if European sites are located within 200m of affected roads.

⁹ NatureScot (formerly Scottish Natural Heritage). (2016). Assessing Connectivity with Special Protection Areas (SPAs) Guidance. Version 3. (online) Available at: <https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf> (Accessed July 2022).

¹⁰ In the Bowland Ecology (2021) study, a threshold of 0.5% of the whole GB population was used, rather than 1% of the qualifying population for each separate SPA. This was because the SPA population of individual species varies across the North West, using a separate threshold for each SPA would require associating each area of land in the North West with a specific SPA based on distance and would therefore not take account of birds moving between SPAs (e.g. pink-footed geese, can travel up to 20km in a day and it would be reasonable to suggest that these birds can cross over boundaries of different SPA associated FLL).

¹¹ Stroud, D.A., Chambers, D., Cook, S., Buxton, N., Fraser, B., Clement, P., Lewis, P., McLean, I., Baker, H. & Whitehead, S. (eds). 2001. The UK SPA network: its scope and content. JNCC, Peterborough, p56.

¹² IAQM. (2024). Guidance on the assessment of dust from demolition and construction. January 2024 (Version 2.2). Available at: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf> Accessed August 2024).

¹³ IAQM. (2020). A guide to the assessment of air quality impacts on designated nature conservation sites (V1.1).

¹⁴ National Highways (formerly Highways England) (2019) DMRB LA 105: Air Quality.

Impacts on qualifying/assemblage features

- 3.2.14 In order to assess the potential effects on qualifying/assemblage bird species (due to construction works, transport/traffic and operational activities), ornithological baseline data was obtained from desk study and field surveys to ascertain the type and level of use by these species within the Draft Order Limits and surrounds. Published literature on the sensitivity of these species will then be used to assess the effects of disturbance on the qualifying/assemblage bird populations involved and determine any LSE.

Consultation

- 3.2.15 The HRA Screening has also been informed by a consultation process undertaken with relevant stakeholders. **Table 5P 3.1** provides an HRA focused overview of the consultation feedback regarding the EIA Scoping Report¹⁵. This feedback has been factored into the approach to the HRA.

¹⁵ Wood Group UK Ltd on behalf of Cadent Gas Limited Ltd. January 2022. HyNet North West Hydrogen Pipeline Project – EIA Scoping Report.

Table 5P 3.1 Consultation Feedback

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
Scoping Opinion		
Planning Inspectorate (PINS) 08/03/2022	The Applicant proposes to scope out effects on <i>Midlands Meres and Mosses Phase 1 Ramsar Site</i> on the basis that there are no ornithological features designated as part of the Ramsar, and there is no hydrological connectivity between the Site and the Proposed Development. The Inspectorate considers that effects on this designated site can be scoped out on this basis.	Scoped out of HRA Screening process.
PINS 08/03/2022	The Applicant proposes to scope out effects on <i>Dee Estuary SPA and Ramsar Site</i> on the basis that the sites qualifying features are unlikely to forage within the proposed site boundary or a 500m buffer, given the distance from the Proposed Development (c.13.5km west) and the lack of hydrological connectivity between the Proposed Development and Ramsar site. The Inspectorate considers that if it can be demonstrated there is no potential effect pathway between the Proposed Development and these designated sites, then the Inspectorate agrees that these can be scoped out.	Assessed within HRA Screening.
PINS 08/03/2022	The Applicant proposes to scope out effects on <i>Mersey Narrows and North Wirral Foreshore SPA and Ramsar Site</i> on the basis that the sites qualifying features are unlikely to forage within the proposed site boundary or 500m buffer, given the distance from the Proposed Development (c.18.2km northwest) and the lack of hydrological connectivity between the Proposed Development and Ramsar site.	Assessed within HRA Screening.

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
	The Inspectorate considers that insufficient evidence has been submitted to demonstrate that the Proposed Development will not impact on functionally linked land. The ES should identify the potential for bird species associated with the designated sites to be present and assess any likely significant effects.	
PINS 08/03/2022	The Applicant proposes to scope out effects on <i>Ribble and Alt Estuaries SPA and Ramsar Site</i> on the basis that the sites qualifying features are unlikely to forage within the proposed site boundary or 500m buffer, given the distance from the Proposed Development (c.18.5km northwest) and the lack of hydrological connectivity between the Proposed Development and Ramsar site. The Applicant highlights that the upper limit of pink-footed goose (a qualifying feature of the SPA) foraging activity from winter roost sites is 15-20km with farmland the principal foraging habitat in winter and states that given the amount of grassland habitat within the wider area, impacts on this species are considered negligible. The Inspectorate considers that if it can be demonstrated there is no potential effect pathway between the Proposed Development and these designated sites, then the Inspectorate agrees that these can be scoped out.	Assessed within HRA Screening.
PINS 08/03/2022	Table 5.7 of the Scoping Report identifies potentially significant effects from noise and physical activities leading to disturbance of SPA qualifying features and Site of Special Scientific Interest (SSSI) designated species using functionally linked land. The ES should also consider the impacts that any direct loss of functionally linked land may have on relevant European and nationally designated sites.	Assessed within HRA Screening.

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
PINS 08/03/2022	Table 5.9 of the Scoping Report states that winter bird survey methods will involve walking a number of transects, will be undertaken in two key areas within the scoping red line boundary and will focus on detecting qualifying features of the Mersey Estuary SPA using functionally linked land within the Zone of Influence of the designated site. It is unclear how the two key areas have been identified or why these are representative of the effects of the Proposed Development on wintering birds. The baseline survey data contained within the ES should be representative of the full effects of the scheme. The ES should include evidence that the extent, location and methodology of surveys has been agreed with relevant consultation bodies.	The non-breeding waterbird survey approach in 2021/22 and 2024 was based on the preferred pipeline routes outlined in the HyNet Phase 2 Feasibility Report - North West England Hydrogen Pipeline Network (Saith Limited, 2020) and the CO2 and H2 Pipeline Enabling Works – Wintering Bird Survey Methodology (WSP, 2021). Survey areas were amended or extended to ensure all FLL within 500m potentially impacted by alternative routing options were suitably covered. FLL was assessed on the basis of the following NE commissioned report: "Review and analysis of changes in waterbird use of the Mersey Estuary SPA, Mersey Narrows & North Wirral Foreshore potential SPA and Ribble & Alt Estuaries SPA (NECR173)". It is intended to agree the survey approach and finalise the scope with Natural England.
Natural England 10/11/2022	We note that the assessment of the Mersey Estuary SPA, Ramsar and SSSI has considered areas of functionally linked habitats outside of the designated site and this is welcomed. However in paragraph 5.11.14 it is	Assessed within this updated HRA Screening Report.

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
	stated that Ince Marshes (a key area for SPA birds) lies within 500m of an established access route which is proposed to be used during the construction of the project. This area is also highlighted within Figure 5.1 Key species activity areas (Appendix 5C), we advise that due to the proximity of the access route to functionally linked habitat that further consideration is required regarding the potential for additional disturbance from the increased use of the access route during construction.	
Natural England 10/11/2022	Natural England notes that the project has been screened the to check for the likelihood of significant effects. The assessment concludes that likelihood of significant effects arising from the proposal can be ruled out both alone or in combination. On the basis of information provided, Natural England advises that there is currently not enough information to rule out the likelihood of significant effects. Uncertainties remain relating to effects that may become significant when considered in combination with other plans or projects. Natural England advises that additional information as detailed below should be included within the assessment, this would then provide an opportunity to repeat your screening to assess the likelihood of significant effects of the project as submitted (i.e. with all new information provided as part of the proposal) but excluding, at this stage, any measures specifically intended to avoid harmful effects on a European sites.	Reassessed within this updated HRA Screening Report.
Natural England 10/11/2022	As noted above we advise further consideration of the impacts of increased use of the access route in close proximity to Ince Marshes, as there is potential for increased disturbance levels to SPA birds using the area.	Reassessed within this updated HRA Screening Report.

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
Natural England 10/11/2022	We advise further consideration of the Manchester Mosses SAC and Rostherne Mere Ramsar within the assessment due to potential impacts of air quality. It is noted that the use of construction vehicles and generator sets has been included within the High Level Screening Table of Environmental Changes and Potential Effects of the Project (Table 3.3) however Manchester Mosses SAC and Rostherne Mere Ramsar have not been considered here. The Air Quality Assessment within Chapter 9 does however include the associated Holcroft Moss and Rostherne Mere SSSIs therefore we advise the HRA is updated and reflects an assessment for the SAC and Ramsar.	Reassessed within this updated HRA Screening Report.
Natural England 10/11/2022	The HRA must also consider any in-combination effects with other plans and projects. This could include plans or projects from neighbouring Local Planning Authorities and those in the marine environment. Plans or projects comprise the following; a) The incomplete or non-implemented parts of plans or projects that have already commenced; b) Plans or projects given consent or given effect but not yet started; c) Plans or projects currently subject to an application for consent or proposed to be given effect; d) Projects that are the subject of an outstanding appeal; e) Ongoing plans or projects that are the subject of regular review; f) Any draft plans being prepared by any public body; g) Any proposed plans or projects published for consultation prior to the application.	Reassessed within this updated HRA Screening Report.
Natural England 10/11/2022	We note that APIS has been used to provide critical loads and levels for the air quality assessment, with minimum nutrient nitrogen deposition and minimum acid deposition loads shown within Table 9.17. However	Reassessed within this updated HRA Screening Report.

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
	we consider that further information is required regarding the use of critical loads presented for the listed SSSIs. We would expect any screening assessment to consider the most sensitive habitat type for each SSSI as part of an initial assessment, e.g. for Holcroft Moss SSSI the minimum nutrient nitrogen deposition load should be 5-10 kg N/ha/yr, however 15 kg N/ha/yr is listed within Table 9.17 and therefore used in the assessment. We advise further detail is provided on the use of the stated critical loads within Table 9.17 and that the values for the most sensitive habitat type are used in the screening assessment. Appendix 9B Dispersion Modelling considers the impacts of air quality on ecological receptors however it is not clear from the results provided within Tables 9B.12 Predicted annual mean NOx concentrations and 9B.13 Predicted daily mean NOx concentrations that the difference (%) represents a percentage of the critical level for NOx. We advise clarity is provided regarding the modelling results to clearly show any relevant critical loads/levels and percentages so that any exceedances can be highlighted.	
22/03592/REQ - CWAC - Statutory Consultation Response (PEIR) (Appendix B)	"Scoping for Biodiversity (Table 5.4 of PEIR and Appendix 5A) It is noted the Mersey Narrows and North Wirral Foreshore SPA and Ramsar Site, Midlands Meres and Mosses Phase 2 Ramsar Site and Midlands Meres and Mosses Phase 1 Ramsar Site have been scoped out of the assessment. CWAC recommended these sites be scoped in at the Scoping stage, or further justification for scoping out should be provided. Only the RAMSAR parts of the designations are noted, not SPA or SAC. Air quality and deposition on these habitats/features have not been considered. It is noted that changes in hydrology and air quality are scoped out at this stage, for potential impacts on all ecological	Reassessed within this updated HRA Screening Report.

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
	features. An example is that the pipeline runs through Frodsham Marsh LWS and coastal floodplain habitats, which are adjacent and hydrologically connected to the Mersey Estuary RAMSAR/SPA/SS(S)I and is likely to form functionally linked land”.	
22/03592/REQ - CWAC - Statutory Consultation Response (PEIR) (Appendix B)	"Section 5.11 Preliminary Assessment of Biodiversity Effects Functionally linked land is referenced and a map of the locations of such should be produced, using Natural England mapping and that which has been discov(ered) through surveys on the ground."	FLL maps are documented within “Natural England Commissioned Report NECR361: Identification of Functionally Linked Land supporting Special Protection Areas (SPAs) waterbirds in the North West of England (Bowland Ecology, 2021)” and are not presented here. Full survey results are illustrated within figures in the Draft ES Chapter 5 Biodiversity Appendices .
22/03592/REQ - CWAC - Statutory Consultation Response (PEIR) (Appendix B)	“...some designations have not been included in the assessment, e.g. West Midlands Mosses SAC. The HRA requires amending to take into account these designations and their qualifying features. Functionally linked land maps should be provided to aid assessment of the HRA. It is expected that Natural England will comment on the HRA in detail.”	Reassessed within this updated HRA Screening Report.
HyNet - H2 Pipeline PEIR Consultation - CWT	"Functionally Linked Land (FLL) to the Mersey Estuary SPA and Ramsar. A full HRA should be undertaken to support the project as, in our opinion, the evidence presented in the scoping report is insufficient to scope out effects on the integrity of the Mersey Estuary SPA and Ramsar. The decision to scope out a full HRA appears to have been	Reassessed within this updated HRA Screening Report.

Stakeholder/ Date of consultation	Stakeholder comment	Action taken to address comment
	made on the outcomes of a single year of wintering bird surveys (detailed in Appendix 5C) which is not in line with good practice. There also appears to be significant gaps in transect data and results, in particular around the Fiddlers Ferry lagoons. Given significant numbers of Mersey SPA species were recorded in proximity to the Preliminary Order Limits (POL), it is reasonable to assume that in a different year large numbers may utilise slightly different locations than those recorded in surveys undertaken in 2021/2022 and may encroach the POL. We advise that route and HAGI options around Frodsham, the Weaver Bend, Moore Nature Reserve and Fiddlers Ferry should only be decided following a full HRA informed by multiple consecutive years of wintering bird surveys."	
Hynet DCO Consultation Response PDNPA	The potential temporary increase in Nitrogen Oxide emissions as a result of increased vehicle movements on any biodiversity interests protected by European designation (i.e. SAC/SPA designated sites) within the National Park should be considered alone and in combination with other projects in your Habitat Regulations Assessment.	Reassessed within this updated HRA Screening Report.

European Sites Screened into the Assessment

- 3.2.16 There are no European sites within the Draft Order Limits. There is one SPA, five SACs and four Ramsar Sites within 10km of the Project. There are a further four SPAs and three Ramsar Sites (designated for ornithological features) within 20km. There are no potential or possible SPAs, SACs or Ramsar Sites within the respective search areas. Of these, a single SAC and Ramsar Site fall within 200m of the proposed key traffic/transport links.
- 3.2.17 Details of the European sites considered for assessment and their qualifying features are listed in **Table 5P 3.2** The distances provided are from the closest point of the draft Order Limits. **Figure 5P.2 - Location of European Sites** illustrates the location of these sites relative to the Draft Order Limits.

Table 5P 3.2 European Sites within the Study Area included for Assessment

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
Mersey Estuary SPA	0.83km north	The Mersey Estuary is on the Irish Sea coast of north-west England. It is a large, sheltered estuary which comprises large areas of saltmarsh and extensive intertidal sand and mudflats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment. The intertidal flats and saltmarshes provide feeding and roosting sites for large and internationally important populations of waterfowl. During the winter, the site is of major importance for duck and waders. The site is also important during spring and autumn migration periods, particularly for wader populations moving along the west coast of Britain.	Non-breeding: shelduck (<i>Tadorna tadorna</i>), teal (<i>Anas crecca</i>), pintail (<i>Anas acuta</i>), golden plover (<i>Pluvialis apricaria</i>), dunlin (<i>Calidris alpina</i>), black-tailed godwit (<i>Limosa limosa</i>) and redshank (<i>Tringa totanus</i>). Waterbird assemblage.
Mersey Estuary Ramsar Site	0.83km north	A large, sheltered estuary comprising large areas of saltmarsh and intertidal sand and mudflats. The site includes brackish marsh, rocky shoreline, and cliffs set in a rural and industrial environment. Internationally important numbers of various species of waterbirds feed and roost at the site in winter, or stage at the	Ramsar criterion 5: Assemblages of international importance. Species with peak counts in winter: 89,576 waterfowl (5 year peak mean 1998/99-2002/03). Ramsar criterion 6: species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): Species with peak counts in

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		site in spring and fall, notably ringed plover (<i>Charadrius hiaticula</i>). Human activities include livestock grazing, hunting, industrial activities.	spring/autumn: shelduck, NW Europe, 12,676 individuals, representing an average of 4.2% of the population (5 year peak mean 1998/99-2002/03); black-tailed godwit, Iceland/W Europe 2,011 individuals, representing an average of 5.7% of the population (5 year peak mean 1998/99-2002/03); redshank, 6651 individuals, representing an average of 2.6% of the population (5 year peak mean 1998/99-2002/03). Species with peak counts in winter: teal, NW Europe 10,613 individuals, representing an average of 2.6% of the population (5 year peak mean 1998/99-2002/03); pintail NW Europe 565 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/99-2002/03); dunlin, W Siberia/W Europe 48,364 individuals, representing an average of 3.6% of the population (5 year peak mean 1998/99-2002/03).
Midlands Meres and Mosses Phase 2 Ramsar Site	2.25km south-west	The Meres & Mosses form a geographically discrete series of lowland open water and peatland sites in the north-west Midlands of England. These have developed in natural depressions in the glacial drift left by receding ice sheets which formerly covered the Cheshire/Shropshire Plain. The 16 component sites include open water	Ramsar criterion 1: The site comprises a diverse range of habitats from open water to raised bog. Ramsar criterion 2: Supports a number of rare species of plants associated with wetlands, including the nationally scarce cowbane (<i>Cicuta virosa</i>) and, elongated sedge (<i>Carex elongata</i>). Also present are the nationally scarce bryophytes <i>Dicranum affine</i> and <i>Sphagnum pulchrum</i> . Also supports an assemblage of invertebrates

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		bodies (meres), the majority of which are nutrient-rich with associated fringing habitats; reed swamps, fen, carr & damp pasture. Peat accumulation has resulted in nutrient poor peat bogs (mosses) forming in some sites in the fringes of meres or completely infilling basins. In a few cases the result is a floating quaking bog or schwingmoor. The wide range of resulting habitats support nationally important flora & fauna.	including several rare species. There are 16 species of British Red Data Book insect listed for this site including the following endangered species: the moth <i>Glyphipteryx lathamella</i> , the caddisfly <i>Hagenella clathrata</i> and the sawfly <i>Trichiosoma vitellinae</i> .
West Midlands Mosses SAC	2.26km southwest	Part of the Midlands Meres and Mosses Ramsar Site.	H3160. Natural dystrophic lakes and ponds; Acid peat-stained lakes and ponds. H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface.
Rostherne Mere Ramsar Site	2.65km east (within 200m of key transport links)	Part of a series of open water and peatland, including peat bog and marsh areas set in glaciated landscape. Vegetation consists of fringing reedbeds, wooded and agricultural land. Wintering waterbirds include nationally important numbers of various duck species. Human activities include agricultural use and bird hunting.	Ramsar criterion 1a: Good representative example of the meres of the Shropshire-Cheshire Plain. Rostherne Mere is one of the deepest and largest of the meres. Its shoreline is fringed with common reed (<i>Phragmites australis</i>) and a small area of peat bog has developed at the north-west end of the mere. Ramsar criterion 3c: Over winter this site regularly supports nationally important numbers of shoveler 86 individuals; and pochard 757 individuals.

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
Rixton Clay Pits SAC	3.43km west	Situated east of Warrington, this site comprises parts of an extensive disused brickworks quarry excavated in glacial boulder clay. The excavation has left a mosaic of water-filled hollows and clay banks. Long-abandoned areas have undergone natural succession to scrub and woodland while more recently worked areas support calcareous grassland. The site is important for great crested newt and holds the county's largest known breeding population.	Great crested newt (<i>Triturus cristatus</i>).
Midlands Meres and Mosses Phase 1 Ramsar Site	3.61km east	As above for Midlands Meres and Mosses Phase 2 Ramsar Site.	Ramsar criterion 1: The site comprises a diverse range of habitats from open water to raised bog. Ramsar criterion 2: Supports a number of rare species of plants associated with wetlands including five nationally scarce species together with an assemblage of rare wetland invertebrates (three endangered insects and five other British Red Data Book species of invertebrates).
Manchester Mosses SAC	3.85km west (within 200m of key transport links)	Mossland formerly covered a very large part of Greater Manchester, Merseyside, south Lancashire and north Cheshire, and provided a severe obstacle to industrial and agricultural expansion. While most has been converted to agriculture or lost to development, several	Degraded raised bogs still capable of natural regeneration.

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		examples have survived as degraded raised bog, such as Risley Moss, Astley and Bedford Mosses, and Holcroft Moss on the Mersey floodplain. Their surfaces are now elevated above adjacent land due to shrinkage of the surrounding tilled land, and all except Holcroft Moss have been cut for peat at some time in the past. While past drainage has produced dominant purple moor-grass (<i>Molinia caerulea</i>), bracken (<i>Pteridium aquilinum</i>) and birch (<i>Betula</i> spp.) scrub or woodland, wetter pockets have enabled peat-forming species to survive.	
Oak Mere SAC	4.6km southwest	Part of the Midlands Meres and Mosses Ramsar Site.	H3110. Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>); Nutrient-poor shallow waters with aquatic vegetation on sandy plains. H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface.
River Dee and Bala Lake SAC	8.54km southwest	The River Dee has its source in Snowdonia at the outflow of Llyn Tegid and it includes the Ceiriog, Meloch, Tryweryn and Mynach tributaries. Its catchment contains a wide spectrum of landscape from high mountains around	H3260. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho Batrachion</i> vegetation; Rivers with floating vegetation often dominated by water-crowfoot S1095. <i>Petromyzon marinus</i> ; Sea lamprey S1096. <i>Lampetra planeri</i> ; Brook lamprey

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		Bala, rugged peaks near Llangollen, steep sided wooded valleys, and the plains of Cheshire, Flintshire, north Shropshire and Wrexham. There is a tidal influence as far upstream as Farndon and high tides regularly exceed the Chester weir crest level. The aquatic plant community includes Wirtgen's water-crowfoot and pond water-crowfoot, and also floating water-plantain. Water-crowfoot forms extensive beds along the whole length of the Dee where flow conditions are suitable. The River Dee is recognised as one of North Wales' premier rivers for Atlantic salmon. The Mynach, Meloch and Ceiriog tributaries are the most important salmon spawning tributaries in the Dee catchment. Other migratory fish utilising the river system include river lamprey and sea lamprey <i>Petromyzon marinus</i>. The Dee also supports important populations of non-migratory fish including bullhead and brook lamprey. The otter is well established throughout the river system, especially where appropriate bank side cover exists.	S1099. <i>Lampetra fluviatilis</i>; River lamprey S1106. <i>Salmo salar</i>; Atlantic salmon S1163. <i>Cottus gobio</i>; Bullhead S1355. <i>Lutra lutra</i>; Otter S1831. <i>Luronium natans</i>; Floating water-plantain

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
The Dee Estuary SPA	13.7km west	The Dee Estuary lies on the border between England and Wales on the north-west coast of Britain. It is a large, funnel-shaped, sheltered estuary, which supports extensive areas of intertidal sand and mudflats and saltmarsh. Where agricultural reclamation has not occurred, the saltmarshes grade into transitional brackish and swamp vegetation on the upper shore. The Site also includes the three sandstone islands of Hilbre, with their important cliff vegetation and maritime heathland and grassland. The two shorelines of the Estuary show a marked contrast between the industrialised usage of the coastal belt in Wales and residential/recreational use in England. The Site is of major importance for waterbirds; during the winter the intertidal flats, saltmarshes and fringing habitats including coastal grazing marsh/fields, provide feeding and roosting sites for internationally important numbers of ducks and waders; in summer the Site supports nationally important breeding colonies of two species of tern. The Site is also important during migration periods, particularly for wader populations moving	Non-breeding: shelduck, teal, pintail, oystercatcher (<i>Haematopus ostralegus</i>), grey plover (<i>Pluvialis squatarola</i>), knot, dunlin, black-tailed godwit, bar-tailed godwit, curlew, redshank and Sandwich tern (<i>Sterna sandvicensis</i>) Breeding: common tern and little tern (<i>Sterna albifrons</i>). Waterbird assemblage.

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		along the west coast of Britain and for Sandwich terns post-breeding.	
The Dee Estuary Ramsar Site	13.7km west	The Dee is a large funnel-shaped sheltered estuary and is one of the top ten estuaries in the UK for wintering and passage waterfowl populations. The Estuary supports internationally important numbers of waterfowl and waders. The Estuary plays a very important role in shoreline stabilisation and dissipation of erosive forces, sediment trapping and water supply. The two shorelines of the Estuary show a marked contrast between the industrialised usage of the coastal belt in Wales and residential and recreational usage in England. The Site was subject of Ramsar Advisory Missions in 1993 and 1994 due to several adverse factors affecting its ecological character: pollution, overfishing, introduction of invasive species and general disturbance from transport and industrial activities. Since then, management plans have been developed and implemented. However, some of the threats remain.	Ramsar criterion 1: Extensive intertidal mud and sand flats (20 km by 9 km) with large expanses of saltmarsh towards the head of the estuary. Habitats Directive Annex I features present on the pSAC include: H1130 Estuaries, H1140 Mudflats and sandflats not covered by seawater at low tide, H1210 Annual vegetation of drift lines, H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts, H1310 Salicornia and other annuals colonising mud and sand, H1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>), H2110 Embryonic shifting dunes, H2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes"), H2130 Fixed dunes with herbaceous vegetation ("grey dunes"), H2190 Humid dune slacks. Ramsar criterion 2: supports breeding colonies of the vulnerable Natterjack Toad. Ramsar criterion 5: Assemblages of international importance: Species with peak counts in winter: Non-breeding season regularly supports 120,726 individual waterbirds (5 year peak mean 1994/95–1998/99). Ramsar criterion 6 – species/populations occurring at levels of international importance. Species with peak counts in spring/autumn:

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
			black-tailed godwit, Iceland/W Europe 3,323 individuals, representing an average of 7% of the population (5-year peak mean 1998/99-2002/03); redshank, 4,465 individuals, representing an average of 1.7% of the population (5-year peak mean 1998/99-2002/03); dunlin, W Siberia/W Europe 38,196 individuals, representing an average of 2.8% of the population (5-year peak mean 1998/99-2002/03 - spring peak); grey plover, E Atlantic/W Africa - wintering 11,021 individuals, representing an average of 4.4% of the population (5-year peak mean 1998/99-2002/03 - spring peak); knot, W & Southern Africa (wintering) 42,692 individuals, representing an average of 9.4% of the population (5-year peak mean 1998/99-2002/03); ringed plover, Europe/Northwest Africa 3,761 individuals, representing an average of 5.1% of the population (5-year peak mean 1998/99-2002/03 - spring peak); and sanderling, Eastern Atlantic 7,401 individuals, representing an average of 6% of the population (5-year peak mean 1998/99-2002/03 - spring peak). Species with peak counts in winter: bar-tailed godwit, W Palearctic 13,935 individuals, representing an average of 11.6% of the population (5-year peak mean 1998/99-2002/03); oystercatcher, Europe & NW Africa-wintering 18,926 individuals, representing an

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
			average of 1.8% of the population (5-year peak mean 1998/99-2002/03); teal, NW Europe 5,107 individuals, representing an average of 1% of the population (5-year peak mean 1998/99-2002/03); wigeon, NW Europe 69,841 individuals, representing an average of 4.6% of the population (5-year peak mean 1998/99-2002/03); pintail, NW Europe 1,497 individuals, representing an average of 2.5% of the population (5-year peak mean 1998/99-2002/03); pink-footed goose, Greenland, Iceland/UK 6,552 individuals, representing an average of 2.42% of the population (5-year peak mean 1998/99-2002/03); Bewick's swan, NW Europe 230 individuals, representing an average of 1.1% of the GB population (5-year peak mean 1998/99-2002/03); and whooper swan, Iceland/UK/Ireland 211 individuals, representing an average of 1% of the population (5-year peak mean 1998/99-2002/03).
Liverpool Bay / Bae Lerpwl SPA	14.5km north-west	Liverpool Bay/Bae Lerpwl SPA is in the east of the Irish Sea, bordering the coastlines of north-west England and north Wales, and running as a broad arc from Morecambe Bay to the east coast of Anglesey. It is classified for the protection of red-throated diver (<i>Gavia stellata</i>), common scoter (<i>Melanitta nigra</i>), and	Non-breeding: red-throated diver, common scoter and little gull (<i>Hydrocoloeus minutus</i>). Breeding: common tern and little tern. Waterbird assemblage.

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		little gull (<i>Hydrocoloeus minutus</i>) in the non-breeding season; common tern (<i>Sterna hirundo</i>) and little tern (<i>Sterna albifrons</i>) in the breeding season, and an internationally important waterbird assemblage. Liverpool Bay/Bae Lerpwl SPA encompasses marine areas supporting large aggregations of wintering red-throated diver and common scoter as well as important marine foraging areas of little terns breeding within The Dee Estuary SPA, and foraging areas of common terns breeding at the Mersey Narrows & North Wirral Foreshore SPA. The boundary of Liverpool Bay/Bae Lerpwl SPA extends beyond 12 nautical miles and therefore lies partly in Welsh and English territorial waters and partly in offshore waters; hence it is a site for which Natural England, Natural Resources Wales, and JNCC have responsibility to provide statutory advice.	
Mersey Narrows and North Wirral Foreshore SPA	17.1km west	Mersey Narrows and North Wirral Foreshore is located on the northwest coast of England at the mouths of the Mersey and Dee estuaries. The Site comprises intertidal habitats at Egremont	Non-breeding: bar-tailed godwit, little gull, knot and common tern. Breeding: common tern. Waterbird assemblage.

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		foreshore, man-made lagoons at Seaforth and the extensive intertidal flats at North Wirral Foreshore. Egremont is most important as a feeding habitat for waders at low tide whilst Seaforth is primarily a high tide roost site, as well as a nesting site for terns. North Wirral Foreshore supports large numbers of feeding waders at low tide and also includes important high tide roost sites.	
Mersey Narrows and North Wirral Foreshore Ramsar Site	17.1km west	Located on the Irish Sea coast of north-west England, on the mouths of the Mersey and Dee estuaries, the Site comprises large areas of saltmarsh and extensive intertidal sand and mud flats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, along a rural and industrial stretch of coast. The intertidal flats are internationally important feeding grounds for waders: the Site regularly supports more than 20,000 waterbirds, including 2.4% of the knot <i>Calidris canutus islandica</i> population and 2.8% of the black-tailed godwit <i>Limosa lapponica</i> population. The Wetland provides ecosystem services including shoreline stabilisation and dissipation of erosive	Ramsar Criterion 4: regularly supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions: During 2004/05-2008/09 the Mersey Narrows and North Wirral Foreshore Ramsar Site supported important numbers of non-breeding little gulls and common terns. Ramsar Criterion 5 because it regularly supports 20,000 or more waterbirds: During the winters 2004/05-2008/09, the Mersey Narrows and North Wirral Foreshore Ramsar Site supported an average peak of 32,402 individual waterbirds. Ramsar Criterion 6: regularly supports 1% of the individuals in the populations of the following species or subspecies of waterbird in any season: During the winters 2004/05-2008/09, the Mersey Narrows and North Wirral Foreshore Ramsar Site supported 2.4% of the islandica

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
		forces, sediment trapping and water supply. The potential threats to its ecological character derive from increasing recreational activities and social and economic pressures to return the foreshore back to sandy beaches, and sedimentation of the foreshore which reduces the available low tide feeding habitat and causes vegetation succession. The adjacent land is dedicated to agriculture and urban development as well as nature conservation and scientific research and monitoring. Recreational activities include bird watching, walking, fishing, sailing, canoeing, cycling and kite surfing, all carried out at intensive levels. There is a visitor centre at Seaforth Nature Reserve.	subspecies, W Europe/Waddensea/Britain/Ireland (non-breeding) population of knot and 2.8% of the lapponica subspecies W Europe/NW Africa (non-breeding) population of bar-tailed godwits.
Ribble and Alt Estuaries SPA	19.1km north-west	The Site lies on the coast of Lancashire and Sefton in northwest England and overlaps the Ribble Estuary SSSI and Sefton Coast SSSI. The Site consists of extensive areas of sandflats and mudflats, as well as large areas of saltmarsh, particularly in the Ribble. There are also areas of coastal grazing marsh.	Non-breeding: Bewick's swan (<i>Cygnus columbianus</i>), whooper swan (<i>Cygnus cygnus</i>), pink-footed goose (<i>Anser brachyrhynchus</i>), shelduck, wigeon, teal, pintail, oystercatcher, ringed plover, golden plover, grey plover, knot, sanderling (<i>Calidris alba</i>), dunlin, black-tailed godwit, bar-tailed godwit and redshank. Breeding: ruff (<i>Philomachus pugnax</i>), lesser black-backed gull and common tern. Waterbird assemblage.

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
Ribble and Alt Estuaries Ramsar Site	19.1km north-west	A large area, including two estuaries, extensive sand and mudflats, saltmarsh and dunes. The tidal flats and saltmarsh support internationally important populations of wintering waterbirds. Internationally important vegetation communities and amphibian populations occur in the sand dunes. Human activities include tourism, livestock grazing, hunting, and large-scale industrial and military activities. There are port facilities, as well as oil and gas production and exploration activities, in the surroundings.	Seabird assemblage. Ramsar criterion 2: This site supports up to 40% of the GB population of natterjack toads. Ramsar Criterion 5: Assemblages of international importance: Species with peak counts in winter: 222,038 waterfowl (5 year peak mean 1998/99-2002/2003). Ramsar Criterion 6: species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): Species regularly supported during the breeding season: Qualifying Species/populations (as identified at designation): lesser black-backed gull, W Europe/Mediterranean/W Africa 4,108 apparently occupied nests, representing an average of 2.7% of the breeding population (Seabird 2000 Census). Species with peak counts in spring/autumn: ringed plover, Europe/Northwest Africa 3,761 individuals, representing an average of 5.1% of the population (5 year peak mean 1998/99-2002/03 - spring peak); grey plover, E Atlantic/W Africa - wintering 11,021 individuals, representing an average of 4.4% of the population (5 year peak mean 1998/99-2002/03 - spring peak); knot, W & Southern Africa (wintering) 42,692 individuals, representing an average of 9.4% of the population (5 year peak

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
			mean 1998/99-2002/03); sanderling, Eastern Atlantic 7,401 individuals, representing an average of 6% of the population (5 year peak mean 1998/99-2002/03 - spring peak); dunlin, W Siberia/W Europe 38,196 individuals, representing an average of 2.8% of the population (5 year peak mean 1998/99-2002/03 - spring peak); black-tailed godwit, Iceland/W Europe, 3,323 individuals, representing an average of 9.4% of the population (5 year peak mean 1998/99-2002/03); redshank, 4,465 individuals, representing an average of 1.7% of the population (5 year peak mean 1998/99-2002/03); lesser black-backed gull, 1,747 individuals, representing an average of 2.8% of the GB population (5 year peak mean 1998/99-2002/03). Species with peak counts in winter: Bewick's swan, NW Europe 230 individuals, representing an average of 2.8% of the GB population (5 year peak mean 1998/99-2002/03); whooper swan, Iceland/UK/Ireland 211 individuals, representing an average of 1% of the population (5 year peak mean 1998/99- 2002/03); pink-footed goose, Greenland, Iceland/UK 6,552 individuals, representing an average of 2.7% of the population (5 year peak mean 1998/99-2002/03); shelduck, NW Europe 2,944 individuals, representing an average of 3.7% of

Site Name	Approx. distance from the Draft Order Limits	Site Description	Qualifying features
			the GB population (5 year peak mean 1998/99-2002/03); wigeon, NW Europe 69,841 individuals, representing an average of 4.6% of the population (5 year peak mean 1998/99-2002/03); teal, NW Europe 5,107 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/99-2002/03); pintail, NW Europe 1,497 individuals, representing an average of 2.4% of the population (5 year peak mean 1998/99-2002/03); oystercatcher, Europe & NW Africa -wintering 18,926 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/99-2002/03); and bar-tailed godwit, W Palearctic 13935 individuals, representing an average of 11.6% of the population (5 year peak mean 1998/99-2002/03).

3.3 Ornithology Baseline

3.3.1 This section summarises information obtained from the following sources:

- Data gathered during waterbird surveys undertaken in winter 2020-21¹⁶, winter 2021-22, April-July 2022 and January-July 2024 by WSP on behalf of the Applicant has also been used to inform the chapter in relation to bird species present within the Study Area; and
- Published literature, including:
 - ▶ The Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland (Balmer *et al.*, 2013)¹⁷;
 - ▶ Birds in Cheshire and Wirral: A breeding and wintering atlas (Cheshire and Wirral Ornithological Society, 2008)¹⁸;
 - ▶ Natural England Commissioned Report NECR361: Identification of Functionally Linked Land supporting Special Protection Areas (SPAs) waterbirds in the North West of England (Bowland Ecology, 2021); and
 - ▶ Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme (Woodward *et al.*, 2024)¹⁹.
- Existing planning applications in proximity to the Project with potential to impact upon European sites and/or FLL, comprising:
 - ▶ Daresbury Park;
 - ▶ Enric Automated Warehouse;
 - ▶ Frodsham Solar Project;
 - ▶ Halton – Policy RD1 Residential Development Allocations;
 - ▶ Heath Park;
 - ▶ Hydrodec Oil Re-Refinery Eastham;

¹⁶ Cadent (2021). Hydrogen Pipeline - Wintering Bird Surveys.

¹⁷ Balmer, D.E, Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. & Fuller, R.J. (2013). The Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford, UK.

¹⁸ Cheshire and Wirral Ornithological Society. (2008). Birds in Cheshire and Wirral: A breeding and wintering atlas. (online) Available at: <http://www.cheshireandwirralbirdatlas.org/species/> (Accessed 26 November 2021).

¹⁹ Woodward, I.D., Calbrade, N.A., Birtles, A., Feather, G.A., Peck, K., Wotton, S.R., Shaw, J.M., Balmer, D.E. & Frost, T.M. 2024. *Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme*. BTO/RSPB/JNCC/NatureScot. Thetford. (Contains Wetland Bird Survey (WeBS) data from *Waterbirds in the UK 2022/23* © copyright and database right 2024. WeBS is a partnership jointly funded by the BTO, RSPB and JNCC, with fieldwork conducted by volunteers and previous support from WWT).

- ▶ HyNet CO2 Pipeline DCO;
- ▶ Hydrogen Production Plant;
- ▶ Keuper Gas Storage Project;
- ▶ Protos ERF Carbon Capture Facility;
- ▶ Protos Plastics Park;
- ▶ Vertex Natural Gas Pipeline²⁰;
- ▶ Fiddlers Employment Land Phase 1;
- ▶ Sandymoor South Phase 2;
- ▶ Warrington – Policy DEV4; and
- ▶ Warrington Western Link.
- Data searches undertaken with the Cheshire and Wirral Ornithological Society (CAWOS); and the British Trust for Ornithology for Wetland Bird Survey (WeBS) data.

Desk Study

- 3.3.2 The *Identification of Functionally Linked Land supporting SPA waterbirds in the North West of England* report (Bowland Ecology, 2021), highlighted the following areas of functionally linked land in proximity to the Project (i.e., within 500m):
- Fiddlers Ferry Power Station and Lagoons/Runcorn Sands and Astmoor Saltmarsh (moderate potential) partially fall within the northern corridor;
 - Lordship Lane Fields (low potential)/Frodsham Sludge Lagoons (high)/Weaver Estuary (moderate)/Weaver Estuary to Catton Hall (moderate) partially fall within the western corridor; and
 - Woolston Eyes (high potential) lies less than 500m from the Novelis spur terminus within the northern corridor (approximately 140m).
- 3.3.3 These areas of FLL are illustrated in **Figure 5P.3 – Natural England FLL Maps**. It is considered that these areas of FLL relate to the Mersey Estuary SPA/Ramsar Site.
- 3.3.4 The *Birds in Cheshire and Wirral: A breeding and wintering atlas* (Cheshire and Wirral Ornithological Society, 2008), reported the following Mersey Estuary SPA/Ramsar Site qualifying species in proximity to the Project:
- Pink-footed goose – only sporadic records of low numbers of birds in the area.
 - Whooper swan – small numbers reported around Lordship Lane Fields.

²⁰ The report concludes: “*Due to incomplete baseline data for the Site is not currently possible to determine if the project is to have an LSE on the Mersey Estuary designation therefore it is not currently possible to determine if in-combination effects are to occur*”.

- Golden plover – Frodsham Marsh is a favoured site in the region, with peak counts of 1,000-4,000 birds reported here, although most records were of small flocks, with a median size of 40 birds.
- Teal – the most recent Mersey Estuary SPA wintering population was estimated at 11,723 individuals (Natural England, 2019²¹), which forms almost half of the total county population of ~25,000 individuals. Other important sites for teal include the Dee Estuary, which averages counts of 4,400 teal, and at Woolston Eyes, which holds around 2,000 birds on average. Additionally, flocks of more than 500 birds were recorded at Fiddler’s Ferry during the atlas period.
- Shelduck – the atlas highlighted that WeBS counts show that counts average 14,500 birds in the Mersey and over 11,000 on the Dee estuaries. This status is based on the moulting flock on the Mersey, which peaks in July or August, and the maximum on the Dee, is usually in October. Mid-winter counts are much lower and the numbers staying to winter on the Mersey have dropped considerably since the moulting flock became established, declining from 5,000 in the late 1990s to 3,000 in recent years. The only non-estuarine areas with three figure counts were from Frodsham Marsh (220 birds) and Fiddlers Ferry (100 birds). Both are feeding and loafing sites adjacent to the tidal Mersey.
- Pintail – occasional reports, including a record of 250 birds using Frodsham Marsh in winter 2004/05.
- Redshank – most redshank records were from coastal habitats during the atlas period, although 30 were recorded on flooded fields alongside the lower River Weaver at Aston.
- Black-tailed godwit – the freshwater sites adjacent to the estuaries are important for the species where they can supplement their diet with earthworms, with Frodsham Marsh being a key area. There were few atlas records of birds away from the estuaries and adjacent sites.

3.3.5 The *Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland* (Balmer *et al.*, 2013) also reported similar distribution to that reported in the county atlas above.

3.3.6 LSEs identified by other developments within the planning system during the HRA process are detailed in **Table 5P 3.3** below. Those not included from the earlier list did not anticipate any LSEs as a result of their respective projects (e.g. Daresbury Park) or have not submitted HRA documentation to date (e.g. Frodsham Solar).

²¹ Natural England. (2019). European Site Conservation Objectives for Mersey Estuary SPA (UK9005131). Mersey Estuary SPA citation (22/08/2014). (online) Available at: <http://publications.naturalengland.org.uk/file/6485318211469312> (Accessed 28 October 2021).

Table 5P 3.3 LSEs relating to adjacent Projects

Project	European site	Qualifying feature(s)	Phase	Potential impact
Hydrogen Production Plant	Mersey Estuary SPA and Ramsar Site	All	Construction	Contamination of watercourses through run off Risk of groundwater contamination/flow
			Operation	Contamination of watercourses through run off
ENCIRC Automated Warehouse	Mersey Estuary SPA and Ramsar Site	All	Construction and Operation	Contamination of watercourses through run off
Protos Carbon Dioxide Spur Pipeline	Mersey Estuary SPA and Ramsar Site	Teal and Waterbird Assemblage	Construction	Noise and visual disturbance to birds using FLL
		All		Hydrological effects Spread of Invasive Non-Native Plant Species (INNPS)
Protos ERF Carbon Capture Facility	Mersey Estuary SPA and Ramsar Site	Black-tailed godwit, golden plover, redshank, shelduck, teal and Waterbird Assemblage	Construction and Operation	Noise and vibration disturbance to birds using FLL
		All	Construction and Operation	Contamination of watercourses through run off
			Construction	Dust pollution
			Operation	Airborne pollution (including Ammonia and Nitrogen pollution)

Project	European site	Qualifying feature(s)	Phase	Potential impact
	Midlands Meres and Mosses Phase 1 and 2 Ramsar Sites	All	Operation	Airborne pollution (including Ammonia and Nitrogen pollution)
Protos Plastics Park	Mersey Estuary SPA and Ramsar Site	All	Construction and Operation	Lighting and visual disturbance Noise and vibration disturbance Surface water run-off or discharge to watercourses
			Construction	Dust pollution
HyNet CO2 Pipeline DCO	Dee Estuary SPA and Ramsar Site	All	Construction and Operation	Direct and indirect habitat loss (including FLL)
	Dee Estuary/Aber Dyfrdwy SAC			Species mortality
	River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC			Visual disturbance
	Deeside and Buckley Newt Sites SAC			Noise and vibration disturbance
	Mersey Estuary SPA and Ramsar Site			Air quality effects (dust deposition)
Sandymoor South Phase 2	Mersey Estuary SPA and Ramsar Site	All	Operation	Recreational pressure on FLL

- 3.3.7 A five-year synopsis of BTO WeBS data (2016/17 to 2020/21) was received for the following six WeBS sectors within 500m of the Draft Order Limits: Frodsham Sludge Lagoons, Ince Marshes Fields, Lordship Lane Fields, Weaver Estuary to Catton Hall, Weaver Estuary, and Weston Marshes. Other BTO WeBS sites within the 500m search area like Fiddlers Ferry Lagoons for example had not had recent regular survey effort (i.e. within the last 5-10 years).
- 3.3.8 The sites are presented in **Figure 5P.4 – BTO WeBS core sectors within 500m of the Draft Order Limits**.
- 3.3.9 Yearly peak counts (and mean peak) of all aforementioned European site qualifying species (denoted by a *), as well as those assemblage species where more than 0.5% of the Great British (GB) population (taken from Woodward *et al*, 2024)²² or 1,000 individuals has been recorded in any year between 2016/17 and 2020/21 are summarised for each BTO WeBS sector in **Table 5P 3.4**,
- 3.3.10 **Table 5P 3.5, Table 5P 3.6, Table 5P 3.7, Table 5P 3.8** and
- 3.3.11 **Table 5P 3.9**.

Table 5P 3.4 Five-year WeBS summary for Frodsham Sludge Lagoons*

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Pink-footed goose*	146,723	200 (Feb)	80 (Dec)	285 (Jan)	0	400 (Jan)	193
Bewick's swan*	192	0	2 (Jan)	0	0	0	0
Whooper swan*	6,243	20 (Mar)	25 (Jan)	14 (Nov)	0	1 (Dec)	12
Shelduck*	40,821	211 (May)	161 (May)	100 (Apr)	41 (Mar)	147 (Apr)	132
Garganey	57	0	0	0	3 (Aug)	2 (Aug)	1
Shoveler*	21,068	293 (Oct)	413 (Jan)	76 (Dec)	143 (Nov)	204 (Sep)	226
Wigeon*	345,032	132 (Sep)	8 (Jan)	485 (Jan)	50 (Mar)	75 (Mar)	150

²² Woodward, I.D., Calbrade, N.A., Birtles, A., Feather, G.A., Peck, K., Wotton, S.R., Shaw, J.M., Balmer, D.E. and Frost, T.M. 2024. Waterbirds in the UK 2022/23: The Wetland Bird Survey and Goose & Swan Monitoring Programme. BTO/RSPB/JNCC/NatureScot. Thetford.

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Pintail*	22,995	26 (Nov)	63 (Nov)	16 (Jan)	17 (Jan)	39 (Oct)	32
Teal*	184,716	(600) (Dec)	342 (Feb)	1300 (Jan)	743 (Nov)	990 (Oct)	844
Black-necked grebe	87	0	0	0	2 (Aug)	2 (Apr)	1
Oystercatcher*	219,407	1 (May)	4 (Apr)	0	3 (Mar)	2 (Jul)	2
Lapwing	201,233	2,000 (Jan)	2,000 (Jan)	1,500 (Jan)	675 (Jan)	1,800 (Jan)	1,595
Golden plover*	117,590	1,000 (Jan)	1,200 (Jan)	550 (Feb)	500 (Jan)	750 (Jan)	800
Grey plover*	29,495	5 (Jan)	41 (Oct)	0	0	0	9
Ringed plover*	15,216	230 (Aug)	7 (Sep)	147 (Aug)	80 (Aug)	21 (Aug)	97
Curlew*	59,465	120 (Nov)	340 (Jan)	221 (Jan)	210 (Feb)	208 (Dec)	220
Bar-tailed godwit*	30,965	8 (Feb)	3 (Oct)	1 (May)	4 (Jun)	3 (Sep)	4
Black-tailed godwit*	49,021	(560) (Dec)	1,200 (Jul)	500 (May)	887 (Jun)	2,021 (Sep)	1,152
Knot*	269,590	2 (Aug)	2 (Oct)	0	8 (May)	4 (Aug)	3
Ruff*	826	16 (Apr)	130 (Oct)	5 (Sep)	4 (Sep)	9 (Sep)	33
Curlew sandpiper	387	26 (Aug)	3 (Sep)	0	0	0	6
Sanderling*	14,697	0	0	1 (Aug)	0	0	0
Dunlin*	395,162	6500 (Feb)	500 (Aug)	119 (Aug)	1000 (Aug)	8 (Aug)	1625
Little stint	75	3 (Jan)	0	0	0	1 (May)	1
Redshank*	78,899	230 (Feb)	233 (Sep)	2 (Oct)	100 (Aug)	13 (Jul)	116

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Wood sandpiper	36	0	0	0	1 (Aug)	0	0
Lesser black-backed gull*	23,249	120 (Sep)	23 (Apr)	2 (Jul)	3 (May)	6 (Mar)	31

* Numbers in parentheses are known undercounts.

Table 5P 3.5 Five-year WeBS summary for Ince Marshes Fields

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Pink-footed goose*	146,723	0	300 (Mar)	0	0	0	60
Whooper swan*	6,243	6 (Nov)	0	0	0	22 (Jan)	6
Shelduck*	40,821	0	16 (Mar)	6 (Jun)	0	8 (Apr)	6
Garganey	57	0	0	0	0	2 (Apr)	0
Wigeon*	345,032	0	4 (Mar)	8 (Jan)	0	1 (Mar)	3
Teal*	184,716	0	43 (Mar)	60 (Dec)	89 (Dec)	69 (Oct)	52
Oystercatcher*	219,407	0	4 (Mar)	2 (Jun)	0	1 (May)	1
Lapwing	201,233	4,000 (Feb)	500 (Mar)	2,500 (Nov)	400 (Oct)	7 (Apr)	1,481
Golden plover*	117,590	300 (Nov)	340 (Mar)	1,000 (Jan)	0	0	328
Curlew*	59,465	20 (Dec)	56 (Mar)	227 (Dec)	134 (Jan)	460 (Nov)	179
Black-tailed godwit*	49,021	0	0	0	0	60 (Mar)	12

* Numbers in parentheses are known undercounts.

Table 5P 3.6 Five-year WeBS summary for Lordship Lane Fields (not counted in 2016/17 and 2017/18)

Species	GB population	2018/19	2019/20	2020/21	Mean peak
Pink-footed goose*	146,723	(0)	200 (Nov)	300 (Mar)	250
Whooper swan*	6,243	(26) (Jan)	22 (Feb)	25 (Mar)	24
Shelduck*	40,821	4 (Jun)	10 (Aug)	14 (Jan)	9
Wigeon*	345,032	(0)	5 (Sep)	45 (Sep)	25
Teal*	184,716	(4) (Apr)	12 (Sep)	76 (Jan)	44
Oystercatcher*	219,407	2 (Jun)	2 (May)	1 (Jul)	2
Golden plover*	117,590	(0)	100 (Nov)	320 (Apr)	210
Grey plover*	29,495	(0)	2 (Nov)	0	1
Ringed plover*	15,216	2 (Jun)	0	1 (Mar)	1
Curlew*	59,465	(21) (Apr)	231 (Jan)	357 (Jan)	294
Black-tailed godwit*	49,021	(23) (Apr)	120 (Nov)	107 (Mar)	114
Ruff*	826	(0)	6 (Sep)	0	3
Redshank*	78,899	(0)	10 (Dec)	5 (Jan)	8
Lesser black-backed gull*	23,249	7 (Jun)	5 (Nov)	3 (Oct)	5

* Numbers in parentheses are known undercounts.

Table 5P 3.7 Five-year WeBS summary for Weaver Estuary to Catton Hall

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Pink-footed goose*	146,723	0	9 (Mar)	0	(0)	4 (Mar)	3
Shelduck*	40,821	4 (Mar)	6 (Feb)	5 (Apr)	5 (Jun)	6 (Feb)	5
Wigeon*	345,032	0	3 (Mar)	0	(1) (Oct)	3 (Mar)	2
Teal*	184,716	12 (Apr)	31 (Mar)	25 (Feb)	8 (Jan)	104 (Feb)	36
Oystercatcher*	219,407	2 (Apr)	8 (Apr)	5 (Feb)	5 (Feb)	2 (Mar)	4

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Curlew*	59,465	(282) (Nov)	216 (Dec)	129 (Dec)	123 (Jan)	51 (Jan)	160
Black-tailed godwit*	49,021	39 (Aug)	304 (Feb)	92 (Mar)	206 (Nov)	191 (Mar)	166
Ruff*	826	0	18 (Mar)	14 (Jan)	(0)	5 (Apr)	9
Dunlin*	395,162	0	2 (Dec)	0	(0)	0	1
Redshank*	78,899	2 (May)	6 (Dec)	1 (Apr)	4 (Nov)	6 (Feb)	4
Black-headed gull	229,818	381 (Dec)	(380) (Jan)	1,005 (Dec)	754 (Nov)	150 (Jan)	573
Lesser black-backed gull*	23,249	0	2 (Mar)	1 (Dec)	(0)	2 (Feb)	1

* Numbers in parentheses are known undercounts.

Table 5P 3.8 Five-year WeBS summary for Weaver Estuary

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Canada goose	87,406	351 (Feb)	546 (Mar)	452 (Feb)	255 (Feb)	883 (Feb)	497
Whooper swan*	6,243	(0)	0	0	0	1 (Sep)	0
Shelduck*	40,821	198 (Jun)	185 (Apr)	180 (Apr)	182 (May)	52 (Jun)	159
Wigeon*	345,032	2 (Sep)	(1) (Jan)	(20) (Jan)	36 (Jan)	4 (Nov)	16
Pintail*	22,995	9 (Mar)	12 (Feb)	5 (Oct)	2 (Oct)	20 (Feb)	10
Teal*	184,716	114 (Dec)	254 (Nov)	95 (Oct)	281 (Feb)	542 (Jan)	257
Oystercatcher*	219,407	10 (Mar)	7 (Apr)	11 (Jul)	6 (Mar)	17 (Apr)	10
Avocet	11,609	14 (May)	4 (Apr)	15 (Jul)	59 (Jun)	9 (May)	20

Species	GB population	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Ringed plover*	15,216	2 (Mar)	4 (Apr)	0	0	1 (May)	1
Curlew*	59,465	(0)	45 (Mar)	2 (Sep)	8 (Feb)	1 (Sep)	14
Black-tailed godwit*	49,021	16 (Nov)	7 (Sep)	46 (Sep)	14 (Oct)	140 (Aug)	45
Knot*	269,590	(0)	0	0	0	1 (Feb)	0
Ruff*	826	(3) (Jul)	7 (Aug)	3 (Aug)	4 (Oct)	0	4
Dunlin*	395,162	(0)	(1) (Jan)	0	2 (Aug)	0	1
Redshank*	78,899	(87) (Jul)	42 (Jul)	14 (Aug)	157 (Sep)	329 (Mar)	136
Black-headed gull	229,818	390 (Dec)	682 (Jul)	515 (Jul)	1,500 (Jun)	28 (Sep)	623
Lesser back-backed gull*	23,249	(0)	0	1 (Jun)	1 (Jun)	14 (May)	4

* Numbers in parentheses are known undercounts.

Table 5P 3.9 Five-year WeBS summary for Weston Marshes

Species	GB population (individuals)	2016/17	2017/18	2018/19	2019/20	2020/21	Mean peak
Shelduck*	40,821	15 (Apr)	6 (Apr)	2 (Apr)	2 (May)	6 (Jul)	6
Teal*	184,716	8 (Sep)	32 (Mar)	2 (Sep)	0	20 (Mar)	12
Oystercatcher*	219,407	(0)	2 (Apr)	0	0	0	1
Ringed plover*	15,216	(0)	0	0	0	1 (Apr)	0
Curlew*	59,465	26 (Apr)	0	0	0	0	5
Black-tailed godwit*	49,021	(0)	2 (Mar)	0	1 (Aug)	7 (Apr)	3
Ruff*	826	(0)	0	0	0	2 (Apr)	1
Redshank*	78,899	4 (Nov)	0	0	1 (Feb)	1 (Apr)	1

* Numbers in parentheses are known undercounts.

- 3.3.12 CAWOS data was received for the entire Draft Order Limits plus a minimum of a 2km buffer (originally the data request covered the Preliminary Order Limits as outlined within the PEIR, hence a minimum buffer of 2km). The data identified similar areas of FLL as those detailed above, including those within ~500m of the Draft Order Limits such as Frodsham Marsh, Ince Marshes, the Weaver Bend, Moore Nature Reserve, Fiddler's Ferry and Richmond Bank.

Field Survey

- 3.3.13 Wintering bird surveys conducted by WSP from October 2020 to March 2021 inclusive (Cadent, 2021¹⁶), recorded a total of 115 bird species, of which six are qualifying species of the Mersey Estuary SPA (shelduck, teal, pintail, golden plover, black-tailed godwit and redshank).
- 3.3.14 Wintering waterbird surveys undertaken by Wood (now WSP) from October 2021 to February 2022 inclusive, focussed on areas of potential FLL highlighted from the desk study process and preliminary surveys undertaken between October 2020 and March 2021 (these areas relate to Transects 5, 6, 7b, 13b and 14, as illustrated in Draft ES **Appendix 5M Figure 5M.2** and/or **Appendix 5O Figure 5O.3**). These areas comprised Ince Marshes (Transect 5), Lordship Lane Fields and Frodsham Sludge Lagoons (Transect 6), the Weaver Bend (Transect 7b), Moore Nature Reserve and Moss Side (Transect 13b), and the area around Fiddler's Ferry, including the Sankey Canal and River Mersey (Transect 14)²³. Full details of the survey methods and results from winter 2020/21 are detailed within Draft ES **Appendix 5M** along with supporting figures.
- 3.3.15 Surveys in winter 2020/21 recorded the following seven Mersey Estuary SPA and/or Ramsar Site qualifying species within the Study Area: shelduck, teal, pintail, golden plover, black-tailed godwit, dunlin and redshank. Several assemblage species were also recorded within the Study Area including whooper swan, wigeon, shoveler, lapwing, curlew, and black-headed gull.
- 3.3.16 Only shelduck, teal, pintail, black-tailed godwit, redshank and shoveler were recorded in notable numbers, with distribution largely restricted to the Ince Marshes, a high tide roost site at Frodsham Sludge Lagoon (functionally linked to the SPA)²⁴, and around the 'Weaver Bend' (a large meander in the River Weaver, also functionally linked to the SPA). Other areas of potential FLL identified by the Bowland Ecology (2021) study did not hold significant numbers of qualifying nor

²³ Potential FLL at Woolston Eyes was not surveyed as a large industrial area screens the Project from this area.

²⁴ Natural England. (2015). Review and analysis of changes in waterbird use of the Mersey Estuary SPA, Mersey Narrows & North Wirral Foreshore pSPA and Ribble & Alt Estuaries SPA (NECR173). 27 May 2015. Annex II: Roost locations by species at a regional level. (online) Available at: <http://publications.naturalengland.org.uk/file/5495789449117696> (Accessed 28 October 2021).

assemblage species on a regular basis across the survey period (i.e. Transects 13b and 14).

- 3.3.17 Pink-footed goose, a qualifying species of the Dee Estuary Ramsar Site and Ribble and Alt Estuaries SPA and Ramsar Site, were also recorded overflying the Study Area (although the Study Area lies at the upper limits of their foraging range from roost sites in the Dee, Ribble and Alt estuaries)²⁵.
- 3.3.18 Non-breeding waterbird surveys were also carried out by WSP between January and June 2024, with further surveys scheduled between September and December 2024. These surveys recorded the same seven Mersey Estuary SPA and/or Ramsar Site qualifying species as in winter 2020/21. Several assemblage species were also recorded within the Study Area including wigeon, lapwing and curlew. Only shelduck, teal, pintail, black-tailed godwit, and shoveler were recorded in notable numbers, with distribution largely restricted to the high tide roost site at Frodsham Sludge Lagoon, Lordship Lane Fields, Moorditch and around the 'Weaver Bend'. Other areas of potential FLL identified by the Bowland Ecology (2021) study did not hold significant numbers of qualifying nor assemblage species on a regular basis across the survey period.
- 3.3.19 Qualifying species from European sites within the 20km search area were also recorded within the Study Area, including whooper swan, pink-footed goose and ruff (qualifying species of the Ribble and Alt Estuaries SPA and Ramsar Site)²⁶.
- 3.3.20 Full details of the survey results from January to June 2024 are detailed within Draft ES **Appendix 5O**.

3.4 Potential Impact Pathways

- 3.4.1 This step identifies whether impacts of the Project (during construction, operation and decommissioning) described in Step 2 (see **Section 2**) have the potential to result in LSE on the qualifying features of these European sites.
- 3.4.2 The main mechanisms by which the Project could affect European sites are through either direct or indirect impact pathways, and described as follows:

²⁵ Brides, K., Mitchell, C. & Hearn R.D. (2013). Mapping the distribution of feeding Pink-footed Geese in England. Wildfowl & Wetlands Trust / Natural England Report, Slimbridge. 43pp. (online) Available at: <https://monitoring.wwt.org.uk/wp-content/uploads/2018/12/Mapping-feeding-Pinkfeet-in-England-Final-report-vFinal.Jan15-2.pdf> (Accessed 22 March 2022).

²⁶ There is potential that the whooper swan and ruff records form part of the Mersey Estuary SPA "non-qualifying species of interest" that occur; and also that the pink-footed goose records, albeit within connectivity distance of the Ribble and Alt Estuaries SPA and Ramsar Site, relate to birds using the newly established high tide roost site at Stanlow Banks in the Mersey Estuary.

Construction

- 3.4.3 **Land take.** Temporary land take/land use change and fragmentation of functionally linked land (of qualifying features of SPAs/Ramsar Sites) from pipeline construction, resulting in potential habitat loss or degradation and/or affect distribution of features of internationally designated sites. This could result in the reduction of available foraging habitat and therefore leading to a reduction in survival or productivity rates.
- 3.4.4 **Fragmentation of habitats.** Where habitats are fragmented and/or cause barrier effects during the construction phase resulting in a reduction in connectivity between FLL. This could result in an increase in energy expenditure leading to a reduction in survival or productivity rates.
- 3.4.5 **Construction activity including use of plant and presence of workforce.** The production of aural and visual stimuli due to noise, vibration, movement of construction vehicles and operatives has the potential to result in disturbance/displacement of birds from SPA/Ramsar Site functionally linked land (if present). This could result in the reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.
- 3.4.6 **Use of chemicals (e.g., fuels, solvents etc.) and the liberation of fine material (e.g., through excavation).** Loss of pollutants or fine material from the Site due to surface water flows during rainfall events or through other hydrological links (e.g. seepage). The introduction of toxic pollutants or sediments resulting in loss of, or damage to terrestrial or freshwater environments leading to effects on habitats and species (as qualifying features of European sites).
- 3.4.7 **Use of construction vehicles (including those along highway routes accessing the Project) and generator sets.** The deposition of oxides of nitrogen and concentrations of NO_x in air from vehicle emissions has the potential to result in enrichment and/or acidification of the environment. This effect/impact could lead to the alteration of the plant community through changes in baseline conditions, resulting in effects on habitats and species (as qualifying features of SACs and SPAs).
- 3.4.8 **Dust creation during construction activity.** The deposition of dust has the potential to result in loss of or damage to terrestrial or freshwater environments from smothering or enrichment resulting in effects on habitats and species (as qualifying features of SACs and SPAs).

Operation

- 3.4.9 **Use of plant and presence of workforce.** The production of aural and visual stimuli due to noise, vibration, movement of vehicles and operatives has the potential to result in disturbance/displacement of birds from functionally linked land (qualifying features of SPAs/Ramsar Sites). This could result in the reduction of energy intake and/or an increase in energy expenditure, leading to a reduction in survival or productivity rates.

- 3.4.10 **Vehicles (along highway routes accessing the Project).** The deposition of nitrogen oxides from engine exhausts derived from vehicles moving to and from the Project has the potential to result in enrichment and/or acidification of the environment. This could lead to the alteration of the plant community through changes in baseline conditions, resulting in effects on habitats and species (as qualifying features of SACs, SPAs and Ramsar Sites).

Decommissioning

- 3.4.11 The environmental changes and effects due to the decommissioning phase have been considered to be the same as for the construction phase, although it is likely that effects from this phase of the development would have a smaller impact than that predicted during the construction phase.

3.5 High Level Screening

- 3.5.1 **Table 5P 3.10** provides a high-level screening exercise of each potential environmental change and effect due to the Project during construction, operation and decommissioning, and its geographic extent. Where there is likely to be no connectivity between the Project and European sites qualifying features, and due to sites falling outwith the corresponding study area, these sites were not taken forward for further consideration (in **Section 4**).

Table 5P 3.10 High Level Screening Table of Environmental Changes and Potential Effects of the Project

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
Construction and decommissioning phase(s)						
Land take (i.e. construction of pipeline and other infrastructure)	Temporary/permanent land take/land use change and fragmentation of functionally linked land (of qualifying features of SPAs/Ramsar Sites).	Potential indirect habitat loss or degradation (of FLL) and/or affect distribution of mobile qualifying features of European Sites resulting in the reduction of available foraging habitat and therefore leading to a reduction in survival or productivity rates.	The Project Draft Order Limits	The are no European sites within the Project Draft Order Limits. Potential FLL is present within the Project Draft Order Limits.	Yes	Mersey Estuary SPA & Ramsar Site
Fragmentation of habitats (or barrier effects)	Where habitats are fragmented and/or cause barrier effects during the construction phase resulting in a reduction in connectivity between FLL.	This could result in an increase in energy expenditure leading to a reduction in survival or productivity rates.	The Project Draft Order Limits	The are no European sites within the Project Draft Order Limits. Potential FLL is present within the Project Draft Order Limits.	No	None

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
				However, it is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as birds will be free to move across the Draft Order Limits, which are considered to be relatively narrow at their widest point within FLL with respect to birds moving between connected habitats.		

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
Construction activity including use of plant and presence of workforce	Production of aural and visual stimuli due to noise and vibration and movement of construction vehicles and engineers.	Disturbance/displacement of mobile qualifying features of European Sites resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	Within 500m of the Project. This is a precautionary distance based on information reported on disturbance in the literature (e.g., Cutts, Phelps & Burdon 2009 ²⁷ ; Goodship & Furness, 2022 ²⁸).	The are no European sites within 500m of the Project. Potential FLL is present within 500m of the Project.	Yes	Mersey Estuary SPA & Ramsar Site
Use of chemicals (e.g., fuels, solvents etc.) and the	Loss of pollutants or fine material from the Site due to surface water flows during rainfall events and	The introduction of toxic pollutants or sediments resulting in loss of, or damage to terrestrial or freshwater environments	Within 50m of the Project. This geographic parameter is based on	The are no European sites within 50m of the Project.	Yes	Mersey Estuary SPA & Ramsar Site

²⁷ Cutts, N., Phelps, A. & Burdon, D. (2009). Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance. Report to Humber INCA. Institute of Estuarine and Coastal Studies, University of Hull.

²⁸ Goodship, N.M. and Furness, R.W. (MacArthur Green). (2022). Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283. (Accessed August 2024).

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
liberation of fine material (e.g., through excavation)	through other hydrological links (e.g. seepage into watercourses).	leading to effects on habitats and species (as qualifying features of European sites).	professional judgement following a review of the Environment Agency Pollution Prevention Guidance PPG5 ²⁹ (which suggests control of impacts can be managed within 50m).	Potential FLL lies within 50m of the Project.		
Use of construction vehicles (including those along highway routes)	Deposition of oxides of nitrogen and NOx in air from engine exhausts.	Deposition of oxides of nitrogen and concentrations of NOx in air from vehicle emissions resulting in enrichment and/or acidification of the environment leading to	Within 200m of the Project and/or wider road network. This geographic parameter is based on	There are no European sites within 200m of the Project but there are two European sites within 200m of	Yes	Manchester Mosses SAC; & Rostherne Mere Ramsar Site

²⁹ Environment Agency (2007). Pollution Prevention Guidelines: Works and maintenance in or near water: PPG5. (online) Available at: <https://webarchive.nationalarchives.gov.uk/ukgwa/20140328090931/http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx> (Accessed July 2022).

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
accessing the Project) and generator sets		alteration of the plant community through changes in baseline conditions resulting in effects on habitats and species (as qualifying features of European sites).	Department for Transport (2005) Interim Advice Note 61/04: Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs ³⁰ .	the wider road network. Potential FLL relating to the Mersey Estuary SPA and Ramsar Site is present within 200m of the Project, although this is mainly farmland (or within farmland), a habitat that already receives high levels of chemical input as part of farm management		

³⁰ Department of Transport (2005). Interim Advice Note 61/04. Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs (Supplement to Design Manual for Roads and Bridges 11.3.1) Technical Guidance LAQM.TG (09).

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
				and, therefore is considered not to be adversely affected by emissions from the Project.		
Dust creation during construction activity	Deposition of dust in areas neighbouring the Site.	Deposition of dust resulting in loss of or damage to terrestrial or freshwater environments from smothering or enrichment resulting in effects on habitats and species (as qualifying features of SACs) and birds (as qualifying features of SPAs/Ramsar Sites).	Within 50m of the Project, and 250m of the Project access points. IAQM guidance is to assess ecological receptors which are within 50m of the construction site and within 250m of any Site entrance(s).	The are no European sites within 500m of the Project. There is potential FLL present within 50m of the Project (or 500m of proposed site entrances).	Yes	Mersey Estuary SPA & Ramsar Site
Operational phase						

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
Operational activities (including presence of workforce)	Production of aural and visual stimuli due to noise and vibration from machinery and their operatives during operational activities.	Disturbance/displacement of birds (qualifying features of qualifying features of SPA/Ramsar Sites) resulting in a reduction of energy intake and/or an increase in energy expenditure leading to a reduction in survival or productivity rates.	Within 500m of the Project. This is a precautionary distance based on information reported on disturbance in the literature (e.g., Cutts, Phelps & Burdon 2009; Goodship & Furness, 2022).	The are no European sites within 500m of the Project. Potential FLL is present within 500m of the Project.	Yes	Mersey Estuary SPA & Ramsar Site
Vehicles (along highway routes to access the Project)	Deposition of oxides of nitrogen from engine exhausts.	Deposition of oxides of nitrogen from vehicle emissions resulting in enrichment and/or acidification of the environment, leading to alteration of the plant community through changes in baseline conditions, resulting in effects on habitats and species (as qualifying	European sites within 200m of the Project boundary and/or major road links with it (the wider road network). This geographic parameter is based on Department for Transport	There are no European sites within 200m of the Project; but there are two European sites within 200m of the wider road network	Yes	Manchester Mosses SAC; & Rostherne Mere Ramsar Site

Activity	Potential Change	Potential Effect	Geographic Extent (Zone of Influence)	Rationale	Screened in?	European sites potentially affected
		features of SACs and SPAs)	(2005) Interim Advice Note 61/04: Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs.			

3.6 In-Combination Effects

- 3.6.1 As part of the HRA screening process, information on other projects and plans that have been subject to a HRA in relation to the European designated sites being assessed is required to allow an assessment of any 'in-combination' effects of the Project with other schemes that may affect the European sites.
- 3.6.2 The screening assessment provided within this HRA takes into account the CJEU ruling on 'People over Wind'³¹. It has also adopted a strong precautionary principle; if a pathway of effect is established between the Project and a European Site, then that site is taken through to Appropriate Assessment. This ensures all effects are captured, including *de minimis* effects.
- 3.6.3 Only those qualifying features and European sites where it can be demonstrated that there is no likelihood of an LSE occurring have been screened out.
- 3.6.4 Therefore, due to the precautionary approach taken to the screening process and identification of LSEs for the Project, in-combination effects will only need to be considered if it is found that the Project is likely to result in LSE on the European sites being considered and detailed within the HRA Screening Assessment.
- 3.6.5 Other projects and plans with the potential to act in-combination with the Project were identified from assessing the shortlist detailed within Draft ES **Chapter 19: Cumulative Effects**. Those developments with the potential to impact European sites listed in **Table 5P 3.2** were identified and therefore require consideration within the in-combination assessment. These are as follows:
- Hydrogen Production Plant.
 - ENCIRC Automated Warehouse.
 - Protos Carbon Dioxide Spur Pipeline.
 - Protos ERF Carbon Capture Facility.
 - Protos Plastics Park.
 - HyNet CO2 Pipeline DCO.
 - Sandymoor South Phase 2.

³¹ Case C-323/17 People Over Wind & Peter Sweetman v Coillte Teoranta ("People over Wind"). [CURIA - Documents \(europa.eu\)](https://eur-lex.europa.eu/curia/doclist/curia.do?method=DoclistDocView&docid=862022)

4. HRA Screening Step 4: Assessing the Presence of Likely Significance Effects on European Sites

4.1 Introduction

- 4.1.1 This step identifies whether the Project described in Step 2 (**Section 2**) and potential effects (in **Table 5P 3.10**) taken forward for further consideration in Step 4 have the potential to cause LSE on the qualifying features of those European sites identified in Step 3 (**Table 5P 3.2**). The potential effects taken forward for further consideration are detailed below³².

4.2 Mersey Estuary SPA/Ramsar Site

Effects of temporary/permanent land take/land use change and fragmentation on potential FLL, and resultant displacement of qualifying bird species

Construction and Decommissioning phases

- 4.2.1 There is no permanent infrastructure (e.g. HAGIs) proposed within areas of potential FLL and therefore there would be no LSE on Mersey Estuary qualifying and assemblage species as a result of the construction of these HAGIs.
- 4.2.2 There will be approximately 49.2 hectares of temporary habitat loss of potential FLL within Frodsham, Helsby and Ince Marshes Local Wildlife Site (LWS) as a result of the pipeline construction (this includes FLL at Frodsham Sludge Lagoons, Lordship Lane Fields and the Weaver Estuary). There is no other proposed temporary habitat loss of potential FLL (at Weaver Estuary to Catton Hall, Woolston Eyes, Runcorn Sands and Astmoor Saltmarsh, and/or Fiddler's Ferry Power Station Lagoons) relating to the Project.
- 4.2.3 Summarised details of the monthly peak counts of each species recorded within the Draft Order Limits are presented in **Table 5P 4.1** and **Table 5P 4.2**. The percentage of the most recent five-year moving average for the Mersey Estuary waterbird populations is also presented, with those highlighted noting where surveys have recorded more than 1% of each respective species.

³² Please note that certain impact pathways taken forward here were not identified within the original HRA NSER and it is considered that those pathways presented here are an exhaustive list.

Table 5P 4.1 Non-breeding waterbird usage of draft Order Limits – October 2021 to February 2022

Species	Peak monthly count within draft Order Limits					Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)				
	O	N	D	J	F		O	N	D	J	F
Qualifying species											
Shelduck	2	0	0	0	0	13,704	0.01	N/A	N/A	N/A	N/A
Teal	0	0	0	1	0	4,394	N/A	N/A	N/A	0.02	N/A
Assemblage species											
Black-headed gull	0	298	162	0	0	12,162	N/A	2.45	1.33	N/A	N/A
Canada goose	0	0	0	26	0	10,191	N/A	N/A	N/A	0.26	N/A
Common gull	0	0	2	0	0	337	N/A	N/A	0.59	N/A	N/A
Coot	0	0	7	0	1	228	N/A	N/A	3.07	N/A	0.44
Curlew	0	0	20	0	29	1,541	N/A	N/A	1.30	N/A	1.88
Great crested grebe	0	0	0	0	1	65	N/A	N/A	N/A	N/A	1.54
Herring gull	0	6	0	0	0	1,584	N/A	0.38	N/A	N/A	N/A
Mallard	4	4	0	0	8	875	0.46	0.46	N/A	N/A	0.91

Species	Peak monthly count within draft Order Limits					Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)				
	O	N	D	J	F		O	N	D	J	F
Moorhen	1	13	20	0	0	53	1.89	24.53	37.74	N/A	N/A
Mute swan	0	0	2	0	0	53	N/A	N/A	3.77	N/A	N/A
Oystercatcher	0	0	0	1	0	1,005	N/A	N/A	N/A	0.10	N/A
Tufted duck	0	0	0	2	0	387	N/A	N/A	N/A	0.52	N/A

Table 5P 4.2 Non-breeding waterbird usage of draft Order Limits – January to June 2024

Species	Peak monthly count of waterbirds within draft Order Limits						Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)					
	J	F	M	A	M	J		J	F	M	A	M	J
Assemblage species													
Cormorant	1	0	0	0	0	0	710	0.14	N/A	N/A	N/A	N/A	N/A
Canada goose	0	14	0	0	0	0	10,191	N/A	0.14	N/A	N/A	N/A	N/A
Coot	0	0	1	0	0	0	228	N/A	N/A	0.44	N/A	N/A	N/A
Little egret	0	1	0	0	0	0	126	N/A	0.79	N/A	N/A	N/A	N/A
Gadwall	0	0	0	2	0	0	109	N/A	N/A	N/A	1.83	N/A	N/A
Lapwing	0	0	4	0	0	8	6,201	N/A	N/A	0.06	N/A	N/A	0.13
Mallard	0	2	8	4	18	0	875	N/A	0.23	0.91	0.46	2.06	N/A
Moorhen	1	1	1	1	0	0	53	1.89	1.89	1.89	1.89	N/A	N/A
Mute swan	0	1	0	0	0	0	53	N/A	1.89	N/A	N/A	N/A	N/A
Oystercatcher	0	0	0	0	0	2	1,005	N/A	N/A	N/A	N/A	N/A	0.20
Whooper swan	0	21	0	0	0	0	26	N/A	80.77	N/A	N/A	N/A	N/A

- 4.2.4 Although there were only limited numbers of records of Mersey Estuary SPA/Ramsar Site qualifying species within the Draft Order Limits during the targeted non-breeding waterbird surveys in winter 2021/22 (limited to two shelduck and a single teal) and January to June 2024, there was a single incidental record of 150 black-tailed godwit loafing within the Draft Order Limits on 11 April 2022. All these records are from the areas around Lordship Lane fields (see Draft ES **Figures 5M.3 and 5O.4**). Seven assemblage species were recorded in numbers greater than 1% of the most recent Mersey Estuary population across the two survey periods, with considerably lower numbers of birds recorded in 2024 than in winter 2021/22. The dataset shows that the area proposed to be temporarily or permanently lost as a result of construction of the pipeline is not “regularly used” by “significant numbers” of qualifying or assemblage species and therefore LSEs from land take can be screened out of the assessment.

Effects of disturbance and resultant displacement on qualifying bird species using potential FLL

Construction and Decommissioning phases

- 4.2.5 There is the potential for qualifying bird species of the Mersey Estuary SPA and Ramsar Site to be deterred from using FLL surrounding (and within) the Project for foraging and roosting, due to disturbance during construction and decommissioning of the Project (due to noise, vehicles, machinery and the presence of operatives).
- 4.2.6 Based on the distributions and known habitat preferences of the qualifying features of the Mersey Estuary SPA and Ramsar Site, which are listed in Table 5P 3.2, all qualifying species (shelduck, teal, pintail, golden plover, black-tailed godwit, dunlin and redshank) could potentially utilise FLL within the Project and/or within a 500m buffer. Potentially FLL was identified through the desk study, with wintering waterbird surveys focussing on these key areas.
- 4.2.7 Summarised details of peak counts of each species recorded within the Draft Order Limits and 500m buffer are presented in **Table 5P 4.3** and **Table 5P 4.4**. The percentage of the most recent five-year moving average for the Mersey Estuary waterbird populations is also presented, with those highlighted noting where surveys have recorded more than 1% of each respective species.

Table 5P 4.3 Non-breeding waterbird usage of draft Order Limits plus 500m buffer – October 2021 to February 2022

Species	Peak monthly count of waterbirds within draft Order Limits plus 500m buffer					Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)				
	O	N	D	J	F		O	N	D	J	F
Qualifying species											
Black-tailed godwit	956	743	496	28	344	12,162	7.86	6.11	4.08	0.23	2.83
Golden plover	0	0	0	0	25	2,068	N/A	N/A	N/A	N/A	1.21
Pintail	109	54	80	86	98	218	50.00	24.77	36.70	39.45	44.95
Redshank	0	1	8	8	9	9,018	N/A	0.01	0.09	0.09	0.10
Shelduck	0	178	1	50	48	13,704	N/A	1.30	0.01	0.36	0.35
Teal	141	981	580	448	476	4,394	3.21	22.33	13.20	10.20	10.83
Assemblage species											
Black-headed gull	2,726	926	213	500	265	12,162	22.41	7.61	1.75	4.11	2.18
Cormorant	3	5	14	3	4	710	0.42	0.70	1.97	0.42	0.56
Canada goose	0	16	17	26	4	10,191	N/A	0.16	0.17	0.26	0.04
Common gull	0	5	2	6	11	337	N/A	1.48	0.59	1.78	3.26

Species	Peak monthly count of waterbirds within draft Order Limits plus 500m buffer					Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)				
	O	N	D	J	F		O	N	D	J	F
Coot	14	80	33	35	39	228	6.14	35.09	14.47	15.35	17.11
Curlew	27	129	100	159	151	1,541	1.75	8.37	6.49	10.32	9.80
Cattle egret	0	8	3	0	1	4	N/A	200.00	75.00	N/A	25.00
Little egret	0	35	13	3	17	126	N/A	27.78	10.32	2.38	13.49
Gadwall	32	30	25	20	21	109	29.36	27.52	22.94	18.35	19.27
Great black-backed gull	0	3	0	0	0	594	N/A	0.51	N/A	N/A	N/A
Green sandpiper	0	1	0	2	2	3	N/A	33.33	N/A	66.67	66.67
Great crested grebe	0	3	0	0	3	65	N/A	4.62	N/A	N/A	4.62
Greylag goose	0	0	0	0	2	71	N/A	N/A	N/A	N/A	2.82
Goldeneye	0	1	3	1	0	21	N/A	4.76	14.29	4.76	N/A
Grey heron	3	3	4	5	2	97	3.09	3.09	4.12	5.15	2.06
Herring gull	30	25	0	30	2	1,584	1.89	1.58	N/A	1.89	0.13

Species	Peak monthly count of waterbirds within draft Order Limits plus 500m buffer					Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)				
	O	N	D	J	F		O	N	D	J	F
Great white egret	0	0	0	0	2	11	N/A	N/A	N/A	N/A	18.18
Jack snipe	0	0	0	0	1	10	N/A	N/A	N/A	N/A	10.00
Kingfisher	0	2	1	0	1	4	N/A	50.00	25.00	N/A	25.00
Lapwing	750	505	130	971	2,003	6,201	12.09	8.14	2.10	15.66	32.30
Lesser black-backed gull	0	0	0	4	0	1,274	N/A	N/A	N/A	0.31	N/A
Little grebe	17	28	7	7	12	33	51.52	84.85	21.21	21.21	36.36
Mallard	30	34	105	46	107	875	3.43	3.89	12.00	5.26	12.23
Moorhen	20	23	26	28	35	53	37.74	43.40	49.06	52.83	66.04
Mute swan	0	6	12	5	5	53	N/A	11.32	22.64	9.43	9.43
Oystercatcher	0	0	0	2	1	1,005	N/A	0.00	N/A	0.20	0.10
Pochard	1	28	15	19	40	52	1.92	53.85	28.85	36.54	76.92
Ruff	0	2	0	0	0	16	N/A	12.50	N/A	N/A	N/A
Snipe	37	7	0	0	6	67	55.22	10.45	0.00	N/A	8.96

Species	Peak monthly count of waterbirds within draft Order Limits plus 500m buffer					Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)				
	O	N	D	J	F		O	N	D	J	F
Shoveler	329	209	60	32	186	227	144.93	92.07	26.43	14.10	81.94
Tufted duck	2	29	80	12	122	387	0.52	7.49	20.67	3.10	31.52
Water rail	0	1	0	2	1	5	N/A	20.00	N/A	40.00	20.00
Wigeon	65	555	400	32	38	2,059	3.16	26.95	19.43	1.55	1.85
Whooper swan	4	17	20	26	29	26	15.38	65.38	76.92	100.00	111.54

Table 5P 4.4 Non-breeding waterbird usage of draft Order Limits plus 500m buffer – January to June 2024

Species	Peak monthly count of waterbirds within draft Order Limits plus 500m buffer						Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)					
	J	F	M	A	M	J		J	F	M	A	M	J
Qualifying species													
Black-tailed godwit	125	165	379	250	4	0	12,162	1.03	1.36	3.12	2.06	0.03	N/A
Dunlin	0	10	0	0	0	0	41,318	N/A	0.02	N/A	N/A	N/A	N/A
Golden plover	50	0	45	0	0	0	2,068	2.42	N/A	2.18	N/A	N/A	N/A
Pintail	27	60	0	18	0	0	218	12.39	27.52	N/A	8.26	N/A	N/A
Redshank	7	3	0	2	0	0	9,018	0.08	0.03	N/A	0.02	N/A	N/A
Shelduck	40	250	13	47	1	20	13,704	0.29	1.82	0.09	0.34	0.01	0.15
Teal	550	207	87	95	0	0	4,394	12.52	4.71	1.98	2.16	N/A	N/A
Assemblage species													
Black-headed gull	0	0	3	0	0	0	12,162	N/A	N/A	0.02	N/A	N/A	N/A
Cormorant	38	18	4	0	0	0	710	5.35	2.54	0.56	0.00	N/A	N/A
Canada goose	6	20	36	1	30	0	10,191	0.06	0.20	0.35	0.01	0.29	N/A

Species	Peak monthly count of waterbirds within draft Order Limits plus 500m buffer						Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)					
	J	F	M	A	M	J		J	F	M	A	M	J
Coot	55	28	29	8	1	2	228	24.12	12.28	12.72	3.51	0.44	0.88
Curlew	74	14	12	10	0	0	1,541	4.80	0.91	0.78	0.65	N/A	N/A
Cattle egret	15	11	0	0	0	0	4	375.00	275.00	N/A	N/A	N/A	N/A
Little egret	28	2	0	0	0	0	126	22.22	1.59	N/A	N/A	N/A	N/A
Gadwall	13	16	19	5	3	0	109	11.93	14.68	17.43	4.59	2.75	N/A
Great crested grebe	2	8	8	0	0	0	65	3.08	12.31	12.31	N/A	N/A	N/A
Greylag goose	0	0	1	0	0	0	71	N/A	N/A	1.41	N/A	N/A	N/A
Goldeneye	2	0	0	0	0	0	21	9.52	N/A	N/A	N/A	N/A	N/A
Grey heron	3	2	1	0	1	0	97	3.09	2.06	1.03	N/A	1.03	N/A
Kingfisher	0	1	2	0	0	0	4	N/A	25.00	50.00	N/A	N/A	N/A
Lapwing	30	3	15	12	13	9	6,201	0.48	0.05	0.24	0.19	0.21	0.15
Little grebe	6	6	8	2	5	2	33	18.18	18.18	24.24	6.06	15.15	6.06
Mallard	62	105	55	31	23	15	875	7.09	12.00	6.29	3.54	2.63	1.71

Species	Peak monthly count of waterbirds within draft Order Limits plus 500m buffer						Moving 5yr average from WeBS core counts for Mersey Estuary (18/19 to 22/23)	Peak monthly count of birds expressed as a % of WeBS core counts for Mersey Estuary (2018/19 to 2022/23)					
	J	F	M	A	M	J		J	F	M	A	M	J
Moorhen	29	23	9	4	1	0	53	54.72	43.40	16.98	7.55	1.89	N/A
Mute swan	3	8	2	0	3	0	53	5.66	15.09	3.77	N/A	5.66	N/A
Oystercatcher	0	0	0	0	2	2	1,005	N/A	N/A	N/A	N/A	0.20	0.20
Pink-footed goose	145	0	0	0	0	0	8,169	1.78	N/A	N/A	N/A	N/A	N/A
Pochard	0	40	2	0	0	0	52	N/A	76.92	3.85	N/A	N/A	N/A
Ruff	12	0	1	0	0	0	16	75.00	N/A	6.25	N/A	N/A	N/A
Snipe	1	56	6	0	0	0	67	1.49	83.58	8.96	N/A	N/A	N/A
Shoveler	120	200	240	21	0	0	227	52.86	88.11	105.73	9.25	N/A	N/A
Tufted duck	14	207	54	152	65	25	387	3.62	53.49	13.95	39.28	16.80	6.46
Whimbrel	0	0	0	0	1	0	37	N/A	N/A	N/A	N/A	2.70	N/A
Wigeon	41	43	39	0	0	0	2,059	1.99	2.09	1.89	N/A	N/A	N/A
Whooper swan	0	21	19	0	0	0	26	N/A	80.77	73.08	N/A	N/A	N/A

* A flock of 24 snow geese were also recorded in May but it was considered these were part of the UK feral population.

- 4.2.8 Additionally, there were incidental records of waterbirds within 500m of the Draft Order Limits obtained during the Schedule 1 bird surveys between April and July 2022. These comprised:
- Avocet:
 - ▶ A peak count of two pairs at Frodsham Sludge Lagoon on 11 April.
 - Black-tailed godwit:
 - ▶ 1,500 at the Frodsham Sludge Lagoon, 150 on Lordship Lane Fields and ten on a seasonal pool on 11 April; and 1,730 at Frodsham Sludge Lagoon in late April; 2,160 and 1,050 at the Frodsham Sludge Lagoon in early and late May respectively; A peak count of 1,320 and 33 at the Frodsham Sludge Lagoon in early and late June respectively; and 110 at the Frodsham Sludge Lagoon in early July and 30 in late July).
 - Kingfisher:
 - ▶ Two pairs bred within 500m of the Draft Order Limits.
 - Pintail:
 - ▶ Records of a pair in April and May at a location within 500m of the Draft Order Limits; additionally four males and a single female also seen at Frodsham Sludge Lagoons in April.
 - Shelduck:
 - ▶ Records of pairs between May and June with a peak count of 39 birds.
- 4.2.9 There were also incidental records of waterbirds within 500m of the Draft Order Limits obtained during the Schedule 1 bird surveys undertaken between April and July 2024. These comprised:
- Cattle egret:
 - ▶ There were four records, one of a single bird in flight in late April, one of a single adult in breeding plumage in early June, and two records of five feeding and two in-flight in early July. All records were noted in proximity to the Frodsham Sludge Lagoons.
 - Kingfisher:
 - ▶ There were ten records; eight records around Dutton Locks, and two at Moore Nature Reserve.
- 4.2.10 Most records of SPA-qualifying species from the non-breeding waterbird surveys in winter 2020/21 related to birds roosting and/or feeding on a waterbody within Frodsham Sludge Lagoons at approximate grid reference SJ 500 780. This waterbody is a well-known high-tide roost site for SPA-qualifying black-tailed godwit, dunlin, shelduck, teal, golden plover and redshank (Natural England, 2015) and is therefore deemed to be functionally linked to the Mersey Estuary SPA (Bowland Ecology, 2021). The non-breeding waterbird surveys in winter 2021/22 confirmed that the waterbody was regularly used across the survey period by black-tailed godwit (peak count of 956 birds), pintail (peak count of 109 birds) and

teal (peak count of 984 birds). Shelduck and redshank were also recorded here but sporadically and in low numbers. Shelduck, pintail and teal continued to use Frodsham Sludge Lagoons in significant numbers during 2024. Although this waterbody lies ~50m from an established access route which is proposed to be used during the construction of the Project, a well-established bund (approximately ~10m high and 30m wide) associated with the Frodsham Sludge Lagoons lies between the FLL and the Draft Order Limits and would therefore negate any effects associated with visual and noise disturbance at this important high tide roost site.

- 4.2.11 During the 2024 survey period, black-tailed godwit were recorded at Frodsham Sludge Lagoons in lesser numbers but were more regularly recorded using wet grassland on Lordship Lane Fields, along with small numbers of golden plover and redshank. Lordship Lane Fields also supported qualifying and assemblage species during winter 2021/22, particularly during periods when the fields were flooded. The areas of habitat used by these species lie outside the Draft Order Limits but within a 500m buffer.
- 4.2.12 Ince Marshes also held over 1% of SPA-qualifying black-tailed godwit (peak count of 82 birds). A former industrial plant (CF Fertilisers) lies between the pipeline route and FLL ~1km to the north. This physical barrier negates any effects associated with visual and noise disturbance created from the construction, operational and/or decommissioning processes, although an access track along Marsh Lane (which is an established “green lane” access route used by vehicles and people) runs along the southern edge of the FLL and is proposed to be used during the construction of the Project.
- 4.2.13 The Weaver Estuary held important numbers of SPA-qualifying shelduck (peak count of 116 birds), teal (peak count of 166), pintail (peak count of 39), black-tailed godwit (peak count of 219) and redshank (peak count of 57) albeit sporadically over the winter period. The key area used by these birds falls outside a 500m buffer around the Draft Order Limits and therefore the species would not be impacted by any construction related activities.
- 4.2.14 It was considered that although Woolston Eyes forms high potential FLL within 500m of the Project, the spur terminus here lies between Woolston Eyes and a currently operational industrial plant and therefore no impact pathways on any qualifying species using such FLL are predicted due to this physical barrier.
- 4.2.15 The only pathway for effects associated with disturbance (and resulting displacement) from the construction and decommissioning of the Project, on qualifying/assemblage features using FLL, may occur around the Ince Marshes and Lordship Lane Fields.

Operational phase

- 4.2.16 There is the potential for qualifying bird species of the Mersey Estuary SPA and Ramsar Site to be deterred from using FLL surrounding (and within) the Project for foraging and roosting, due to disturbance during the operational phase of the Project. Operational activities would generally be irregular and/or short-term (e.g. aerial surveys are proposed to be typically undertaken every two weeks, although the final frequency will be determined during further design development and

engagement with the Health and Safety Executive). As described earlier, the inspection of the pipelines is undertaken internally from the inspection facilities at HAGIs with limited access to the buried pipeline route. It is anticipated that no pipeline maintenance would be required where excavation of the pipeline is required unless a defect is identified. Some infrequent maintenance surveys (every 2 to 7 years) may be required and would require access on foot (line walking) over the route of the pipeline, but do not require excavation or other intrusive activities.

- 4.2.17 Given that operational disturbance would be very occasional, short-term and of a temporary nature, it is considered that there is no pathways for any effects associated with disturbance on any qualifying features using FLL, and therefore no LSEs are identified.

Effects of water pollution on the European sites and/or associated potential FLL

Construction and decommissioning phases

- 4.2.18 Although the Mersey Estuary SPA/Ramsar Site does not fall within the 50m Zol for potential water pollution impacts from the Project, it is hydrologically linked to it via the network of ditches and drains across the Frodsham, Ince and Helsby Marshes that drain into the River Weaver and then into the Mersey Estuary.
- 4.2.19 LSEs cannot be screened out at the construction and decommissioning phases and therefore this impact pathway will be taken forward to Stage 2 – AA.

Effects of dust deposition on potential FLL

Construction and decommissioning phases

- 4.2.20 Although there are no European sites within the Zol, there is potential FLL present within 50m of the Project (or 250m of proposed site entrances).
- 4.2.21 LSEs cannot be screened out at the construction and decommissioning phases and therefore this impact pathway will be taken forward to Stage 2 – AA.

4.3 Manchester Mosses SAC

Effects of pollutants derived from engine exhausts using the wider road network

Construction and decommissioning phases

- 4.3.1 Manchester Mosses SAC falls within the 200m Zol for potential pollution impacts from the Project's associated usage of the wider road network.
- 4.3.2 LSEs cannot be screened out at construction/decommissioning stage and therefore this impact pathway will be taken forward to Stage 2 – AA.

Operational phase

- 4.3.3 Manchester Mosses SAC falls within the 200m Zol for potential pollution impacts from the Project's associated usage of the wider road network. However, considering that HAGIs would generally be monitored and operated remotely from an Energy Control Centre located off-site and any inspections of the pipeline would be occasional, it is considered that there is no pathway for LSEs from pollution via the wider road network.
- 4.3.4 Therefore, LSEs from the effects of pollutants derived from engine exhausts using the wider road network are screened out at the operational stage.

4.4 Rostherne Mere Ramsar Site

Effects of pollutants derived from engine exhausts using the wider road network

Construction and decommissioning phases

- 4.4.1 Rostherne Mere Ramsar Site falls within the 200m Zol for potential pollution impacts from the Project's associated usage of the wider road network.
- 4.4.2 LSEs cannot be screened out at construction/decommissioning stage and therefore this impact pathway will be taken forward to Stage 2 – AA.

Operational phase

- 4.4.3 Rostherne Mere Ramsar Site falls within the 200m Zol for potential pollution impacts from the Project's associated usage of the wider road network. However, considering that HAGIs would generally be monitored and operated remotely from an Energy Control Centre located off-site and any inspections of the pipeline would be occasional, it is considered that there is no pathway for LSEs from pollution via the wider road network.
- 4.4.4 Therefore, LSEs from the effects of pollutants derived from engine exhausts using the wider road network are screened out at the operational stage.

4.5 In-Combination Effects

- 4.5.1 It is considered that those effects screened out could not result in any in-combination effects. All other potential effects on European sites (and qualifying/assemblage species/habitats) from the Project are screened in and therefore in-combination effects are not discussed in detail at this stage.

4.6 Conclusion

- 4.6.1 A summary of the conclusions set out in **Section 4** is provided in **Table 5P 4.5**. Each European site and its qualifying features are listed with a screening rationale on whether potential for any LSE is predicted.

Table 5P 4.5 Screened in European sites, Screening Rationale and Potential for LSE

Site name	Qualifying Feature(s)	Screening Rationale	Potential for LSE	In-combination potential for LSE
Construction and decommissioning phases				
Mersey Estuary SPA	Non-breeding: shelduck, teal, pintail, golden plover, dunlin, black-tailed godwit and redshank. Waterbird assemblage.	<i>Land take – permanent and/or temporary</i> Survey data gathered over winter 2021/22 and between January and June 2024 have shown that the Draft Order Limits do not support regular usage by significant numbers of qualifying or assemblage species. Consequently, there would be no pathway for LSE on any SPA qualifying/assemblage features associated with temporary land take as a result of the Project.	No	Yes
		<i>Visual, noise (and vibration) and lighting disturbance</i> There is evidence that SPA qualifying/assemblage species use areas of FLL within 500m of the Project for foraging and loafing/roosting, particularly during the core winter period. Therefore, there is a potential pathway for LSE during the construction and decommissioning phases of the Project. The FLL of the Frodsham Sludge Lagoons is ~50m from the Draft Order Limits but is screened by a 10m high, 30m wide earth bund. Therefore, it is unlikely that there would be impacts from disturbance and displacement during the construction phase of the Project at this locality. However, some areas of FLL at Lordship Lane Fields and Ince Marshes fall within 500m of the Project and in a direct line of sight. Consequently, there is a potential pathway for LSE on the SPA qualifying/assemblage	Yes	Yes

Site name	Qualifying Feature(s)	Screening Rationale	Potential for LSE	In-combination potential for LSE
		features associated with disturbance (and resultant displacement) as a result of the Project.		
		<i>Water pollution</i> Although the SPA does not fall within the 50m ZoI for potential water pollution impacts from the Project, it is hydrologically linked to it via the network of ditches and drains across the Frodsham, Ince and Helsby Marshes that drain into the River Weaver and then into the Mersey Estuary. Consequently, there is a potential pathway for LSE on the SPA qualifying/assemblage features associated with water pollution (in the absence of mitigation) as a result of the Project.	Yes	Yes
		<i>Dust pollution</i> Although the SPA does not fall within the within the ZoI, there is potential FLL present within 50m of the Project (or 250m of proposed site entrances). Consequently, there is a potential pathway for LSE on the SPA qualifying/ assemblage features associated with dust pollution (in the absence of mitigation) as a result of the Project.	Yes	Yes
Mersey Estuary Ramsar Site	Populations of international importance in the spring / autumn of shelduck, black-tailed godwit and redshank;	<i>Land take – permanent and/or temporary</i> Survey data gathered over winter 2021/22 and between January and June 2024 have shown that the Draft Order Limits do not support regular usage by significant numbers of qualifying or assemblage species. Consequently, there would	No	Yes

Site name	Qualifying Feature(s)	Screening Rationale	Potential for LSE	In-combination potential for LSE
	and in the winter of teal, pintail and dunlin.	be no pathway for LSE on any SPA qualifying/ assemblage features associated with land take as a result of the Project.		
		<i>Visual, noise (and vibration) and lighting disturbance</i> There is evidence that Ramsar Site qualifying/assemblage species use areas of FLL within 500m of the Project for foraging and loafing/roosting, particularly during the core winter period. Therefore, there is a potential pathway for LSE during the construction and decommissioning phases of the Project. The FLL of the Frodsham Sludge Lagoons is ~50m from the Draft Order Limits but is screened by a 10m high, 30m wide earth bund. Therefore, it is unlikely that there would be impacts from disturbance and displacement during the construction phase of the Project at this locality. However, some areas of FLL at Lordship Lane Fields and Ince Marshes fall within 500m of the Project and in a direct line of sight. Consequently, there is a potential pathway for LSE on the Ramsar Site qualifying/assemblage features associated with disturbance (and resultant displacement) as a result of the Project.	Yes	Yes
		<i>Water pollution</i> Although the Ramsar Site does not fall within the 50m ZoI for potential water pollution impacts from the Project, it is hydrologically linked to it via the network of ditches and drains across the Frodsham, Ince and Helsby Marshes that drain into the River Weaver and then into the Mersey Estuary. Consequently, there is a potential pathway for LSE in the	Yes	Yes

Site name	Qualifying Feature(s)	Screening Rationale	Potential for LSE	In-combination potential for LSE
		absence of mitigation on the Ramsar Site qualifying/assemblage features associated with water pollution as a result of the Project.		
		<i>Dust pollution</i> Although the Ramsar Site does not fall within the within the Zol, there is potential FLL present within 50m of the Project (or 250m of proposed site entrances). Consequently, there is a potential pathway for LSE on the Ramsar Site qualifying/assemblage features associated with dust pollution (in the absence of mitigation) as a result of the Project.	Yes	Yes
Manchester Mosses SAC	Degraded raised bogs still capable of natural regeneration.	<i>Atmospheric pollution</i> This site falls within the 200m Zol for potential pollution impacts from the Project's associated usage of the wider road network. Due to the lack of air quality modelling data, LSEs cannot be screened out at this stage.	Yes	Yes
Rostherne Mere Ramsar Site	Ramsar criterion 1a: Good representative example of the meres of the Shropshire-Cheshire Plain. Rostherne Mere is one of the deepest and largest of the meres. Its shoreline is fringed with common	<i>Atmospheric pollution</i> This site falls within the 200m Zol for potential pollution impacts from the Project's associated usage of the wider road network. Due to the lack of air quality modelling data, LSEs cannot be screened out at this stage.	Yes	Yes

Site name	Qualifying Feature(s)	Screening Rationale	Potential for LSE	In-combination potential for LSE
	reed (<i>Phragmites australis</i>) and a small area of peat bog has developed at the north-west end of the mere.			
Operational phase				
Mersey Estuary SPA	Non-breeding: shelduck, teal, pintail, golden plover, dunlin, black-tailed godwit and redshank. Waterbird assemblage.	<i>Visual, noise (and vibration) and lighting disturbance</i> Although qualifying/assemblage species of the SPA have been recorded in areas in proximity to the Project, operational phase disturbance would be very occasional and of a temporary nature. It is therefore considered that there is no pathway for any effects associated with disturbance on any SPA qualifying/assemblage features using FLL, and therefore no LSEs are identified.	No	Yes
Mersey Estuary Ramsar Site	Populations of international importance in the spring / autumn of shelduck, black-tailed godwit and redshank; and in the winter of teal, pintail and dunlin.	<i>Visual, noise (and vibration) and lighting disturbance</i> Although qualifying/assemblage species of the Ramsar Site have been recorded in areas in proximity to the Project, operational phase disturbance would be very occasional and of a temporary nature. It is therefore considered that there is no pathway for any effects associated with disturbance on any Ramsar Site qualifying/assemblage features using FLL, and therefore no LSEs are identified.	No	Yes

Site name	Qualifying Feature(s)	Screening Rationale	Potential for LSE	In-combination potential for LSE
Manchester Mosses SAC	Degraded raised bogs still capable of natural regeneration.	<i>Atmospheric pollution</i> This site falls within the 200m ZoI for potential pollution impacts from the Project's associated usage of the wider road network. Operational phase vehicle movements would be occasional and negligible in number. It is therefore considered that there is no pathway for any effects associated with pollution on any SAC habitats and therefore no LSEs are identified.	No	No
Rostherne Mere Ramsar Site	Ramsar criterion 1a: Good representative example of the meres of the Shropshire-Cheshire Plain. Rostherne Mere is one of the deepest and largest of the meres. Its shoreline is fringed with common reed (<i>Phragmites australis</i>) and a small area of peat bog has developed at the north-west end of the mere.	<i>Atmospheric pollution</i> This site falls within the 200m ZoI for potential pollution impacts from the Project's associated usage of the wider road network. Operational phase vehicle movements would be very occasional and negligible in number. It is therefore considered that there is no pathway for any effects associated with pollution on any SAC habitats and therefore no LSEs are identified.	No	No

5. Stage 1 - Screening Conclusions

- 5.1.1 Stage 1 of the HRA process, the four-step screening, identifies any likely impacts upon a European Site arising from a project or plan, either alone or 'in combination' with other projects or plans, and considers whether these impacts are likely to result in LSEs.
- 5.1.2 The screening assessment provided within this HRA takes into account the CJEU ruling on 'People over Wind'. It has also adopted a strong precautionary approach - if a pathway of effect is established between the Project and a European Site, then that site is taken through to Stage 2 Appropriate Assessment. This ensures all effects are captured, including de minimis effects.
- 5.1.3 Only those qualifying features and European sites where it can be demonstrated that there is no likelihood of a significant effect occurring have been screened out.
- 5.1.4 Therefore, due to the precautionary approach taken to the screening process and identification of LSEs for the Project, in-combination effects will be considered if it is found that the Project is not likely to result in LSE on the European sites being considered and detailed within any HRA Report.
- 5.1.5 All potential effects are detailed within **Annex 5P1 – Screening Matrices**.
- 5.1.6 Potential effects taken forward for further consideration in Step 4 (**Table 5P 3.10**) had the potential to cause LSE on the qualifying features of those European sites within the study area in Step 3 (**Table 5P 3.2**).
- 5.1.7 The potential effects taken forward for further consideration and those that have the potential for LSEs on the screened in European sites (based on the evidence set out in Sections 3 and 4 and **Table 5P 4.5**) are detailed in **Table 5P 5.1**.

Table 5P 5.1 Screened in European sites, Project phase, potential effects and potential for LSE

Site	Project phase	Potential effects	Potential for LSE
Mersey Estuary SPA	Construction and decommissioning	Habitat loss Visual, noise (and vibration) and lighting disturbance Water pollution Dust pollution	No Yes Yes Yes
	Operation	Visual, noise (and vibration) and lighting disturbance	No
Mersey Estuary Ramsar Site	Construction and decommissioning	Habitat loss Visual, noise (and vibration) and lighting disturbance Water pollution	No Yes Yes Yes

Site	Project phase	Potential effects	Potential for LSE
		Dust pollution	
	Operation	Visual, noise (and vibration) and lighting disturbance	No
Manchester Mosses SAC	Construction and decommissioning	Atmospheric pollution	Yes
	Operation	Atmospheric pollution	No
Rostherne Mere Ramsar Site	Construction and decommissioning	Atmospheric pollution	Yes
	Operation	Atmospheric pollution	No

5.1.8 As there are LSEs for qualifying (and assemblage) features of four European sites, there is a requirement for Stage 2 of HRA – Appropriate Assessment, to be undertaken.

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Annex 5P1

Screening Matrices

Potential Impacts

Potential impacts upon the screened in European sites, which are considered within the Stage 1 Screening Report, are provided in the table below. Impacts have been grouped where appropriate for ease of presentation.

Table 5P1.2 Impacts considered within the screening matrices

Impacts in submission information	Presented in screening matrices as	Designated sites considered
Effects of temporary and permanent indirect habitat loss (FLL) from land take e.g. pipeline, associated infrastructure (e.g. HAGIs), access and construction areas.	Effect 1: Habitat Loss	- Mersey Estuary SPA - Mersey Estuary Ramsar Site - Rixton Clay Pits SAC - Dee Estuary SPA - Dee Estuary Ramsar Site - Liverpool Bay SPA - Mersey Narrows and North Wirral Foreshore SPA - Mersey Narrows and North Wirral Foreshore Ramsar Site - Ribble and Alt Estuaries SPA - Ribble and Alt Estuaries Ramsar Site
Indirect effects by way of disturbance (visual, noise/vibration and lighting) to surrounding habitat used by qualifying/assemblage species resulting in displacement from suitable habitat.	Effect 2: Disturbance/displacement	- Mersey Estuary SPA - Mersey Estuary Ramsar Site - Rixton Clay Pits SAC - Dee Estuary SPA - Dee Estuary Ramsar Site - Liverpool Bay SPA - Mersey Narrows and North Wirral Foreshore SPA

Impacts in submission information	Presented in screening matrices as	Designated sites considered
		- Mersey Narrows and North Wirral Foreshore Ramsar Site - Ribble and Alt Estuaries SPA - Ribble and Alt Estuaries Ramsar Site
Indirect effects by way of pollution (including changes in hydrology, air quality, and other pollution events) and spread of INNS to surrounding habitat.	Effect 3: Pollution/ INNS	- Mersey Estuary SPA - Mersey Estuary Ramsar Site - Midlands Meres and Mosses Phase 2 Ramsar Site - West Midlands Mosses SAC - Rostherne Mere Ramsar Site - Rixton Clay Pits SAC - Midland Meres and Mosses Phase 1 Ramsar Site - Manchester Mosses SAC - Oak Mere SAC - River Dee and Bala Lake SAC - Dee Estuary SPA - Dee Estuary Ramsar Site - Liverpool Bay SPA - Mersey Narrows and North Wirral Foreshore SPA - Mersey Narrows and North Wirral Foreshore Ramsar Site - Ribble and Alt Estuaries SPA - Ribble and Alt Estuaries Ramsar Site
Effects of indirect habitat loss/barrier effects, i.e. the displacement of species from the area due to permanent infrastructure	Effect 4: Habitat fragmentation	- Mersey Estuary SPA - Mersey Estuary Ramsar Site - Rixton Clay Pits SAC - Dee Estuary SPA

Impacts in submission information	Presented in screening matrices as	Designated sites considered
associated with the Project (e.g. HAGIs) or during construction.		• Dee Estuary Ramsar Site • Liverpool Bay SPA • Mersey Narrows and North Wirral Foreshore SPA • Mersey Narrows and North Wirral Foreshore Ramsar Site • Ribble and Alt Estuaries SPA • Ribble and Alt Estuaries Ramsar Site
In combination effects.	Effect 5: In-combination	• Mersey Estuary SPA • Mersey Estuary Ramsar Site • Midlands Meres and Mosses Phase 2 Ramsar Site • West Midlands Mosses SAC • Rostherne Mere Ramsar Site • Rixton Clay Pits SAC • Midland Meres and Mosses Phase 1 Ramsar Site • Manchester Mosses SAC • Oak Mere SAC • River Dee and Bala Lake SAC • Dee Estuary SPA • Dee Estuary Ramsar Site • Liverpool Bay SPA • Mersey Narrows and North Wirral Foreshore SPA • Mersey Narrows and North Wirral Foreshore Ramsar Site • Ribble and Alt Estuaries SPA • Ribble and Alt Estuaries Ramsar Site

Stage 1: Screening Matrices

The European Sites screened in for further assessment are:

- Mersey Estuary SPA;
- Mersey Estuary Ramsar Site;
- Midland Meres and Mosses Phase 2 Ramsar Site;
- Rostherne Mere Ramsar Site;
- West Midlands Mosses SAC;
- Rixton Clay Pits SAC;
- Midland Meres and Mosses Phase 1 Ramsar Site;
- Manchester Mosses SAC;
- Oak Mere SAC;
- River Dee and Bala Lake SAC;
- Dee Estuary SPA;
- Dee Estuary Ramsar Site;
- Liverpool Bay SPA;
- Mersey Narrows and North Wirral Foreshore SPA;
- Mersey Narrows and North Wirral Foreshore Ramsar Site;
- Ribble and Alt Estuaries SPA; and
- Ribble and Alt Estuaries Ramsar Site.

Evidence for likely significant effects on their qualifying features is detailed within the footnotes to the screening matrices below.

Where effects are not applicable to a particular feature they are greyed out with n/a.

Stage 1 Matrix A: Mersey Estuary SPA

Name of site: Mersey Estuary SPA

Distance to HyNet North West Hydrogen Pipeline Project 0.83km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/ displacement</i>			<i>Pollution/ INNS</i>			<i>Habitat fragmentation</i>			<i>In- combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Shelduck (non-breeding)</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
<i>Teal (non-breeding)</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
<i>Pintail (non-breeding)</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
<i>Golden plover (non-breeding)</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
<i>Dunlin (non-breeding)</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
<i>Black-tailed godwit (non-breeding)</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
<i>Redshank (non-breeding)</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
<i>Waterbird assemblage</i>	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g

✓ = Likely significant effect **cannot** be excluded ✗ = Likely significant effect **can** be excluded

C = construction

O = operation

D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the SPA is located 0.83km from the Draft Order Limits and outside an identified Zol. Given the distance between this site and the Draft Order Limits, none of the qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this site. These receptors would therefore not be subject to any LSEs. There is potential FLL relating to the SPA within the Draft Order Limits but this was not used regularly and in significant numbers during surveys in 2020/21 and 2024 and therefore would also not be subject to any LSEs.
- **b.** There is no evidence to indicate that FLL utilised by qualifying features identified within 500m of the Project would form a pathway for LSE during the construction and/or decommissioning phases of the Project, particularly during the core winter period. The FLL of the Frodsham Sludge Lagoons (utilised by shelduck, teal, pintail, golden plover, dunlin, black-tailed godwit and redshank) is ~50m from the Draft Order Limits but is screened by a 10m high, 30m wide earth bund. Therefore, it is unlikely that there would be impacts from disturbance and displacement during the construction phase of the Project at this locality. However, some areas of FLL at Lordship Lane Fields and Ince Marshes fall within 500m of the Project and in a direct line of sight. Consequently, there is a potential pathway for LSE on the SPA qualifying/assemblage features associated with disturbance (and resultant displacement) as a result of the Project.
- **c.** There is the potential for qualifying bird species of the SPA to be deterred from using FLL surrounding (and within) the Project for foraging and roosting, due to disturbance during the operational phase of the Project. However, the inspection of the pipelines is undertaken internally from the inspection facilities at HAGIs with limited access to the buried pipeline route. It is anticipated that no pipeline maintenance would be required where excavation of the pipeline is required unless a defect is identified. Some infrequent maintenance surveys may be required and would require access on foot over the route of the pipeline, but do not require excavation or other intrusive activities. Given that operational disturbance would be very occasional and of a temporary nature, it is considered that there is no pathway for any effects associated with disturbance on any features using FLL, and therefore no LSEs are identified.
- **d.** As detailed in **Sections 3.2.12 and 3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network), and therefore the SPA will not be directly affected by proposals. However, the SPA is hydrologically linked to the Project via the network of ditches and drains across the Frodsham, Ince and Helsby Marshes that drain into the River Weaver and then into the Mersey Estuary. Consequently, there is a potential pathway for LSE on the SPA qualifying/assemblage features associated with water and/or dust pollution as a result of the Project.
- **e.** Once the Project is operational it is considered that there is no pathway for LSE on the SPA through pollution events and is therefore screened out of the assessment.
- **f.** It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as birds will be free to move across the Draft Order Limits, which are considered to be relatively narrow at their widest point within FLL with respect to birds moving between connected habitats.

- **g.** Given that there are pathways for LSE on the SPA via indirect effects relating to pollution and disturbance during the construction and decommissioning phases, in-combination effects have therefore been screened in.
- **h.** Given that there are no pathways for LSE on the SPA during operation, in-combination effects have therefore been screened out during the operational phase.

Stage 1 Matrix B: Mersey Estuary Ramsar Site

Name of site: Mersey Estuary Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 0.83km

Qualifying features	HyNet North West Hydrogen Pipeline Project														
Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In- combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Ramsar criterion 5: Assemblages of international importance. Species with peak counts in winter: 89,576 waterfowl (5 year peak mean 1998/99-2002/03).	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g
Ramsar criterion 6: species / populations occurring at levels of international importance. Qualifying Species / populations (as identified at designation): Species with peak counts in spring / autumn: shelduck, NW Europe, 12,676 individuals, representing an average of 4.2% of the population (5 year peak mean 1998/99-2002/03); black-tailed godwit, Iceland / W Europe 2,011 individuals, representing an average of 5.7% of the population (5 year peak mean 1998/99-2002/03); redshank, 6651 individuals, representing an average of 2.6% of the population (5 year peak mean 1998/99-2002/03).	x _a	x _a	x _a	✓ _b	x _c	✓ _b	✓ _d	x _e	✓ _d	x _f	x _f	x _f	✓ _g	x _h	✓ _g

Name of site: Mersey Estuary Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 0.83km

Qualifying features	HyNet North West Hydrogen Pipeline Project				
Effect	Habitat loss	Disturbance/ displacement	Pollution/ INNS	Habitat fragmentation	In- combination
<i>Species with peak counts in winter: teal, NW Europe 10,613 individuals, representing an average of 2.6% of the population (5 year peak mean 1998/99-2002/03); pintail NW Europe 565 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/99-2002/03); dunlin, W Siberia / W Europe 48,364 individuals, representing an average of 3.6% of the population (5 year peak mean 1998/99-2002/03).</i>					

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded
C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Ramsar Site is located 0.83km from the Draft Order Limits and outside an identified Zol. Given the distance between this site and the Draft Order Limits, none of the qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this site. These receptors would therefore not be subject to any LSEs. There is potential FLL relating to the Ramsar Site within the Draft Order Limits but this was not used regularly and in significant numbers during surveys in 2020/21 and 2024 and therefore would also not be subject to any LSEs.
- **b.** There is no evidence to indicate that FLL utilised by qualifying features identified within 500m of the Project would form a pathway for LSE during the construction and/or decommissioning phases of the Project, particularly during the core winter period. The FLL of the Frodsham Sludge Lagoons (utilised by shelduck, teal, pintail, golden plover, dunlin, black-tailed godwit and redshank) is ~50m from the Draft Order Limits but is screened by a 10m high, 30m wide earth bund. Therefore, it is unlikely that there would be impacts from disturbance and displacement during the construction phase of the Project at this locality. However, some areas of FLL at Lordship Lane Fields and Ince Marshes fall within 500m of the Project and in a direct line of sight. Consequently, there is a potential pathway for LSE on the Ramsar Site qualifying/assemblage features associated with disturbance (and resultant displacement) as a result of the Project.
- **c.** There is the potential for qualifying bird species of the Ramsar Site to be deterred from using FLL surrounding (and within) the Project for foraging and roosting, due to disturbance during the operational phase of the Project. However, the inspection of the pipelines is undertaken internally from the inspection facilities at HAGIs with limited access to the buried pipeline route. It is anticipated that no pipeline maintenance would be required where excavation of the pipeline is required unless a defect is identified. Some infrequent maintenance surveys may be required and would require access on foot over the route of the pipeline, but do not require excavation or other intrusive activities. Given that operational disturbance would be very occasional and of a temporary nature, it is considered that there is no pathway for any effects associated with disturbance on any features using FLL, and therefore no LSEs are identified.
- **d.** As detailed in **Sections 3.2.12 and 3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network), and therefore the Ramsar Site will not be directly affected by proposals. However, the Ramsar Site is hydrologically linked to the Project via the network of ditches and drains across the Frodsham, Ince and Helsby Marshes that drain into the River Weaver and then into the Mersey Estuary. Consequently, there is a potential pathway for LSE on the Ramsar Site qualifying/assemblage features associated with water and/or dust pollution as a result of the Project.
- **e.** Once the Project is operational it is considered that there is no pathway for LSE on the Ramsar Site through pollution events and is therefore screened out of the assessment.
- **f.** It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as birds will be free to move across the Draft Order Limits, which are considered to be relatively narrow at their widest point within FLL with respect to birds moving between connected habitats.

- **g.** Given that there are pathways for LSE on the Ramsar Site via indirect effects relating to pollution and disturbance during the construction and decommissioning phases, in-combination effects have therefore been screened in.
- **h.** Given that there are no pathways for LSE on the Ramsar Site during operation, in-combination effects have therefore been screened out during the operational phase.

Stage 1 Matrix C: Midland Meres and Mosses Phase 2 Ramsar Site

Name of site: Midland Meres and Mosses Phase 2 Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 2.25km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/ displacement</i>			<i>Pollution/ INNS</i>			<i>Habitat fragmentation</i>			<i>In-combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Ramsar criterion 1: The site comprises a diverse range of habitats from open water to raised bog.</i>	-	-	-	-	-	-	xa	xa	xa	-	-	-	xb	xb	xb
<i>Ramsar criterion 2: Supports a number of rare species of plants associated with wetlands, including the nationally scarce cowbane (Cicuta virosa) and, elongated sedge (Carex elongate). Also present are the nationally scarce bryophytes Dicranum affine and Sphagnum pulchrum. Also supports an assemblage of invertebrates including several rare species. There are 16 species of British Red Data Book insect listed for this site including the following endangered species: the moth Glyptotendipes lathamella, the caddisfly Hagenella clathrata and the sawfly Trichiosoma vitellinae.</i>	-	-	-	-	-	-	xa	xa	xa	-	-	-	xb	xb	xb

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network), and therefore all qualifying habitats and species are unlikely to be affected by proposals.
- **b.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix D: West Midlands Mosses SAC

Name of site: West Midlands Mosses SAC

Distance to HyNet North West Hydrogen Pipeline Project 2.26km

Qualifying features	HyNet North West Hydrogen Pipeline Project														
Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In-combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Natural dystrophic lakes and ponds; Acid peat-stained lakes and ponds.	-	-	-	-	-	-	xa	xa	xa	-	-	-	xb	xb	xb
Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface.	-	-	-	-	-	-	xa	xa	xa	-	-	-	xb	xb	xb

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded
C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the ZoI of the Draft Order Limits (and wider road network), and therefore all qualifying habitats are unlikely to be affected by proposals.
- **b.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix D: Rostherne Mere Ramsar Site

Name of site: Rostherne Mere Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 2.65km

Qualifying features	HyNet North West Hydrogen Pipeline Project														
	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In-combination		
Effect	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Stage of Development															
Ramsar criterion 1a: Good representative example of the meres of the Shropshire-Cheshire Plain. Rostherne Mere is one of the deepest and largest of the meres. Its shoreline is fringed with common reed (Phragmites australis) and a small area of peat bog has developed at the north-west end of the mere.	-	-	-	-	-	-	✓a	✗b	✓a	-	-	-	✓c	✗d	✓c

✓ = Likely significant effect **cannot** be excluded ✗ = Likely significant effect **can** be excluded
C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Sections 3.2.12** and **3.2.13**, although this European site falls outside the Zol of the Draft Order Limits, it does falls within the Zol of the wider road network, and therefore qualifying habitats may be affected by proposals.
- **b.** Once the Project is operational it is considered that there is no pathway for LSE on the Ramsar Site through pollution events and is therefore screened out of the assessment.
- **c.** Given that there are pathways for LSE on the Ramsar Site via indirect effects relating to pollution during the construction and decommissioning phases, in-combination effects have therefore been screened in.
- **d.** Given that there are no pathways for LSE on the Ramsar Site during operation, in-combination effects have therefore been screened out during the operational phase.

Stage 1 Matrix D: Rixton Clay Pits SAC

Name of site: Rixton Clay Pits SAC

Distance to HyNet North West Hydrogen Pipeline Project 3.43km

Qualifying features HyNet North West Hydrogen Pipeline Project

Effect	Habitat loss			Disturbance/displacement			Pollution/INNS			Habitat fragmentation			In-combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Great crested newt (<i>Triturus cristatus</i>)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded
C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the SAC is located 3.43km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, the qualifying feature would not be susceptible to effects resulting from habitat loss as there is no land take/land use or access required within the Zol of this site. These receptors would therefore not be subject to any LSEs.
- **b.** As detailed in **Table 5P 3.10**, the SAC is located 3.43km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, the qualifying feature would not be susceptible to effects resulting from disturbance and/or displacement. These receptors would therefore not be subject to any LSEs.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the draft Order Limits (and wider road network) and therefore all qualifying species are unlikely to be affected by proposals.
- **d.** As detailed in **Table 5P 3.10**, the SAC is located 3.43km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, the qualifying feature would not be susceptible to indirect effects resulting from habitat fragmentation within the Zol of this site. This receptor would therefore not be subject to any LSEs.
- **e.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix E: Midland Meres and Mosses Phase 1 Ramsar Site

Name of site: Midland Meres and Mosses Phase 1 Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 3.61km

Qualifying features

HyNet North West Hydrogen Pipeline Project

Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In-combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Ramsar criterion 1: The site comprises a diverse range of habitats from open water to raised bog.	-	-	-	-	-	-	x a	x a	x a	-	-	-	x b	x b	x b
Ramsar criterion 2: Supports a number of rare species of plants associated with wetlands including five nationally scarce species together with an assemblage of rare wetland invertebrates (three endangered insects and five other British Red Data Book species of invertebrates).	-	-	-	-	-	-	x a	x a	x a	-	-	-	x b	x b	x b

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded
C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outside the Zol of the Draft Order Limits (and wider road network), and therefore all qualifying habitats are unlikely to be affected by proposals.
- **b.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix F: Manchester Mosses SAC

Name of site: Manchester Mosses SAC

Distance to HyNet North West Hydrogen Pipeline Project 3.85km

Qualifying features HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/displacement</i>			<i>Pollution/INNS</i>			<i>Habitat fragmentation</i>			<i>In-combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Degraded raised bogs still capable of natural regeneration.</i>	-	-	-	-	-	-	✓ a	✗ b	✓ a	-	-	-	✓ c	✗ d	✓ c

✓ = Likely significant effect **cannot** be excluded ✗ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Sections 3.2.12** and **3.2.13**, although this European site falls outside the Zol of the Draft Order Limits, it does falls within the Zol of the wider road network, and therefore qualifying habitats may be affected by proposals.
- **b.** Once the Project is operational it is considered that there is no pathway for LSE on the SAC through pollution events and is therefore screened out of the assessment.
- **c.** Given that there are pathways for LSE on the SAC via indirect effects relating to pollution during the construction and decommissioning phases, in-combination effects have therefore been screened in.
- **d.** Given that there are no pathways for LSE on the SAC during operation, in-combination effects have therefore been screened out during the operational phase.

Stage 1 Matrix G: Oak Mere SAC

Name of site: Oak Mere SAC

Distance to HyNet North West Hydrogen Pipeline Project 4.6km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/displacement</i>			<i>Pollution/INNS</i>			<i>Habitat fragmentation</i>			<i>In-combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae); Nutrient-poor shallow waters with aquatic vegetation on sandy plains.</i>	-	-	-	-	-	-	xa	xa	xa	-	-	-	xb	xb	xb
<i>Transition mires and quaking bogs; Very wet mires often identified by an unstable 'quaking' surface.</i>	-	-	-	-	-	-	xa	xa	xa	-	-	-	xb	xb	xb

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network), and therefore all qualifying habitats are unlikely to be affected by proposals.
- **b.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix H: River Dee and Bala Lake SAC

Name of site: River Dee and Bala Lake SAC

Distance to HyNet North West Hydrogen Pipeline Project 8.54km

Qualifying features	HyNet North West Hydrogen Pipeline Project														
Effect	Habitat loss			Disturbance/displacement			Pollution/INNS			Habitat fragmentation			In-combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
<i>Petromyzon marinus; Sea lamprey</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Lampetra planeri; Brook lamprey</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Lampetra fluviatilis; River lamprey</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Salmo salar; Atlantic salmon</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Cottus gobio; Bullhead</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Lutra lutra; Otter</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Luronium natans; Floating water-plantain</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

✓ = Likely significant effect **cannot** be excluded ✗ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the SAC is located 8.54km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, the qualifying features would not be susceptible to effects resulting from habitat loss as there is no land take/land use or access required within the Zol of this site. These receptors would therefore not be subject to any LSEs.
- **b.** As detailed in **Table 5P 3.10**, the SAC is located 8.54km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, the qualifying features would not be susceptible to effects resulting from disturbance and/or displacement. These receptors would therefore not be subject to any LSEs.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the draft Order Limits (and wider road network), and therefore all qualifying species are unlikely to be affected by proposals.
- **d.** As detailed in **Table 5P 3.10**, the SAC is located 8.54km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, the qualifying features would not be susceptible to indirect effects resulting from habitat fragmentation within the Zol of this site. The receptors would therefore not be subject to any LSEs.
- **e.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix I: Dee Estuary SPA

Name of site: Dee Estuary SPA

Distance to HyNet North West Hydrogen Pipeline Project 13.7km

Qualifying features	HyNet North West Hydrogen Pipeline Project														
<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/displacement</i>			<i>Pollution/INNS</i>			<i>Habitat fragmentation</i>			<i>In-combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Shelduck (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Teal (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Pintail (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Oystercatcher (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Grey plover (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Knot (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Dunlin (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Black-tailed godwit (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Bar-tailed godwit (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

Name of site: Dee Estuary SPA

Distance to HyNet North West Hydrogen Pipeline Project 13.7km

Qualifying features HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/displacement</i>			<i>Pollution/INNS</i>			<i>Habitat fragmentation</i>			<i>In-combination</i>		
<i>Curlew (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Redshank (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Sandwich tern (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Common tern (breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Little tern (breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Waterbird assemblage</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Dee Estuary SPA is located 13.7km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, none of the qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this site. There is potential FLL relating to the SPA (i.e. suitable wintering waterbird habitat) within the Draft Order Limits but this was not used regularly and in significant numbers during surveys in 2020/21 and 2024. It is also likely that the birds recorded here are qualifying or assemblage species of the Mersey Estuary. Therefore the Dee Estuary SPA qualifying and/or assemblage features would therefore not be subject to any LSEs.
- **b.** Although some SPA qualifying (and waterbird assemblage) species were recorded “regularly” in “significant numbers” within 500m of the Project (e.g. black-tailed godwit and shoveler), it is considered that these birds are likely to be related to waterbird populations supported by the Mersey Estuary³³, which lies <1km from the Draft Order Limits. Therefore, it is considered that there is unlikely to be any pathway for LSE associated with disturbance and/or displacement on Dee Estuary SPA features as a result of the Project.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network) and therefore all qualifying species are unlikely to be affected by proposals.
- **d.** As detailed above (b), the features recorded during the survey programme likely relate to the Mersey Estuary waterbird populations. It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as any birds will be free to move across the Draft Order Limits. The Draft Order Limits are considered to be relatively narrow at their widest point within FLL, with respect to birds moving between connected habitats. Receptors, whether linked to the Dee Estuary or Mersey Estuary would therefore not be subject to any LSEs.
- **e.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

³³ <https://publications.naturalengland.org.uk/file/6485318211469312>

Stage 1 Matrix J: Dee Estuary Ramsar Site

Name of site: Dee Estuary Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 13.7km

Qualifying features

HyNet North West Hydrogen Pipeline Project

Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In- combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Ramsar criterion 1: Extensive intertidal mud and sand flats (20 km by 9 km) with large expanses of saltmarsh towards the head of the estuary. Habitats Directive Annex I features present on the pSAC include: H1130 Estuaries, H1140 Mudflats and sandflats not covered by seawater at low tide, H1210 Annual vegetation of drift lines, H1230 Vegetated sea cliffs of the Atlantic and Baltic coasts, H1310 Salicornia and other annuals colonising mud and sand, H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae), H2110 Embryonic shifting dunes, H2120 Shifting dunes along the shoreline with Ammophila arenaria (“white dunes”), H2130 Fixed dunes with herbaceous vegetation (“grey dunes”), H2190 Humid dune slacks.	-	-	-	-	-	-	xc	xc	xc	-	-	-	xe	xe	xe

Name of site: Dee Estuary Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 13.7km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/ displacement</i>			<i>Pollution/ INNS</i>			<i>Habitat fragmentation</i>			<i>In- combination</i>		
<i>Ramsar criterion 2: supports breeding colonies of the vulnerable Natterjack Toad.</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Ramsar criterion 5: Assemblages of international importance. Species with peak counts in winter: Non-breeding season regularly supports 120,726 individual waterbirds (5 year peak mean 1994/95–1998/99).</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Ramsar criterion 6 – species / populations occurring at levels of international importance. Species with peak counts in spring / autumn: black-tailed godwit, Iceland/W Europe 3,323 individuals, representing an average of 7% of the population (5-year peak mean 1998/99-2002/03); redshank, 4,465 individuals, representing an average of 1.7% of the population (5-year peak mean 1998/99-2002/03); dunlin, W Siberia / W Europe 38,196 individuals, representing an average of 2.8% of the population (5-year peak</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

Name of site: Dee Estuary Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 13.7km

Qualifying features

HyNet North West Hydrogen Pipeline Project

Effect	Habitat loss	Disturbance/ displacement	Pollution/ INNS	Habitat fragmentation	In- combination
<i>mean 1998/99-2002/03 - spring peak); grey plover, E Atlantic / W Africa - wintering 11,021 individuals, representing an average of 4.4% of the population (5-year peak mean 1998/99-2002/03 - spring peak); knot, W & Southern Africa (wintering) 42,692 individuals, representing an average of 9.4% of the population (5-year peak mean 1998/99-2002/03); ringed plover, Europe / Northwest Africa 3,761 individuals, representing an average of 5.1% of the population (5-year peak mean 1998/99-2002/03 - spring peak); and sanderling, Eastern Atlantic 7,401 individuals, representing an average of 6% of the population (5-year peak mean 1998/99-2002/03 - spring peak). Species with peak counts in winter: bar-tailed godwit, W Palearctic 13,935 individuals, representing an average of 11.6% of the population (5-year peak mean 1998/99-2002/03); oystercatcher, Europe & NW Africa-wintering 18,926 individuals, representing an average of</i>					

Name of site: Dee Estuary Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 13.7km

Qualifying features	HyNet North West Hydrogen Pipeline Project				
Effect	Habitat loss	Disturbance/ displacement	Pollution/ INNS	Habitat fragmentation	In- combination
1.8% of the population (5-year peak mean 1998/99-2002/03); teal, NW Europe 5,107 individuals, representing an average of 1% of the population (5-year peak mean 1998/99-2002/03); wigeon, NW Europe 69,841 individuals, representing an average of 4.6% of the population (5-year peak mean 1998/99-2002/03); pintail, NW Europe 1,497 individuals, representing an average of 2.5% of the population (5-year peak mean 1998/99-2002/03); pink-footed goose, Greenland, Iceland/UK 6,552 individuals, representing an average of 2.42% of the population (5-year peak mean 1998/99-2002/03); Bewick’s swan, NW Europe 230 individuals, representing an average of 1.1% of the GB population (5-year peak mean 1998/99-2002/03); and whooper swan, Iceland / UK / Ireland 211 individuals, representing an average of 1% of the population (5-year peak mean 1998/99-2002/03).					

✓ = Likely significant effect cannot be excluded ✕ = Likely significant effect can be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Dee Estuary Ramsar Site is located 13.7km from the Draft Order Limits and outside an identified Zone of Influence (ZoI). Given the distance between this site and the Draft Order Limits, none of the qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the ZoI of this site. There is potential FLL relating to the Ramsar Site's waterbird populations within the Draft Order Limits but this was not used regularly and in significant numbers during surveys in 2020/21 and 2024. It is also likely that the waterbirds recorded here are qualifying or assemblage species of the Mersey Estuary. Therefore the Dee Estuary Ramsar Site qualifying and/or assemblage features would therefore not be subject to any LSEs.
- **b.** Although some Ramsar Site qualifying (and waterbird assemblage) species were recorded "regularly" in "significant numbers" within 500m of the Project (e.g. black-tailed godwit and shoveler), it is considered that these birds are likely to be related to waterbird populations supported by the Mersey Estuary, which lies <1km from the Draft Order Limits. Therefore, it is considered that there is unlikely to be any pathway for LSE associated with disturbance and/or displacement on Dee Estuary Ramsar Site features as a result of the Project.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the ZoI of the Draft Order Limits (and wider road network), and therefore all qualifying species are unlikely to be affected by proposals.
- **d.** As detailed above (b), the features recorded during the survey programme likely relate to the Mersey Estuary waterbird populations. It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as any birds will be free to move across the Draft Order Limits. The Draft Order Limits are considered to be relatively narrow at their widest point within FLL, with respect to birds moving between connected habitats. Receptors, whether linked to the Dee Estuary or Mersey Estuary would therefore not be subject to any LSEs.
- **e.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix K: Liverpool Bay SPA

Name of site: Liverpool Bay SPA

Distance to HyNet North West Hydrogen Pipeline Project 14.5km

Qualifying features HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/displacement</i>			<i>Pollution/INNS</i>			<i>Habitat fragmentation</i>			<i>In-combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Red-throated diver (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Common scoter (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Little gull (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Common tern (breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Little tern (breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Waterbird assemblage</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Liverpool Bay SPA is located 14.5km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, none of the largely marine-associated qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this marine SPA. There is also no evidence to indicate that FLL falls within the Draft Order Limits. These receptors would therefore not be subject to any LSEs.
- **b.** There is no evidence to indicate that FLL utilised by largely marine-associated qualifying features falls within 500m of the Project and consequently, there would be no pathway for LSE on any qualifying features associated with disturbance and resultant displacement as a result of the Project.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network), and therefore all qualifying features are unlikely to be affected by proposals.
- **d.** It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as none of the largely marine-associated qualifying features would be susceptible to this effect as a result of the Project.
- **e.** With no LSE predicted for the Project or any potential pathways for LSE, there are considered to be no LSE for in-combination effects.

Stage 1 Matrix L: Mersey Narrows and North Wirral Foreshore SPA

Name of site: Mersey Narrows and North Wirral Foreshore SPA

Distance to HyNet North West Hydrogen Pipeline Project 17.1km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/ displacement</i>			<i>Pollution/ INNS</i>			<i>Habitat fragmentation</i>			<i>In- combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Bar-tailed godwit (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Little gull (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Knot (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Common tern (breeding and non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Waterbird assemblage</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Mersey Narrows and North Wirral Foreshore SPA is located 17.1km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, none of the largely estuarine- and/or marine-associated qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this SPA. There is also no evidence to indicate that FLL falls within the Draft Order Limits (none of the qualifying species were recorded regularly nor in significant numbers during the survey programme). These receptors would therefore not be subject to any LSEs.
- **b.** There is no evidence to indicate that FLL utilised by largely estuarine- and/or marine-associated qualifying features falls within 500m of the Project and consequently, there would be no pathway for LSE on any qualifying features associated with disturbance and resultant displacement as a result of the Project.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network), and therefore all qualifying features are unlikely to be affected by proposals.
- **d.** It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as none of the largely marine-associated qualifying features would be susceptible to this effect as a result of the Project.
- **e.** With no LSE predicted for the Project or any potential pathways for LSE, there are considered to be no LSE for in-combination effects.

Stage 1 Matrix M: Mersey Narrows and North Wirral Foreshore Ramsar Site

Name of site: Mersey Narrows and North Wirral Foreshore Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 17.1km

Qualifying features	HyNet North West Hydrogen Pipeline Project														
Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In- combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Ramsar Criterion 4: regularly supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions: During 2004/05-2008/09 the Mersey Narrows and North Wirral Foreshore Ramsar Site supported important numbers of non-breeding little gulls and common terns.	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Ramsar Criterion 5 because it regularly supports 20,000 or more waterbirds: During the winters 2004/05-2008/09, the Mersey Narrows and North Wirral Foreshore Ramsar Site supported an average peak of 32,402 individual waterbirds.	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Ramsar Criterion 6: regularly supports 1% of the individuals in the populations of the following	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

Name of site: Mersey Narrows and North Wirral Foreshore Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 17.1km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>	<i>Disturbance/ displacement</i>	<i>Pollution/ INNS</i>	<i>Habitat fragmentation</i>	<i>In- combination</i>
---------------	---------------------	--------------------------------------	----------------------------	----------------------------------	----------------------------

***species or subspecies of waterbird in any season:
During the winters 2004/05-2008/09, the Mersey Narrows and North Wirral Foreshore Ramsar Site supported 2.4% of the islandica subspecies, W Europe / Waddensea / Britain / Ireland (non-breeding) population of knot and 2.8% of the lapponica subspecies W Europe/NW Africa (non-breeding) population of bar-tailed godwits.***

✓ = Likely significant effect **cannot** be excluded ✗ = Likely significant effect **can** be excluded

C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Mersey Narrows and North Wirral Foreshore Ramsar Site is located 17.1km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, none of the largely estuarine- and/or marine-associated qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this Ramsar Site. There is also no evidence to indicate that FLL falls within the Draft Order Limits (none of the qualifying species were recorded regularly nor in significant numbers during the survey programme). These receptors would therefore not be subject to any LSEs.
- **b.** There is no evidence to indicate that FLL utilised by largely estuarine- and/or marine-associated qualifying features falls within 500m of the Project and consequently, there would be no pathway for LSE on any qualifying features associated with disturbance and resultant displacement as a result of the Project.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the Draft Order Limits (and wider road network), and therefore all qualifying features are unlikely to be affected by proposals.
- **d.** It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as none of the largely marine-associated qualifying features would be susceptible to this effect as a result of the Project.
- **e.** With no LSE predicted for the Project or any potential pathways for LSE, there are considered to be no LSE for in-combination effects.

Stage 1 Matrix N: Ribble and Alt Estuaries SPA

Name of site: Ribble and Alt Estuaries SPA

Distance to HyNet North West Hydrogen Pipeline Project 19.1km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>			<i>Disturbance/ displacement</i>			<i>Pollution/ INNS</i>			<i>Habitat fragmentation</i>			<i>In- combination</i>		
<i>Stage of Development</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>	<i>C</i>	<i>O</i>	<i>D</i>
<i>Bewick's swan (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Whooper swan (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Pink-footed goose (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Shelduck (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Wigeon (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Teal (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Pintail (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Oystercatcher (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
<i>Ringed plover (non-breeding)</i>	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

Name of site: Ribble and Alt Estuaries SPA

Distance to HyNet North West Hydrogen Pipeline Project 19.1km

Qualifying featuresHyNet North West Hydrogen Pipeline Project

Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In- combination		
Golden plover (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Grey plover (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Knot (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Sanderling (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Dunlin (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Black-tailed godwit (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Bar-tailed godwit (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Redshank (non-breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Ruff (breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Lesser black-backed gull (breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

Name of site: Ribble and Alt Estuaries SPA

Distance to HyNet North West Hydrogen Pipeline Project 19.1km

Qualifying featuresHyNet North West Hydrogen Pipeline Project

Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In- combination		
Common tern (breeding)	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Waterbird assemblage	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Seabird assemblage	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded
C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Ribble and Alt Estuaries SPA is located 19.1km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, none of the qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this site. There is potential FLL relating to the SPA (i.e. suitable wintering waterbird habitat) within the Draft Order Limits but this was not used regularly and in significant numbers during surveys in 2020/21 and 2024. It is also likely that the birds recorded here are qualifying or assemblage species of the Mersey Estuary. Therefore, the Ribble and Alt Estuaries SPA qualifying and/or assemblage features would therefore not be subject to any LSEs.
- **b.** Although some SPA qualifying (and waterbird assemblage) species were recorded “regularly” in “significant numbers” within 500m of the Project (e.g. black-tailed godwit and shoveler), it is considered that these birds are likely to be related to waterbird populations supported by the Mersey Estuary, which lies <1km from the Draft Order Limits. Therefore, it is considered that there is unlikely to be any pathway for LSE associated with disturbance and/or displacement on Ribble and Alt Estuaries SPA features as a result of the Project.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the draft Order Limits (and wider road network), and therefore all qualifying species are unlikely to be affected by proposals.
- **d.** As detailed above (b), the features recorded during the survey programme likely relate to the Mersey Estuary waterbird populations. It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as any birds will be free to move across the Draft Order Limits. The Draft Order Limits are considered to be relatively narrow at their widest point within FLL, with respect to birds moving between connected habitats. Receptors, whether linked to the Ribble and Alt Estuaries or Mersey Estuary would therefore not be subject to any LSEs.
- **e.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

Stage 1 Matrix O: Ribble and Alt Estuaries Ramsar Site

Name of site: Ribble and Alt Estuaries Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 19.1km

Qualifying features	HyNet North West Hydrogen Pipeline Project														
Effect	Habitat loss			Disturbance/ displacement			Pollution/ INNS			Habitat fragmentation			In- combination		
Stage of Development	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Ramsar criterion 2: This site supports up to 40% of the GB population of natterjack toads.	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Ramsar Criterion 5: Assemblages of international importance: Species with peak counts in winter: 222,038 waterfowl (5 year peak mean 1998/99-2002/2003).	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe
Ramsar Criterion 6: species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): Species regularly supported during the breeding season: Qualifying Species/populations (as identified at designation): lesser black-backed gull, W Europe / Mediterranean / W Africa 4,108 apparently occupied nests, representing an	xa	xa	xa	xb	xb	xb	xc	xc	xc	xd	xd	xd	xe	xe	xe

Name of site: Ribble and Alt Estuaries Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 19.1km

Qualifying features	HyNet North West Hydrogen Pipeline Project				
Effect	Habitat loss	Disturbance/ displacement	Pollution/ INNS	Habitat fragmentation	In- combination
average of 2.7% of the breeding population (Seabird 2000 Census). Species with peak counts in spring / autumn: ringed plover, Europe / Northwest Africa 3,761 individuals, representing an average of 5.1% of the population (5 year peak mean 1998/99-2002/03 - spring peak); grey plover, E Atlantic / W Africa - wintering 11,021 individuals, representing an average of 4.4% of the population (5 year peak mean 1998/99-2002/03 - spring peak); knot, W & Southern Africa (wintering) 42,692 individuals, representing an average of 9.4% of the population (5 year peak mean 1998/99-2002/03); sanderling, Eastern Atlantic 7,401 individuals, representing an average of 6% of the population (5 year peak mean 1998/99-2002/03 - spring peak); dunlin, W Siberia / W Europe 38,196 individuals, representing an average of 2.8% of the population (5 year peak mean 1998/99-2002/03 - spring peak); black-tailed godwit, Iceland / W					

Name of site: Ribble and Alt Estuaries Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 19.1km

Qualifying features

HyNet North West Hydrogen Pipeline Project

<i>Effect</i>	<i>Habitat loss</i>	<i>Disturbance/ displacement</i>	<i>Pollution/ INNS</i>	<i>Habitat fragmentation</i>	<i>In- combination</i>
<i>Europe, 3,323 individuals, representing an average of 9.4% of the population (5 year peak mean 1998/99-2002/03); redshank, 4,465 individuals, representing an average of 1.7% of the population (5 year peak mean 1998/99-2002/03); lesser black-backed gull, 1,747 individuals, representing an average of 2.8% of the GB population (5 year peak mean 1998/99-2002/03). Species with peak counts in winter: Bewick's swan, NW Europe 230 individuals, representing an average of 2.8% of the GB population (5 year peak mean 1998/99-2002/03); whooper swan, Iceland / UK / Ireland 211 individuals, representing an average of 1% of the population (5 year peak mean 1998/99- 2002/03); pink-footed goose, Greenland, Iceland / UK 6,552 individuals, representing an average of 2.7% of the population (5 year peak mean 1998/99-2002/03); shelduck, NW Europe 2,944 individuals, representing an average of 3.7% of the GB population (5 year peak mean 1998/99-2002/03);</i>					

Name of site: Ribble and Alt Estuaries Ramsar Site

Distance to HyNet North West Hydrogen Pipeline Project 19.1km

Qualifying features	HyNet North West Hydrogen Pipeline Project				
Effect	Habitat loss	Disturbance/ displacement	Pollution/ INNS	Habitat fragmentation	In- combination
<i>wigeon, NW Europe 69,841 individuals, representing an average of 4.6% of the population (5 year peak mean 1998/99-2002/03); teal, NW Europe 5,107 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/99-2002/03); pintail, NW Europe 1,497 individuals, representing an average of 2.4% of the population (5 year peak mean 1998/99-2002/03); oystercatcher, Europe & NW Africa - wintering 18,926 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/99-2002/03); and bar-tailed godwit, W Palearctic 13935 individuals, representing an average of 11.6% of the population (5 year peak mean 1998/99-2002/03).</i>					

✓ = Likely significant effect **cannot** be excluded ✕ = Likely significant effect **can** be excluded
C = construction O = operation D = decommissioning

Evidence supporting conclusions

- **a.** As detailed in **Table 5P 3.10**, the Ribble and Alt Estuaries Ramsar Site is located 19.1km from the Draft Order Limits and outside an identified Zone of Influence (Zol). Given the distance between this site and the Draft Order Limits, none of the qualifying features would be susceptible to direct effects resulting from direct habitat loss as there is no land take/land use or access required within the Zol of this site. There is potential FLL relating to the Ramsar Site (i.e. suitable wintering waterbird habitat) within the Draft Order Limits but this was not used regularly and in significant numbers during surveys in 2020/21 and 2024. It is also likely that the birds recorded here are qualifying or assemblage species of the Mersey Estuary. Therefore the Ribble and Alt Estuaries Ramsar Site qualifying and/or assemblage features would not be subject to any LSEs.
- **b.** Although some Ramsar Site qualifying (and waterbird assemblage) species were recorded “regularly” in “significant numbers” within 500m of the Project (e.g. black-tailed godwit and shoveler), it is considered that these birds are likely to be related to waterbird populations supported by the Mersey Estuary, which lies <1km from the Draft Order Limits. Therefore, it is considered that there is unlikely to be any pathway for LSE associated with disturbance and/or displacement on Ribble and Alt Estuaries Ramsar Site features as a result of the Project.
- **c.** As detailed in **Sections 3.2.12** and **3.2.13**, this European site falls outwith the Zol of the draft Order Limits (and wider road network), and therefore all qualifying species are unlikely to be affected by proposals.
- **d.** As detailed above (b), the features recorded during the survey programme likely relate to the Mersey Estuary waterbird populations. It is considered that there is no potential for barrier effects/habitat fragmentation during any of the development phases as any birds will be free to move across the Draft Order Limits. The Draft Order Limits are considered to be relatively narrow at their widest point within FLL, with respect to birds moving between connected habitats. Receptors, whether linked to the Ribble and Alt Estuaries or Mersey Estuary would therefore not be subject to any LSEs.
- **e.** With no potential pathways for LSE or LSE predicted for the Project, there are considered to be no potential for LSE through in-combination effects.

HyNet North West Hydrogen Pipeline

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