HyNet North West

ENVIRONMENTAL STATEMENT (VOLUME II)

Chapter 8 Cultural Heritage

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

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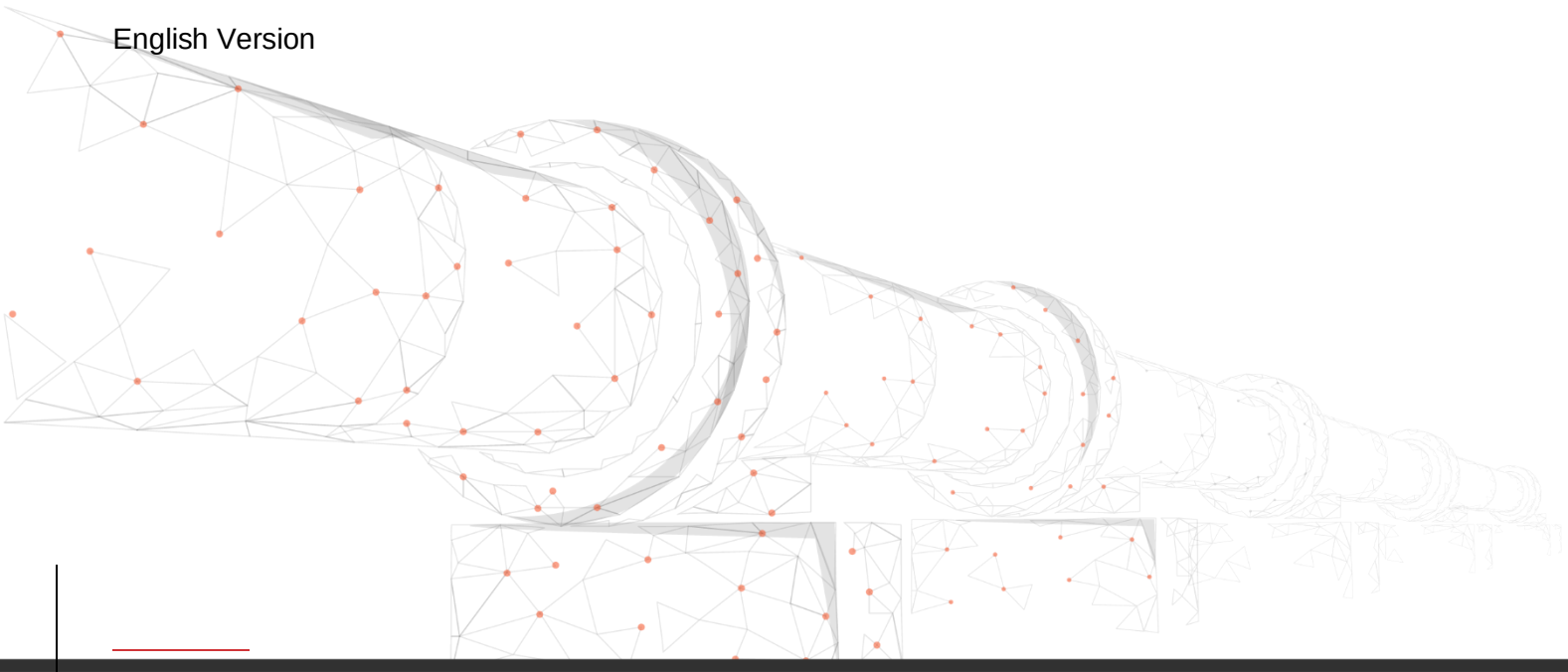

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8. CULTURAL HERITAGE

8.1. INTRODUCTION

8.1.1. This Chapter reports the assessment of the likely significant effects of the Development Consent Order (DCO) Proposed Development on Cultural Heritage (also known as the Historic Environment). The focus of the assessment is on buried heritage assets (archaeological remains and palaeoenvironmental deposits) and above ground heritage assets (buildings, structures, monuments and landscapes of heritage interest), including the character and setting of designated heritage assets. The Chapter describes:

- Relevant, legislation, policy and guidance;
- Consultation undertaken;
- Scope of the assessment;
- Assessment methodology;
- Baseline conditions;
- Sensitive receptors;
- Design development and embedded mitigation;
- Assessment of likely impacts and effects;
- Mitigation and enhancement measures;
- Residual effects;
- Monitoring; and
- Next steps.

8.1.2. The Chapter describes the assessment methodology, the baseline conditions within the Newbuild Infrastructure Boundary and in the surrounding area and provides a summary of the likely significant environmental effects arising from the construction, operation and decommissioning of the DCO Proposed Development. It outlines mitigation measures required to prevent, reduce or off-set any significant negative environmental effects, and reports on the likely residual effects after these measures have been employed.

8.1.3. This Chapter is supported by the following Technical Appendices:

- **Appendix 8.1 - Heritage Environment Desk Based Assessment (HEDBA)** (**Volume III**),
- **Appendix 8.2 - Gazetteer of Heritage Assets** (**Volume III**),
- **Appendix 8.3 - Aerial Photo and LiDAR review** (**Volume III**)
- **Appendix 8.4 - Geophysical Survey Report** (**Volume III**).
- **Appendix 8.5 - Geoarchaeological Deposit Model** (**Volume III**)

8.1.4. This Chapter is also supported by the following Technical Figures:

- **Figure 8.1 – Designated Heritage Assets (Volume IV)**
- **Figure 8.2 – Non-designated Heritage Assets (Volume IV)**
- **Figure 8.3 – Previous Investigations (Volume IV)**

8.1.5. This Chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to **Chapter 3 – Description of the DCO Proposed Development** and **Chapter 12 – Landscape and Visual (Volume II)**. An overarching **Outline Archaeological Written Scheme of Investigation (OAWSI) (Document reference: D.6.5.2)** setting out the general approach to intrusive archaeological investigation to be undertaken in support of the DCO Proposed Development is provided alongside this DCO Application. An **Archaeological Evaluation Report [REP4-267]** has also been prepared and submitted as part of the DCO process.

8.1.6. This Chapter has been prepared by competent experts that are members of the Chartered Institute for Archaeologists (CIfA) with relevant and appropriate experience, within a CIfA Registered Archaeological Organisation. This is outlined in **Appendix 5.1 – Relevant Expertise and Competency (Volume III)**.

8.2. LEGISLATIVE AND POLICY FRAMEWORK

8.2.1. A summary of the international, national, and local legislation, planning policy and guidance relevant to the Cultural Heritage assessment for the DCO Proposed Development is set out below.

LEGISLATIVE FRAMEWORK

8.2.2. The legislation considered during the preparation of this Chapter is summarised as follows:

National

Ancient Monuments and Archaeological Areas Act 1979 (**Ref. 8.1**)

8.2.3. An Act to consolidate and amend the law relating to ancient monuments which sets out the procedures to list on, amend, or remove ancient monuments from a register or schedule; gives protection to ancient monuments; requires any works within the boundaries of the scheduled ancient monuments to be taken under Scheduled Monument Consent granted by the Secretary of State.

Historic Environment (Wales) Act 2016 (**Ref. 8.2**)

8.2.4. An Act of the National Assembly for Wales which makes provision for the protection and sustainable management of the historic environment, giving more effective protection to listed buildings and setting out the procedures for consents to changes within the designated aspects of the historic environment within Wales.

The Planning (Listed Buildings and Conservation Areas) Act of 1990 (**Ref.8.3**)

8.2.5. Provides for a list of buildings of special architectural or historical interest classified as Grades I, II* and II, and accorded statutory protection. Areas of special architectural or historic interest can be designated as conservation areas. Requires decision-makers to have special regard to the desirability of preserving a building or its setting or any features of special architectural or historic interest which it possesses, and to preserving or enhancing the character and appearance of conservation areas.

Protection Of Military Remains Act 1986 (**Ref. 8.4**)

8.2.6. Sets out specific protections for the remains of military aircraft and vessels that have crashed, sunk or been stranded and of associated human remains, including a general prohibition on any disturbance or removal of such remains without a licence granted by the Secretary of State.

The Hedgerow Regulations 1997 (**Ref. 8.5**)

8.2.7. Regulations restricting the removal of hedgerows of particular interest which are 'important hedgerows'. The criteria for defining important hedgerows include heritage considerations: marking the boundary, or part of the boundary, of at least one historic parish or township; incorporating an archaeological feature (Scheduled Monument or recorded in the HER); situated wholly or partly within an archaeological site or on land adjacent to and associated with such a site; marks the boundary of a pre-1600 AD estate or manor; or recorded in a document held at the relevant date at a Record Office as an integral part of a field system pre-dating the Inclosure Acts.

POLICY

National

National Policy Statement for Energy EN1 (**Ref. 8.6**)

8.2.8. This National Policy Statement (NPS) sets out national policy for the energy infrastructure. The relevant policies are set out in Section 5.8 of the statement.

8.2.9. An update of the National Policy Statement for Energy EN1 (**Ref. 8.7**) was published for consultation on 6 September 2021. The consultation period is now closed but the draft has not yet been accepted. The relevant policies are set out in Section 5.9 of the statement.

National Planning Policy Framework (NPPF) (**Ref. 8.8**)

8.2.10. The Government issued a revised version of the National Planning Policy Framework (NPPF) in July 2021 (MHCLG 2021) and supporting revised Planning Practice Guidance in 2018 (MHCLG 2018). Section 16 of the NPPF deals with 'Conserving and Enhancing the Historic Environment'. The NPPF recognises that heritage assets are an irreplaceable resource which 'should be

conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations' (para 189).

Planning Policy Wales (PPW) Edition 11, Chapter 6: Distinctive and Natural Places (February 2021) (**Ref. 8.9**)

8.2.11. PPW Chapter 6 (2021) outlines policies for the historic environment and planning applications in relation to Archaeological Remains, Listed Buildings, Locally Listed Assets, Historic Landscapes including the significance and setting of historic assets. The relevant policies of PPW are set out in paragraphs 6.1.10–6.1.29.

Planning Policy Wales Technical Advice Note 24: The Historic Environment – the Setting of Historic Assets (**Ref. 8.10**)

8.2.12. The purpose of TAN 24 is to provide guidance on how the planning system considers the historic environment during development plan preparation and decision making on planning and Listed Building (LBC) applications. This TAN provides specific guidance on how aspects of the historic environment should be considered.

Local

Cheshire West and Chester Local Plan (Part One) Strategic Policies (2015) and (Part two) Land Allocations and Detailed Policies (2019) (**Ref. 8.11**)

8.2.13. The Cheshire West and Chester Local Plan (Part One) Strategic Policies was adopted 29 January 2015. The Cheshire West and Chester Local Plan (Part two) Land Allocations and Detailed Policies was adopted 18 July 2019. The relevant policies are ENV5 and DM 46 – DM 50.

FLINTSHIRE LOCAL DEVELOPMENT PLAN 2015–2030 ADOPTED 24 JANUARY 2023 (REF. 8.31)

8.2.14. The Flintshire Local Development Plan (LDP) was adopted 24 January 2023 and is in force as of the date of this report. ~~The Flintshire Local Development Plan was adopted 24 January 2023 and is in force as of the date of this report~~. The relevant policies are EN8–EN10.

GUIDANCE

National

8.2.15. The guidance used during the preparation of this Chapter is summarised as follows.

- National Planning Policy Guidance (**Ref. 8.13**)
- Conservation principles, policies and guidance, Historic England 2008 (**Ref. 8.14**)

- Conservation principles, policies and guidance Consultation Draft, Historic England 2017 (**Ref. 8.15**)
- The Setting of Heritage Assets, Historic England 2017 (**Ref. 8.16**)
- Statements of Heritage Significance, Historic England 2019 (**Ref. 8.17**)
- Conservation Principles for the Sustainable Management of the Historic Environment in Wales, Cadw 2011. (**Ref. 8.18**)
- Heritage Impact Assessment in Wales, Cadw 2017a. (**Ref. 8.19**)
- Setting of Historic Assets in Wales, Cadw 2017b. (**Ref. 8.20**)
- Standard and Guidance for Historic Environment Desk-based Assessment, Chartered Institute for Archaeologists (CIfA) 2020a (**Ref. 8.21**)
- Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment, CIfA (2020b) (**Ref. 8.22**)

8.3. SCOPING OPINION AND CONSULTATION

RESPONSE TO THE SCOPING OPINION

8.3.1. An EIA Scoping Opinion was received by the Applicant from the Planning Inspectorate ('The Inspectorate') on 14 July 2021, including formal responses from Statutory Consultees. A full list of the responses from The Inspectorate and how these requirements have been addressed by the Applicant are set out in **Appendix 1.3 – EIA Scoping Opinion Responses (Volume III)**.

CONSULTATION UNDERTAKEN TO DATE

8.3.2. Consultation with Historic England, Cadw, the Archaeology Planning and Advisory Service (APAS) for Cheshire West and Chester, and Clwyd-Powys Archaeological Trust (CPAT) was undertaken on 27 May 2021 to present the DCO Proposed Development and discuss the proposed assessment methodology and review the key heritage constraints.

8.3.3. Further consultation was undertaken (by email correspondence) in January 2022 to agree the rationale and scope for the Geophysical Survey. The Written Scheme of Investigation (WSI) for the Geophysical Survey was approved on 25 January and 8 February 2022, by APAS and CPAT respectively.

8.3.4. Following completion of the Geophysical Survey, the results were shared with both CPAT and APAS on 22 June 2022. The results of the survey were discussed in email exchanges and the archaeological advisors noted features of interest that warranted investigation within the strategy for targeted evaluation.

8.3.5. A teleconference to review the final development proposal plans and discuss potential mitigation was undertaken on 18 August 2022, and has been used to inform the Final ES.

8.4. SCOPE OF THE ASSESSMENT

8.4.1. The scope of this assessment has been established through an ongoing scoping process. Further information can be found in **Chapter 5 - EIA Methodology (Volume II)** of this ES.

8.4.2. This section provides an update to the scope of the assessment and re-iterates the evidence base for scoping out elements following further iterative assessment.

ELEMENTS SCOPED OUT OF THE ASSESSMENT

8.4.3. As described in **Appendix 1.3 - Scoping Opinion and Responses (Volume III),** several heritage assets have been scoped out of the assessment based on professional opinion and observations from site inspection and visualisations (**Chapter 12 - Landscape and Visual, Volume II**). A number of factors have been considered in determining whether or not the impacts of the DCO Proposed Development are likely to result in significant effects (or otherwise) on either above ground heritage assets, or the contribution that the setting makes to the significance of heritage assets. These include:

- The potential for direct physical impacts to a built heritage asset resulting in substantial harm to their 'heritage significance' as a result of alteration, partial demolition or loss;
- The nature and scale of the DCO Proposed Development;
- The location and the Zone of Theoretical Visibility (ZTV);
- Visualisations of the DCO Proposed Development;
- The fact that the greater the distance a built heritage asset is from the Newbuild Infrastructure Boundary, the more diminished the visual effects are likely to be;
- The location and position of intervening development, infrastructure, vegetation and landscape features; and
- The location and direction of key views likely to contribute meaningfully to a particular asset's significance.

8.4.4. The existing Flint Connection to Point of Ayr (PoA) Terminal Pipeline has been considered as a historic impact only. No effect arising from construction, operation or decommissioning activities associated with the existing pipeline has been considered within the assessment.

8.4.5. The following effects are considered insignificant and have been scoped out of this ES Chapter:

Table 8.1 - Elements Scoped Out of the Assessment

Element Scoped Out	Justification
Construction effects on the setting of designated heritage assets out of view of, or over 100m from, the Newbuild Infrastructure Boundary	An assessment of construction effects of the DCO Proposed Development on designated heritage assets that are either out of view or beyond the immediate vicinity of the Newbuild Infrastructure Boundary (<100 m) has been scoped out on the basis that there is unlikely to be a significant temporary effect from dust, noise and vibration and artificial lighting due to the distance between the works and these assets.
Operational effects on buried heritage assets	An assessment of operational effects on buried heritage assets have been scoped out on the basis that, once the DCO Proposed Development has been completed, no further ground disturbance is expected as part of the DCO Proposed Development. As such, effects on the buried archaeological resource are 'scoped out' of further consideration within this Chapter.
Operational effects on the setting of designated above ground heritage assets, where they are considered insignificant	The scope will only include those assets that may be subject to a 'significant' change to their setting in accordance with the stepped approach set out in Historic England (**Ref. 8.16**) and the Landscape Institute and Institute of Environmental Management and Assessment (**Ref. 8.23**).
Cumulative effects on buried heritage assets	This has been scoped out. Cumulative effects are ‘elevated’ effects which occur where the combined effect of the DCO Proposed Development with other developments in the vicinity, on a discrete and significant shared buried heritage asset, is more severe than that reported for the DCO Proposed Development. This is on the basis that for intangible and deeply buried heritage assets it is not feasible to quantify accurately the nature of the resource across the Study Area, which will enable the identification of a cumulative impact and potential elevated effect.

Element Scoped Out	Justification
Decommissioning effects	These have been scoped out on the basis that there will be no further impact on buried archaeology from decommissioning activity if it takes place within land directly impacted by the DCO Proposed Development. In addition, the decommissioning will broadly result in a return to current baseline conditions and therefore will result in no impact through changes in setting. Activities engaged in the removal of the above ground aspects of the DCO Proposed Development will have a temporary impact on the setting of nearby built heritage assets; however, the mitigation will already be established and therefore will result in a negligible impact on the asset.
Operation and Decommissioning Stage effects on hedgerows considered 'important' under the Hedgerow Regulations (**Ref. 8.5**)	The baseline assessment has identified 21 hedgerows possibly considered 'important' under the Hedgerow Regulations (**Ref. 8.5**). No further impact on the hedgerows is anticipated following the Construction Stage and therefore it has not been considered further.

ELEMENTS SCOPED INTO THE ASSESSMENT

Construction Stage

8.4.6. The following elements have been scoped into the assessment:

- physical impacts to buried heritage assets in areas where ground disturbance is proposed;
- physical impacts to above ground heritage assets;
- impacts to the significance of designated heritage assets in the vicinity of the DCO Proposed Development (within 100 m) or within direct sight of it, through changes to setting and how the asset is understood and appreciated;
- physical impacts to hedgerows considered 'important' under the Hedgerow Regulations (Ref. 8.6); and
- physical impacts to historic landscape character.

Operation Stage

8.4.7. The following element has been scoped into the assessment:

- the setting of selected designated heritage assets within the Study Area around the DCO Proposed Development within 100 m or direct line of sight to an Above Ground Installation (AGI) or Block Valve Station (BVS).

8.5. ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

STUDY AREA

8.5.1. The Study Area for designated heritage assets consists of a 1 km buffer around the Newbuild Infrastructure Boundary. The Study Area for non-designated heritage assets and previous archaeological investigations consists of a 500 m buffer around the Newbuild Infrastructure Boundary. The Study Areas were determined using professional judgement and through consultation and agreement with Historic England, Cadw, Cheshire West and Chester Council (CWCC) and Flintshire County Council's (FCC) archaeological advisors.

8.5.2. **Figures 8.1 – Designated Heritage Assets** and **Figure 8.2 – Non-Designated Heritage Assets (Volume IV)** show the location of designated and non-designated heritage assets within the Newbuild Infrastructure Boundary and associated Study Areas. These have been identified from the sources below, during the site visit, or through the course of research for this assessment.

METHOD OF BASELINE DATA COLLATION

Heritage Environment Desk Based Assessment (HEDBA)

8.5.3. **Appendix 8-1 – HEDBA (Volume III)** provides a desk-based study and includes a review of available information to determine the baseline conditions within the Newbuild Infrastructure Boundary and surrounding Study Area. This assessment consisted of an analysis of existing written, graphic, photographic and electronic information, and a site walkover, in order to identify the likely heritage assets and determine their significance. The following data sources were reviewed:

- Historic England, for records on statutory designated assets (**Ref. 8.2**) and aerial photographs;
- Archwilio, the Heritage Environment Record of Wales, for details of designated heritage assets (including World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Heritage Parks and Gardens and Registered Battlefields) (**Ref. 8.26**);
- The Cheshire Historic Environment Record (CHER) for records on statutory designated sites, and for records of known archaeological or historical interest and archaeological events;
- The Clwyd-Powys Archaeological Trust (CPAT) Historic Environment Record (HER) for records on statutory designated sites, and for records of known archaeological or historical interest and archaeological events;

- Cheshire Archives;
- North East Wales Archives;
- National Library of Wales;
- Royal Commission on the Ancient and Heritage Monuments of Wales, the National Monuments Record (NMR) of Wales;
- DEFRA LiDAR data (**Ref. 8.27)**;
- Natural Resources Wales LiDAR data received from Lle Geo-Portal (**Ref. 8.28**);
- Local Planning Authority (LPA) information on conservation areas and locally listed buildings;
- Primary sources such as maps and documents;
- British Geological Survey data and available geotechnical and topographical survey data (**Ref. 8.24**); and
- Online sources, such as British History Online (**Ref. 8.29**) and the Archaeological Data Service (**Ref. 8.30**).

Site Visit and Surveys

8.5.4. ~~Four~~ Five site visits have been conducted within the Newbuild Infrastructure Boundary and Study Area:

- A preliminary visual survey of the route of the DCO Proposed Development, was undertaken on the 20 of September 2021. This was to assess access for the proposed geophysical survey, to identify any potential non-archaeological constraints for the non-intrusive survey.
- A site walkover was undertaken between 11–15 October 2021, to determine the topography and existing land use, identify any visible heritage assets (e.g. structures and earthworks), and assess any possible factors which may affect the survival or condition of any known or potential heritage assets.
- A site walkover undertaken at the proposed Block Valve Station (BVS) and Above Ground Installation (AGI) locations and to complete the setting assessments for heritage assets within 1km along the route on the 24 and 25 February 2022 (as per Historic England on setting (**Ref. 8.16**)).
- A further site walkover was carried out on 3 June 2022 for the purposes of baseline assessment and revised settings appraisal for an additional site parcel located at Deeside Lane in Sealand, Flintshire.
- A site visit was undertaken on the 8 December 2022 to ascertain the setting impact of the proposed relocation of Northop Hall AGI (PS03) to the north-west of its original position on the Grade II listed Highfield Hall (Cadw Ref. 322).

Geophysical Survey

8.5.5. A Geophysical Survey (as reported in **Appendix 8-4, Volume III**) was undertaken across suitable sections of the Newbuild Infrastructure Boundary. The results of this survey have been incorporated into the **HEDBA** (**Appendix 8-1, Volume III**) and this Chapter. The purpose of the geophysical survey was:

- To determine, as far as is reasonably possible, the nature of the detectable archaeological resource within a specified area using appropriate methods and practices; and
- To inform either the scope and nature of any further archaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

8.5.6. Prior to the survey, a scoping exercise was carried out along the Newbuild Infrastructure Boundary. The sites selected for survey were determined by a number of factors. The BVSs to be located along the existing Flint Connection to PoA Terminal Pipeline were scoped out of the geophysical survey on the rationale that the ground, and therefore any buried archaeology, had been disturbed by the previous construction works for the installation of the existing Flint Connection to PoA Terminal Pipeline. Sites on alluvium, colluvium, blown sand or peat were scoped out, as the geophysical survey method was not considered to be appropriate to produce useful results. Archaeological features in these types of deposits would likely be deeply buried, beyond depths of 1m, and outside the effective detecting range of the instrument.

8.5.7. A further consideration was the extent of the site. At narrow linear locations, such as access routes, preliminary geophysical survey was not considered appropriate. This is because unless a wide area can be covered then the identification of features can be difficult.

IMPACT ASSESSMENT METHODOLOGY

8.5.8. Following the characterisation of the baseline conditions, the methodology used to characterise the likely environmental effects on known and potential heritage assets has entailed:

- Evaluating the significance of heritage assets, based on existing designations and professional judgment (where assets have no formal designation), and considering historical, archaeological, architectural / artistic interest as outlined in Historic England's Conservation Principles (**Ref. 8.14** and **Ref. 8.15**);
- Evaluating the contribution that setting makes to the overall significance of above ground heritage assets selected for assessment (**Ref. 8.16**);

- Predicting the magnitude of change upon the known or potential heritage significance of assets and the likelihood and resulting significance of environmental effect (**Ref. 8.17**);
- Considering the mitigation measures that have been included within the Preliminary Design of the DCO Proposed Development and any additional mitigation that might be required in order to avoid, reduce or off-set any significant negative effects; and
- Quantifying any residual effects (those that might remain after mitigation).

SIGNIFICANCE CRITERIA

8.5.9. The Overarching National Policy Statement for Energy (EN-1) defines significance as '*The sum of the heritage interests that a heritage asset holds*'. That interest may be historic, archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

8.5.10. The determination of the significance is based on statutory designation and/or professional judgment based on the above interests or values. Full descriptions and definitions of each value can be found in **Appendix 8.1 – HEDBA (Volume III).**

8.5.11. The assessment has considered the contribution which the heritage character and setting makes to the overall significance of designated assets. The established terminology of 'significance' as defined by HE's Conservation Principles (**Ref. 8.15**) is equivalent to 'sensitivity' or 'value' in EIA terms.

8.5.12. **Table 8.2** gives examples of the significance of designated and non-designated heritage assets.

Table 8.2 - Significance of heritage assets

Heritage Asset Description	Significance
World heritage sites	Very High
Scheduled Monuments Grade I Listed Buildings Grade II* Listed Buildings Grade II Listed Buildings which can be shown to have exceptional qualities in their fabric or historical associations, or which are clearly associated with heritage assets of high, national significance Conservation Areas containing buildings of great importance Non-designated structures of clear national importance.	High

Heritage Asset Description	Significance
Non-designated below ground Heritage Assets of clear national importance	
Grade II Listed Buildings which can be shown to have qualities in their fabric or historical association of regional importance only Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical associations Locally Listed Buildings Conservation Areas containing buildings that contribute significantly to its heritage character Historic Townscape or built-up areas with important historic integrity in their buildings, or built settings Known buried Heritage Assets of regional importance	Medium
Historic (unlisted) buildings of modest quality in their fabric or historical association. Historic Townscape or built-up areas of limited historic integrity in their buildings, or built settings Known buried Heritage Assets of local importance	Low
Item with no significant value or interest	Negligible
Heritage assets that have a clear potential, but for which current knowledge is insufficient to allow significance to be determined	Uncertain

Magnitude of impact

8.5.13. The assessment of the magnitude of impact (i.e. change) is the identification of the degree of the impact of the DCO Proposed Development on the heritage assets. There is no standard scale of comparison against which the severity of effects on heritage assets may be judged, because of the great variety of resources and assets, but it is based on the deviation from baseline conditions. The assignment of a magnitude of impact is a matter of professional judgement and is summarised in **Table 8.3**.

Table 8.3 - Magnitude of Impact Criteria

Impact	Description
Major	Change to most or all key archaeological materials or key historic building elements, such that the resource is totally altered Comprehensive changes to setting
Moderate	Changes to many key archaeological materials or key historic building elements, such that the resource is clearly modified Considerable changes to setting that affect the character of the asset
Minor	Changes to key archaeological materials or key historic building elements, such that the asset is slightly altered Slight changes to setting
Negligible	Very minor changes to archaeological materials or historic building elements, or setting
No Change	No change

8.5.14. The significance of effect on heritage assets has been derived from a consideration of the significance (value) of the receptor (asset) and the magnitude of the impact upon it, as illustrated by the matrix in **Table 8.4**.

Table 8.4 - Matrix for Determining Significance of Effect

		Magnitude of Impact				
		Major	**Moderate**	**Minor**	**Negligible**	**No Change**
Value	**Very High**	Very Large	Large/ Very Large	Moderate/ Large	Slight	Neutral
	High	Large/ Very Large	Moderate/ Large	Moderate/ Slight	Slight	Neutral
	Medium	Moderate/ Large	Moderate	Slight	Neutral/ Slight	Neutral
	Low	Slight/ Moderate	Slight	Neutral/ Slight	Neutral/ Slight	Neutral
	Negligible	Slight	Neutral/ Slight	Neutral/ Slight	Neutral	Neutral
	Uncertain	Unknown	Unknown	Unknown	Unknown	Unknown

8.5.15. In EIA terms, a moderate or greater effect is considered '*significant'.*

8.5.16. Rather than apply the test of the NPS when considering the impact of the DCO Proposed Development on designated assets, the language used in the NPS (i.e., harmful impact or substantial harm) has been correlated with the standard EIA methodology. A large or very large effect may equate to 'substantial harm' or 'total loss of significance'. Whether they do so shall be determined by a qualitative analysis of the specific impact to the environment and will be based on professional judgement. If/where this is the case, the basis for any judgement will be outlined.

Assessing the Contribution of Setting to the Value of Heritage Assets

8.5.17. In relation to designated heritage assets, the assessment considers the contribution that setting makes to the overall value of the asset.

8.5.18. Setting is the way in which the asset is understood and experienced. It is not an asset in itself. It differs from curtilage (heritage/present property boundary); context (association with other assets irrespective of distance) and heritage character (sum of all heritage attributes, including setting, associations, and visual aspects).

8.5.19. Guidance produced by Historic England (**Ref. 8.16**) and the Landscape Institute and Institute of Environmental Management and Assessment (**Ref. 8.23**) has been used to adopt a staged approach to assessing the potential for impacts on the significance of the settings of heritage assets, as follows:

- **Stage 1:** asset identification. The NPPF requires an approach that is proportional to the significance of the asset, and for this reason only the settings of the most sensitive (i.e., designated) heritage assets are considered in this assessment. A scoping exercise filtered out those assets which would be unaffected.
- **Stage 2:** assess the contribution of setting. This stage assesses how setting contributes to the overall significance of a designated asset;
- **Stage 3:** assess change. This stage identifies the effects the proposals may have on setting and considers the resultant harm or benefit to the significance of the heritage asset. It is noted however that it can be difficult to quantify such change to the overall significance of a Designated Heritage Asset (for example, significance would rarely be downgraded from 'high' to 'medium' due to changes in setting). For this reason, the impact is reported in this assessment in terms of the extent to which the proposals would change how the asset is understood and experienced;
- **Stage 4:** mitigation. This explores the way to maximise enhancement and avoid or minimise harm. This is typically considered at the design stage (i.e. embedded mitigation); and
- **Stage 5**: reporting. Making and documenting decisions and outcomes.

8.5.20. The assessment has considered the physical surroundings of the asset, including topography and intervening development and vegetation. It also considers how the asset is currently experienced and understood through its setting, in particular the visual aspect of the asset along with any changes to the noise, air quality and light surrounding the asset, and the extent to which setting may have already been compromised. These attributes all contribute to the overall setting.

8.5.21. Following Stage 3, the impact is described as beneficial, neutral or adverse with an indication of its magnitude.

8.5.22. Changes may occur to the settings of an asset that neither affect their contribution to the significance of the asset, nor the extent to which its significance can be experienced. In such instances it will be considered that there is no impact through changes in the setting.

ASSUMPTIONS AND LIMITATIONS

8.5.23. This Chapter forms an assessment based on available information at the time of preparation and represents a reasonable worst case and precautionary approach based on the Rochdale Envelope approach. The position of the Newbuild Carbon Dioxide Pipeline considered for the assessment is not limited and would include any reasonable position within the 'Permanent Acquisition of Subsurface Area'.

8.5.24. The assessment considers potential impacts as a result of the construction and operation of the Newbuild Carbon Dioxide Pipeline which connects to the existing Flint Connection to PoA Terminal Pipeline. The impacts from the construction of the existing Flint Connection to PoA Terminal Pipeline have only been considered as a historic impact and are noted as such within the assessment.

8.5.25. The following limitations apply to the assessment:

- No intrusive surveys or intrusive palaeoenvironmental assessment have been undertaken to support the ES. The assessment undertaken to date is considered to be sufficient to allow significant impacts to be identified and assessed based on the precautionary approach mentioned above.
- Due to the nature of below-ground archaeological remains, buried and not visible from the surface, there is always an element of uncertainty regarding the survival, condition, nature and extent of the known assets identified within the Newbuild Infrastructure Boundary. This will be addressed by further site-based archaeological investigation where appropriate.
- Due to restricted access, not all built heritage assets could be fully viewed for the assessment of setting. Details are available in **Appendix 8.1 – HEDBA (Volume III).**

- The data provided by HERs is not a record of all surviving heritage assets, but a record of the discovery of a wide range of archaeological and historical components of the heritage environment. There is a potential for the presence of further unrecorded heritage assets to be present.

8.6. BASELINE CONDITIONS

EXISTING BASELINE

8.6.1. The Baseline Historic Environment thematic overview (including topography and geology) is contained within **Appendix 8-1: HEDBA** (**Volume III**) along with the **Historic Environment Gazetteer** in **Appendix 8.2** (**Volume III**) (which lists the detailed descriptions of all known Historic Environment features).

8.6.2. The following is a high-level overview of the historic environmental baseline and the surrounding Study Area. The detailed historic environment baseline is provided in detail in **Appendix 8.1: HEDBA** (**Volume III**) and summarised below.

8.6.3. In the **HEBDA** (**Appendix 8–1, Volume III**), the Newbuild Infrastructure Boundary has been divided into three broad groups, which equate with the eastern end of the Newbuild Carbon Dioxide Pipeline in Cheshire, the western section in Flintshire and the discrete BVSs along the Flint Connection to PoA Terminal Pipeline, also located within Flintshire. This distinction was made for the purposes of providing a broad archaeological and historical background narrative and includes mention of any past archaeological investigations that have been carried out.

Designated Heritage Assets

8.6.4. A total of ~~183~~ 208 designated heritage assets are present within 1km of the Newbuild Infrastructure Boundary, comprising~~-~~:

- ~~20~~ 22 Scheduled Monuments;
- ~~150~~ 173 Listed Buildings;
- 2 Registered Historic Parks and Gardens;
- 1 Registered Historic Landscape; and
- 10 Conservation Areas.

8.6.5. Of these, only three designated heritage assets lie within the Newbuild Infrastructure Boundary, comprising Chester Canal Conservation Area, Thornton-le-Moors Conservation Area and the Holywell Common and the Halkyn Mountain Registered Historic Landscape (HLW (C) 2).

8.6.6. Thirty-six heritage assets were observed within the Newbuild Infrastructure Boundary (shown on **Figure 8.2 – Non-designated Heritage Assets (Volume IV)**) during the site walkovers.

Topography and Geology

8.6.7. Topography can provide an indication of suitability for settlement which, along with geology data (as mapped by British Geological Survey (**Ref. 8.24**), can provide an indication of suitability for early settlement, and the potential depth of remains.

8.6.8. Within Cheshire, the landscape is characterised by rolling hills which are intercut by successive river valleys and streams, along with extensive low-lying areas of former marshland. Notably, these include the River Gowy in the north-east and along the edge of the district boundary, and the River Dee. The natural topography is lower across the Ince Marshes (where alluvium is present) and rises gradually from here towards the River Dee Valley. The ground level in the Flintshire section rises gradually from the River Dee valley in Mancot and Sandycroft flattening out towards Ewloe.

8.6.9. Towards Flintshire and the River Dee valley the topography becomes relatively flat, which forms an extensive floodplain containing superficial deposits of alluvium and in parts Glaciofluvial deposits. Across Flintshire the superficial deposits comprise a conglomeration of tills, overlying mudstone bedrock.

Archaeological and historical background

Prehistoric Period (800,000 BC–AD 43)

8.6.10. The earliest evidence of prehistoric activity within the Newbuild Infrastructure Boundary dates to the Bronze Age. The westernmost section of the development from Northop Hall through the Babell BVS site is located within a known prehistoric landscape dominated by funerary monuments dating to the Bronze Age. The remains of three round barrows are noted as damaged or destroyed within close vicinity to Northop Hall (101848, 100051, and 100049) and within 1 km of the Pentre Halkyn and Babell BVSs there are five Scheduled Monuments dated to the prehistoric period comprising numerous round barrows (FL006, FL046, FL076, FL096, FL189) and the late Bronze Age to Iron Age hillfort Bwrdd y Rhyfel Camp (FL072).

Roman (AD 43–410)

8.6.11. The evidence for Roman activity is limited to the lines of suspected Roman roads. The closest evidence of Roman settlement and extensive activity is found in and around the Pentre Bridge Roman Scheduled Monument (FL131) located on the southern bank of the River Dee, *c* 850 m north of the indicative route of the Flint AGI to Flint Connection Pipeline. Investigations undertaken in and between the modern towns of Flint and Oakenholt, 800–950 m north and north-east of the Newbuild Infrastructure Boundary, have identified Roman industrial activity. The Croes Atti Roman site (a road, settlement and associated cemetery) scheduled monument (FL213) is 762 m to the north-east of the

indicative route of the Flint AGI to Flint Connection Pipeline. Isolated find spots in the form of coins and jewellery have been noted throughout the Study Area.

Early Medieval period (AD 410–1066)

8.6.12. The departure of the Romans from Wales is dated to *c.*383 AD and the period following their departure in Cheshire and North Wales is not well represented in the archaeological record. Anglo-Saxon activity within the Study Area is documented through place name evidence but little else.

8.6.13. By the 8th century, the kingdom of Mercia had pushed into the low-lying regions of Wales, evidenced through the construction of defensive earthworks. Wat's Dyke stretched from Basingwerk Abbey on the Dee Estuary to the Severn Estuary and the more substantial, Offa's Dyke, formed an acknowledged border between Mercia and the Welsh Kingdoms. It is thought that the dykes may have been constructed to limit raiding and regulate trade and population movement. The assumed line of Wat's Dyke runs along the east bank of the Afon Nant-y-Fflint which lies within the Newbuild Infrastructure Boundary of the proposed Cornist Lane BVS, though the presence of this dyke has not been confirmed through archaeological investigation.

Late medieval period (AD 1066–1540)

8.6.14. Following the Norman conquest of 1066, King William I took over most of the Saxon lands, which included Cheshire, after protracted rebellions which resulted in the destruction of many communities in and around Chester. Although much of the land within Flintshire was conquered at the same time, Welsh revolts led to periods of unrest. It is these continued conflicts across the border areas that is thought to have led to the evolution of castle sites. Several small castles were built in the border area in the 12th and 13th centuries, predominantly by Norman lords. Examples within the Study Area include Hen Blas Castle Site (FL062) 870 m north of the proposed Cornist Lane BVS, and Ewloe Castle (FL002) 435 m north-west of the Newbuild Infrastructure Boundary at Ewloe.

8.6.15. Moated sites also became more prevalent during this period both as a form of defence and also in response to the low-lying marshy nature of much of the landscape. Examples within the Study Area include the moated site at Elton (NHLE 1012122) 35 m north-east of the Newbuild Infrastructure Boundary and Hafod Wood Moated Site (FL179) 560 m south-east of the proposed Cornist Lane BVS. Further settlement from this period across the Study Area is noted through the presence of Hen Caerwys Deserted Village Site (FL162) located 680 m south-west of the proposed Babell BVS. Whilst field systems, enclosures and hollow-ways, thought to date primarily to the later medieval period (FL163), are located 360 m south-west of the proposed Babell BVS. The HER notes the presence of Ffrith Farm Quillet (89506), 235m north of the proposed Cornist Lane BVS. The quillet, a form of field system usually represented by strip fields,

has been damaged and is obscured by modern development. Evidence of agricultural activity in the form of ridge and furrow exists throughout the Study Area.

8.6.16. Later medieval isolated find spots within the Study Area include: a silver pin from an annular brooch probably dating from c 1200–1400 (120334), small fragment of a cast copper alloy buckle (120335) and a silver long cross penny of Henry III minted in Canterbury between 1251–1272 (120386).

Post-medieval period (AD 1540–1901)

8.6.17. The settlement patterns within the Study Area, during the early 16th century, consisted of islands of settled and agriculturally developed land set in areas of open unmodified or unused land and the wetlands of the region located around the River Mersey, River Gowy and River Dee floodplains continued to be marshy and largely uninhabited. Chester remained the only city within the region and was the centre of activity and governance for the towns surrounding it.

8.6.18. Although agriculture was the predominant industry within the Study Area during the early post-medieval period, documentary evidence suggests that the manufacture of pottery was a common secondary occupation, the industry fuelled by the import of clays from areas such as North Wales. This initially started as a cottage industry but grew in size with pottery manufacturing evident at Buckley Potteries in Ewloe Green, c.250m south-west of the Newbuild Infrastructure Boundary.

8.6.19. The developments in transport infrastructure in this period, including the Trent and Mersey Canal and the Chester Canal, allowed industries in Cheshire and North Wales to take better advantage of the natural mineral resources in the area. The Welsh coal mining industry saw a sharp rise in demand, and this is reflected in the number of collieries present in the Study Area including the Ewloe Farm Colliery (103806) located within the Newbuild Infrastructure Boundary.

8.6.20. Travel innovations in the form of railways began to transform the landscape within Cheshire and Flintshire in the 19th century allowing for even greater connectivity and increased ease in the transport of goods and people. Cheshire's first railway line opened in 1837 and by 1875 and a railway link was provided at Ellesmere Port in 1863 via the Birkenhead Railway.

Modern period (20th century)

8.6.21. During the modern period, the landscape and focus of industrial activity within the Study Area began to change in response to external pressures. Mining within Flintshire declined at the end of the 19th century in the face of cheaper imported lead and only small-scale, intermittent activity continued following the First World War until the remaining mines closed in the 1960s. The prolonged agricultural depression in Britain along with the introduction of heavy taxes on inherited wealth in the 20th century, put an end to agricultural land being the primary source of wealth. These pressures resulted in the sale, either whole-sale or partial, of the several large estates in this region of Cheshire giving rise to the large-scale development surrounded by traditional rural agrarian landscape that is evidenced today.

8.6.22. The landscape within the Study Area was well utilised during the Second World War and the HER records a number of sites within the Newbuild Infrastructure Boundary. ROF Dunham on the Hill (4217, MCH9985), a Second World War ammunition site, was located at the Elton end of the Newbuild Infrastructure Boundary, whilst RAF Hawarden (85258) was developed, at Hawarden, in the late 1930s as a shadow factory for military planes. The factory had a connected airfield that was used for RAF intensive flight training. The sites of four military aircraft wrecks are noted within the Study Area around RAF Hawarden:

- the Airspeed Oxford II N4731 which crashed on 26/4/1940 (130274) 55 m west of the Newbuild Infrastructure Boundary;
- the Supermarine Spitfire I R7117 which crashed at Mancot on 30/3/1942 (130408) 340 m south-east of the Newbuild Infrastructure Boundary;
- the Armstrong Whitworth Siskin IIIDC J9207 which crashed on 14/7/1939 (130305) 450 m north-west of the Newbuild Infrastructure Boundary; and
- the Supermarine Spitfire I R6829 which crashed on 20/2/1942 (130407) 450 m north-west of the Newbuild Infrastructure Boundary.

8.6.23. Formerly small, dispersed settlements in the Study Area became increasingly developed within this period. The construction of motorway networks often formed the focus for an increase in residential and commercial development, for example at Elton in the vicinity of the M56. Whilst much of the Study Area remained agricultural, large scale industrial developments were created following the dewatering and reclamation of land in Stanlow and Ince Marshes.

Overview of past archaeological investigations

8.6.24. There have been 14 previous investigations undertaken within the extent of the Newbuild Infrastructure Boundary. Considering the full length of the DCO Proposed Development, this is a very small number of investigations and as such, current understanding of the nature and distribution of past activity, in

particular for the prehistoric, Roman and early Saxon period, for which there is no documentary record, is very limited.

8.6.25. The previous archaeological investigations are detailed in the HEDBA (**Appendix 8.1 - Heritage Environment Desk Based Assessment (HEDBA) (Volume III)**). A summary of the DCO Proposed Development geophysical survey and geoarchaeological assessment is provided below.

Aerial Photography and LiDAR Review (**Appendix 8.3, Volume III**)

8.6.26. Seventy-nine aerial photographs were utilised for the assessment from the Historic England Archive, while 66 were identified in The Royal Commission of Ancient and Historic Monuments of Wales's (RCAHMW) archive.

8.6.27. The LiDAR data was downloaded from publicly available sources. It does not provide full coverage of the Newbuild Infrastructure Boundary; approximately 61% of the Newbuild Infrastructure Boundary was covered by 1 m resolution and approximately 18% coverage from 2 m resolution. Altogether, coverage of the available LiDAR dataset was 78.5% of the Newbuild Infrastructure Boundary. In total, LiDAR data was found to be available for 360 hectares. Features of potential archaeological interest were identified by visual examination of the LiDAR imagery, in conjunction with other relevant datasets, within Newbuild Infrastructure Boundary.

8.6.28. The features identified are predominately evidence of agricultural activity. Feature types include late medieval and post-medieval ridge and furrow evidence, drainage features, access tracks and field boundaries. No features earlier than late medieval date were identified.

8.6.29. Twenty-six of the identified anomalies were discrete features, mostly sub-circular or sub-oval in plan. They were mostly identified within or at the edges of agricultural fields. While some of these features may be of natural origin, such as ponds, it is likely that many of these features represent post-medieval extraction pits and industrial activities.

8.6.30. The Newbuild Infrastructure Boundary crosses two reclaimed marshlands, the Ince Marshes and the Saltney Marshes. Palaeochannels were noted within both areas and occasionally across the Newbuild Infrastructure Boundary. The palaeochannels in the former Saltney Marshes are noted on historic maps from the 18th century and are also documented on the plans for the Dee canalisation activities.

Geophysical (Magnetometer) Survey (**Appendix 8.4, Volume III**)

8.6.31. The Applicant commissioned Magnitude Surveys Ltd to produce a magnetic geophysical survey of land within a 60m corridor around the indicative line of the Newbuild Carbon Dioxide Pipeline and 30m around the installations outlined in the DCO Proposed Development. The geophysical survey complied with

national and international guidance, including the Standard and guidance for archaeological geophysical survey.

8.6.32. Evidence for a possible pit alignment was recorded immediately south of the M56 and Thornton Lane (NGR 0344596, 373363). Pit alignments can date between the Late Bronze Age and medieval periods and are usually associated with periods where access to land is controlled and demarcated.

8.6.33. Other anomalies recorded during the geophysical survey were characterised as natural geological features, such as infilled oxbow lakes, and post-medieval to modern agricultural boundaries. Several strong anomalies were also interpreted as modern service pipes and cables. However, further investigation of these features is required.

Geoarchaeological Deposit Model Report (**Appendix 8.5, Volume III**)

8.6.34. Oxford Archaeology undertook a geoarchaeological deposit model at three locations, within the Newbuild Infrastructure Boundary, where the route traverses large tracts of tidal flat and peat deposits associated with the low-lying floodplains and marsh of the Rivers Mersey, Gowy, and Dee. The main aim of the work was to provide preliminary baseline data on the nature and depth of the sediment sequences and their geoarchaeological and palaeoenvironmental potential to inform the design of future evaluation and mitigation strategies. Area 1 was located in marshland at the north-eastern end of the DCO Proposed Development; Area 2 was within the River Gowy floodplain, also near the north-eastern end of the DCO Proposed Development; and Area 3 was within the River Dee floodplain, near the centre of the Newbuild Infrastructure Boundary.

8.6.35. The results of recent geotechnical ground investigation and historical boreholes sourced from the British Geological Survey (BGS) were used to prepare a geoarchaeological model. The result of the modelling is broadly consistent with the BGS mapping of the areas, with superficial sedimentary sequences dominated by minerogenic sands, clays, and silts, likely laid down in intertidal/alluvial environments. The thickness of Holocene deposits overlying Pleistocene glacial deposits was recorded to a maximum depth of *c* .15m in Area 1 marginal to the River Mersey; *c.* 7m in Area 2 on the Gowy floodplain; and *c.* 18.5m in Area 3 on the Dee. Analysis of LiDAR Digital Terrain Model (DTM) data has clearly identified the presence of tidal creek systems and palaeochannels, particularly across the floodplain of the River Dee (Area 3). Within the tidal deposits, the borehole data record multiple interbedded peat horizons which were particularly substantial in the north-eastern marshland in Area 1, and on the River Gowy floodplain in Area 2, the top of which occurred at, or within 1m of, current ground surface. Thin peats are recorded from parts of the Dee floodplain (Area 3), although the distribution here was found to be somewhat poor, with much of the data deriving from shallow test-pit interventions.

8.6.36. The overall data distribution was generally sparse. This was notable close to the floodplain edge in Areas 1 and 2, which are located at the interface between dryland and wetland. These areas may have provided a focus for past activity where evidence of occupation and relict land surfaces may lie buried at relatively shallow depths in waterlogged conditions. As a result, the character and depth of the interface of the Holocene and Glacial deposits is difficult to predict at these locations.

8.6.37. The waterlogged burial conditions suggest good potential for preservation of organic remains which may include wooden structures and artefacts associated with seasonal wetland edge occupation, particularly adjacent to former watercourses. In addition, the presence of substantial peat and intertidal deposits suggests high potential for preservation of a range of palaeoenvironmental remains (e.g. pollen, insects, and plant remains) and investigation of coastal evolution, sea-level change and palaeohydrology (e.g. diatoms, ostracods, and foraminifera).

Archaeological Evaluation Report **[REP4-267]**

8.6.38. Oxford Archaeology undertook a programme of 45 archaeological evaluation trenches, targeted on anomalies identified in the geophysical survey, and at the fixed locations, such as the Block Valve Stations and Above Ground Installations. Of these, 19 were excavated between Elton and Saughall in Cheshire West and Chester, and 26 between Deeside and Babell in Flintshire.

8.6.39. In Cheshire West and Chester, 8 of the 19 excavated trenches revealed a total of 13 archaeological features, alongside a small group of artefacts from three trenches. The most significant remains were revealed in~~by~~ Trench 28 and comprised a cobble and sandstone surface, likely ~~(~~a potential building footing,~~)~~ and a step-profiled ditch. Both assets were associated with Roman pottery, ironwork, and glass dating to the mid-second to mid-third century AD. This trench was located just to the south of Saughall on land overlooking the River Dee. Other features from Cheshire West and Chester mainly formed undated field boundaries which may form parts of early enclosure systems, peat deposits, and a palaeochannel. The possible pit alignment identified on the geophysical survey was not an archaeological feature, but an unrecorded buried pipe.

8.6.40. In Flintshire, 14 of the 26 excavated trenches revealed a total of 24 archaeological features. The earlie~~r~~st dateable feature from this area was found in Trench 78 and comprised a single pit which contained possible Bronze Age pottery and charred remains. Another pair of pits from Trench 58 were found to contain seventeenth to eighteenth century domestic refuse. Other undated boundary features were revealed in Flintshire, and included pits, ditches and gullies, some of which may have represented former field boundaries or

enclosure systems, alongside potential domestic features, palaeochannels and other natural features.

8.6.37.8.6.41. Overall, the correlation of geophysical anomalies and archaeological remains located during the evaluation trenching was variable.

FUTURE BASELINE

8.6.38.8.6.42. For buried heritage assets the future baseline is expected to be the same as the present. Such remains are a static resource, which have reached equilibrium with their environment and do not change (i.e. decay or grow) unless their environment changes as a result of human or natural intervention.

8.6.39.8.6.43. For the above ground heritage assets there may be some decay over time in the absence of the DCO Proposed Development. The setting of heritage assets may change due to the presence of, currently unknown, future developments. These could have a detrimental or positive effect on setting and could result in the intervening presence of buildings and/or vegetation.

8.7. SENSITIVE RECEPTORS

8.7.1. Following the scoping out of a number of assets as per the criteria in **paragraph 8.4.3** and **Table 8-1**, the following remaining sensitive receptors have been assessed and are displayed in **Table 8.5**~~**Table 8.5**~~ below.

Table 8.5 - Sensitive Heritage Receptors

Value/Sensitivity	Receptor
Very High	None
High	**Scheduled Monument:** Moated site, fishpond and connecting channel, Elton (NHLE 1012122) Hafod Wood Moated Site (FL179) Bryn y Cosyn Round Barrows (FL096) Round Barrow 225m south-east of Plas Newydd (FL076) Offa's Dyke: Section N & S of the Circle on Holywell Racecourse, and Circle and Round Barrow (FL006) Llyn Du Round Barrow (FL189) Enclosure, Field System & Hollow-ways North of Pant (FL163) **Conservation Area:**

Value/Sensitivity	Receptor
	Thornton le Moors Conservation Area Ince Conservation Area **Grade II* Listed Building:** Aston Hall (Cadw ref. 23) **Grade II Listed Building:** Grade II listed The Willows (NHLE 1229983) Grade II listed Barn 25 Metres South East of Willow Farmhouse (NHLE 1229984) Grade II listed Sundial within the garden of The Willows (NHLE 1278832) Aedocular Gateway at Aston Hall (Cadw ref. 15103) **Non-designated Asset:** Whitford Dyke (106723 and 106724) Wat's Dyke (27061–27075)
Medium	**Conservation Area:** Picton Conservation Area Chester Canal Conservation Area **Grade II Listed Building:** Footpath Guidepost 40 Metres North West of No 123 (NHLE 1130583) Church of the Holy Spirit (20115) Castle Hill Farm Complex (Cadw Ref. 15105 – 15110) Former Maltings at Swndwr Farm (Cadw ref. 575) and associated farm buildings Plas Moor (Cadw Ref. 15113) and L-Plan range of Farm Buildings (Cadw Ref. 15114) Highfield Hall (322) Plas-newydd (24687) **Non-designated Asset:**

Value/Sensitivity	Receptor
	King's Wood Lane/Saltersway/ Military Way (2030/1, MCH1278) Roman Road - Chester to Wirral (Margary 670) (2010/1/0, MCH6164) **Assets identified during Trial Trench Evaluation:** Roman ditch and putative structures (Trench 28)
Low	**Non-designated Asset**: Chester to Crewe Line (L & NWR) (2468/1/0, MCH1705) Birkenhead and Chester Line (L & NWR/GWR) (2527/1/0, MCH19851) ROF Dunham on the Hill (4217, MCH9985) Ridge and Furrow Earthworks in Large Standleys and Standleys Small (15191, MCH25127) Sidings South of Mollington Station, Chester to Birkenhead Railway (2527/1/14, MCH1552) Royal Observer Corps Monitoring Post at Saughall (4135/0/2, MCH9818) Sealand Embankment III (34237) Ashfield Farm Brickworks (103787) Brookside Ridge and Furrow (97837) Chester - St Asaph Roman road (46802) Coal Pit Hey (99047) Ewloe Green Farm Colliery (103806) Ewloe railway (99043) Ewloe, Old Aston Hill, RAF Hawarden wireless station, aerial mast IV (129644) Ewloe, Old Aston Hill, RAF Hawarden wireless station, building II (129640) Hen-dyddyn Farm sand pit (85032) Holly House Farm Sand pits (99061) Little Leadbrook Farm marl pit (85035)

Value/Sensitivity	Receptor
	Little Leadbrook Farm marl pit (85036) Mancot Royal strip field system (99060) Sandycroft boundary stone (103807) Bryn-eithin farmstead (89541) Bryn-eithin well (37999) **Assets identified during Trial Trench Evaluation:** Potential early enclosure systems (Trenches 15, 21 and 28) Undated pit and ditch (Trench 9) Ince Marshes peat (Trench 2) Bronze Age pit (Trench 78) Early post-medieval pits with domestic waste (Trench 58) Potential early enclosure systems (Trench 80) Potential domestic features (Trenches 38, 56 and 67) Dee floodplain peat (Trench 37)
Negligible	**Non-designated Asset:** Hawarden find spot, finger ring (120329)
Unknown	Previously unrecorded buried archaeological remains

8.8. DESIGN DEVELOPMENT, IMPACT AVOIDANCE, AND EMBEDDED MITIGATION

8.8.1. Cultural Heritage inputs have been provided into the development of the Preliminary Design including the avoidance of direct physical impacts to designated heritage assets within the Newbuild Infrastructure Boundary.

8.8.2. There are no further embedded mitigation measures currently in place in the DCO Proposed Development to avoid impacting heritage assets (designated or non-designated). This is largely due to the limited and largely 'insignificant' nature of impacts from the DCO Proposed Development on the cultural heritage resource.

8.9. ASSESSMENT OF LIKELY IMPACTS AND EFFECTS

8.9.1. This section details the assessment of predicted impacts and effects for the DCO Proposed Development during both the Construction and Operational Stages.

8.9.2. During the installation of the DCO Proposed Development, any activities that require ground disturbance, such as preliminary ground works, topsoil stripping for easement corridor, trench excavation, trenchless crossings, establishment of access roads, laydown areas and temporary Construction Compounds, could impact on known or possible below ground heritage assets. The assessment also considers those excavations needed for the AGIs and BVSs pit or foundation pad, and the Construction Compounds.

SIGNIFICANT EFFECTS

8.9.3. Heritage assets identified as experiencing no change, negligible or minor effects (*not significant*) during the preliminary assessment of likely impacts and effects have been reported in **Appendix 8.1 – HEDBA (Volume III**). Both indirect impacts ~~(deriving from changes to setting)~~ and direct ~~physical~~ impacts have been assessed to understand the potential for significant environmental effects.

8.9.4. There is potential for direct impacts leading to significant effects on previously unrecorded buried heritage assets (archaeology) within the Newbuild Infrastructure Boundary during the Construction Stage. Survival potential for previously unrecorded buried heritage assets is likely to be variable around the Cornist Lane, Pentre Halkyn and Babell BVS sites due to the previous construction of the existing Flint Connection to PoA Terminal Pipeline across the rural (greenfield).

Construction Stage

8.9.5. The likely significant effects for Cultural Heritage associated with the Construction Stage are set out in **Table 8.6.**

Table 8.6 - Construction Effects (prior to mitigation)

Heritage Asset (Receptor)	Value	Magnitude of change	Significance of Effect (prior to mitigation)
Moated site, fishpond and connecting channel, Elton Scheduled Monument (NHLE 1012122)	High	Minor adverse – through the loss of associated buried archaeology	***Moderate adverse (significant)***

Heritage Asset (Receptor)	Value	Magnitude of change	Significance of Effect (prior to mitigation)
Wat's Dyke (27066)	High	Moderate adverse – through direct physical impacts	***Moderate adverse*** *(**significant**)*
Potential Bronze Age funerary remains from Northop Hall west to Babell BVS	Medium to high depending on extent and survival	Major adverse – through direct physical impacts	***Moderate or large adverse*** *(**significant**)*
Potential Roman road remains	Medium	Moderate adverse – through direct physical impacts	***Moderate adverse*** *(**significant**)*
Potential Roman roadside remains	Medium	Major adverse – through direct physical impacts	***Moderate adverse*** *(**significant**)*
Potential modern earthworks/building remains relating to RAF Hawarden	Low or medium, depending on type of remains	Moderate adverse – through direct physical impacts	*Slight or* ***moderate adverse*** *(not significant to **significant**)*
Potential remains associated with the Second World War Airspeed Oxford II N4731 crash site (130274)	Medium	Major adverse – through direct physical impacts	***Moderate adverse*** *(**significant**)*
Aston Hall (Cadw ref. 23) and Aedocular Gateway at Aston Hall (Cadw ref. 15103)	High	Moderate adverse – through indirect impacts to setting	***Moderate adverse*** *(**significant**)*

Heritage Asset (Receptor)	Value	Magnitude of change	Significance of Effect (prior to mitigation)
Roman ditch and putative structures (Trench 28)	Medium	Moderate adverse – through direct physical impacts	***Moderate adverse (significant)***

8.9.6. In addition to these assets, features identified from the aerial photograph and LiDAR report and from the geophysical survey will be affected by the DCO Proposed Development during the Construction stage. The majority of the features identified are unlikely to be of more than low value, forming the remains of previous agricultural activity, former field boundaries and late post-medieval industrial activity. Any ground disturbance associated with the DCO Proposed Development will likely result in a major magnitude of impact on the asset, resulting in a *slight adverse (not significant)* effect.

~~8.9.6.~~8.9.7. The trial trench evaluation revealed a number of archaeological features. The majority of these features comprise field boundaries that are likely to represent early enclosure systems (Trenches 15, 21, 28 & 80), a single Bronze Age pit (Trench 78), undated pits and ditches (Trench 9), post-medieval pits (Trench 58), and potential domestic features (Trenches 38, 56 and 67). These features are all considered to be of low value ~~and are likely to represent field boundaries or relate to elements of field systems. Other features identified during the evaluation include natural features such as the peat from both Ince Marshes and the Dee floodplain. These natural features are also of low value.~~ Any ground disturbance from the DCO Proposed Development will likely result in a major magnitude of impact on the asset, resulting in a slight adverse (not significant) effect.

~~8.9.7. Evidence for a possible pit alignment was recorded immediately south of the M56 and Thornton Lane (NGR 0344596, 373363). Pit alignments can date between the Late Bronze Age and medieval periods and are usually associated with periods where access to land is controlled and demarcated. If this feature is of prehistoric or Roman date, it would be of high value. It has archaeological interest and historic interest for the information it contains about past land division. A section of this pit alignment will be crossed by the DCO Proposed Development, which will likely result in a moderate magnitude of impact on the asset, resulting in a ***moderate adverse*** ***(significant)*** effect.~~

8.9.8. Based on the results of the geoarchaeological deposit model across the three areas, there is potential for effects by the DCO Proposed Development upon subsurface deposits such as peat which may be close to the surface, especially in Areas 1 and 2. These areas include the peat deposits located during the

archaeological evaluation trenching (Trenches 2 and 37). The results of the geoarchaeological deposit model across the three areas indicate that the subsurface deposits are of low or medium value and are of archaeological interest for the information they contain about past environments and past landforms. While the magnitude of impact on any subsurface deposits would vary locally, it is unlikely to be more than minor, as the DCO Proposed Development will not remove the deposits in their entirety, and they extend outside of the Newbuild Infrastructure Boundary. Taking a worst-case scenario where deposits are of medium value, this will result in a significance of effect of *slight adverse (not significant)* effect.

Operation Stage

8.9.9. Operation Stage effects on buried heritage assets are scoped out (see **Table 8.1**. As such, during the Operation Stage only the setting of selected designated heritage assets within the Study Area around the DCO Proposed Development within 100 m or direct line of sight of the AGIs and BVSs has been considered in the ES.

8.9.10. There is no 'significant' environmental effect on sensitive receptors identified during the Operation Stage.

Decommissioning Stage

8.9.11. The decommissioning Stage has been scoped out on the basis that all works will be undertaken within the Newbuild Infrastructure Boundary for the DCO Proposed Development and therefore there will be no further impact on buried archaeology. Although there may be some change to the setting of assets due to the decommissioning of the DCO Proposed Development above ground infrastructure (BVS/AGIs) any such changes will result in a return to conditions similar to the current baseline and are unlikely to result in significant effects.

8.10. MITIGATION AND ENHANCEMENT MEASURES

8.10.1. This section sets out the preliminary avoidance, mitigation and compensation measures required to address the significant effects as assessed in **Section 8.9.**

8.10.2. It is considered that effects from direct physical impacts on sub-surface heritage assets during the Construction Stage are anticipated in areas of interest identified during the assessment of the LiDAR and aerial photography and on the features identified during the geophysical survey. Where appropriate the proposed work will comprise the following targeted activities:

- ~~Targeted archaeological trial trench evaluation on previously identified features and within those parts of the DCO Proposed Development where the design is fixed (e.g. BVS, AGI and compound locations);~~

- 2% trial trench evaluation, following Detailed Design of the remainder of the DCO Proposed Development, focussed on the refined 32m wide working width for the construction of the Newbuild Carbon Dioxide Pipeline, along with completion of the 35 trenches that could not be completed during the first phase of trenching (subject to constraints of services);
- Geoarchaeological mitigation, comprising further boreholes and/or test pitting in marshland at the north-eastern end of the DCO Proposed Development, within the River Gowy floodplain and within the River Dee floodplain (Areas 1-3) to retrieve sediments for geoarchaeological and palaeoenvironmental purposes and to investigate peat deposits;
- Recording of cross-sections of hedgerows located on parish and township boundaries (21 total) where they will be disturbed by the DCO Proposed Development;
- Preservation in situ;
- Archaeological excavation;
- Archaeological strip, map, and sample; and
- Proportionate and appropriate post-excavation analysis and reporting.

8.10.3. If, following the trial trenches, areas do not contain any archaeological remains, then no further archaeological work will be required.

8.10.4. A **Register of Environmental Actions and Commitments (REAC) (Document reference: D.6.5.1)** provides the general mitigation commitments, which are detailed in an **Outline Archaeological WSI** (**OAWSI**) **(Document reference: D.6.5.2).** The OAWSI has been submitted alongside the DCO Application to detail the methodologies for any further investigation and mitigation required following the granting of the DCO. This includes areas where preservation *in situ* may be required, and further investigation of geoarchaeological deposits.

8.10.5. Any archaeological investigations required will be designed and undertaken in consultation with the relevant Archaeological Advisor (the LPA) and in accordance with an approved archaeological Written Scheme of Investigation (WSI) (**REAC (Document reference: D.6.5.1)** entry **D-CH-001**). The production of a WSI in accordance with the OAWSI is included as a Requirement of the **Draft DCO (Document Reference: D.3.1)**

8.10.6. The Elton moated site scheduled monument (NHLE 1012122), adjacent to the Newbuild Infrastructure Boundary, will be avoided during construction activities and retained *in situ*. Any works in the surrounding area will adhere to the WSI and in consultation with the relevant Archaeological Advisor. A 30 m buffer was built-in to the Newbuild Infrastructure Boundary around the area of the scheduled monument to ensure that it is not inadvertently damaged during construction activities (**REAC (Document reference: D.6.5.1)** entry **D-CH-002**).

Associated features located outside the scheduled monument boundary will be investigated and an appropriate mitigation strategy implemented under consultation with the LPA's archaeological advisor.

8.10.7. Good construction practices outlined in the **Outline Construction Environmental Management Plan (OCEMP) (Document reference: D.6.5.4)** and the **Register of Environmental Actions and Commitments (REAC) (Document reference: D.6.5.1)** will reduce any temporary impacts that will occur in the Construction Stage due to changes in the setting of heritage assets.

8.10.8. Permanent impacts to the setting of the historic assets will be mitigated through the planting of vegetative screening around upstanding aspects of the proposed AGI and BVS installations to reduce the impact of the visual intrusion within the landscape. Refer to **Chapter 12 - Landscape and Visual (Volume II)** for details of the landscape mitigation proposed for the DCO Proposed Development.

8.11. RESIDUAL EFFECTS

8.11.1. **Table 8.7~~Table 8.7~~** below summarises the residual significant effects associated with the DCO Proposed Development during construction and operation.

Table 8.7 - Summary of Residual Effects

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
Construction			
Features associated with the moated site, fishpond and connecting channel, Elton (NHLE 1012122)	***Moderate adverse (significant)***	Mitigation through preservation by record or preservation *in situ* through avoidance. The controlled and recorded removal of archaeological remains will decrease the magnitude of impact from moderate to minor.	*Slight adverse (not significant) or Neutral (not significant) if avoided*
Wat's Dyke (27066)	***Moderate adverse (significant)***	Mitigation through preservation by record. The controlled and recorded removal of archaeological remains will decrease the effect of the impact on the asset from moderate to minor adverse.	*Slight adverse (not significant)*
~~Pit alignment~~	~~***Moderate adverse (significant)***~~	~~Mitigation through preservation by record. The controlled and recorded removal of archaeological remains will decrease the effect of the impact on the asset from moderate to minor adverse.~~	~~*Slight adverse (not significant)*~~
Potential for Bronze Age funerary remains	***Large adverse (significant)***	Mitigation through preservation by record. The controlled and recorded removal of archaeological remains will decrease the magnitude of impact from major to moderate.	***Moderate adverse (significant)***

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
Potential Roman roadside remains	***Moderate adverse (significant)***	Mitigation through preservation by record. The controlled and recorded removal of archaeological remains will decrease the magnitude of impact on the asset from moderate to minor.	*Slight adverse (not significant)*
Potential modern earthworks/building remains relating to RAF Hawarden	***Moderate adverse (significant)***	Mitigation through preservation by record. The controlled and recorded removal of archaeological remains will decrease the magnitude of impact on the asset from moderate to minor.	*Slight adverse (not significant)*
Potential remains associated with the Second World War Airspeed Oxford II N4731 crash site (130274)	***Moderate adverse (significant)***	Mitigation through preservation by record. The controlled and recorded removal of archaeological remains will decrease the magnitude of impact on the asset from moderate to minor	*Slight adverse (not significant)*
Aston Hall (Cadw ref. 23)	***Moderate adverse (significant)***	Good construction practices, noise and visual screening while constructing Aston Hill BVS and the Newbuild Carbon Dioxide Pipeline adjacent to the asset will limit the visual and auditory intrusion on the asset. This will constitute a temporary change in how the asset is experienced within the landscape which will result in a slight adverse effect on value.	*Slight adverse (not significant)*
Roman ditch and putative structures (Trench 28)	***Moderate adverse (significant)***	Mitigation through preservation by record. The controlled and recorded removal of archaeological	*Slight adverse (not significant)*

Description of the effect	Pre-mitigation significance of effects	Mitigation measure	Residual effect
		remains will decrease the effect of the impact on the asset from moderate to minor adverse.	

8.12. IN-COMBINATION CLIMATE CHANGE IMPACTS

8.12.1. Impacts to any buried archaeological remains during the Construction Stage will result in the removal of the assets and therefore they will not be affected by further climate change impacts.

8.12.2. There are no anticipated operational effects from the DCO Proposed Development as the archaeology present will have been excavated and preserved by record. As a result, there will be no in-combination climate change impacts.

8.13. MONITORING

8.13.1. No further monitoring beyond the mitigation outlined in **Section 8.10** is required.

8.14. REFERENCES

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- **Ref. 8.2**: Welsh Government. (2016). *Historic Environment (Wales) Act 2016*. Cardiff: Welsh Government.
- **Ref. 8.3**: The Planning (Listed Buildings and Conservation Areas) Act of 1990
- **Ref. 8.4**: *Protection of Military Remains Act 1986 c.35* Available at Protection of Military Remains Act 1986 (legislation.gov.uk) [Accessed 9/05/2022]
- **Ref. 8.5:** *The Hedgerow Regulations Act* 1997 Available at https://www.legislation.gov.uk/uksi/1997/1160/contents/made
- **Ref. 8.6:** *National Policy Statement for Energy EN1* Available at https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure
- **Ref. 8.7:** *Draft Overarching National Policy Statement for Energy EN1* Available at https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-review-of-energy-national-policy-statements
- **Ref. 8.8:** MHCLG 2021 [Ministry of Housing, Communities and Local Government], July 2021 National Planning Policy Framework
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- **Ref. 8.17:** Historic England, 2019, Statements of Heritage Significance: Historic England Advice Note 12
- **Ref. 8.18:** Cadw. (2011). *Conservation Principles for the Sustainable Management of the Heritage Environment in Wales.* Cardiff: Welsh Government.
- **Ref. 8.19:** Cadw. (2017b). *Heritage Impact Assessment in Wales*. Cardiff: Welsh Government.
- **Ref. 8.20:** Cadw. (2017a). *Setting of Historic Assets in Wales.* Cardiff: Welsh Government.
- **Ref. 8.21:** CIfA. (2020a). Standards and Guidance for Desk-based Assessment.
- **Ref. 8.22:** CIfA. (2020b). *Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment.*
- **Ref. 8.23:** Landscape Institute and Institute of Environmental Management and Assessment. (2013). *Guidelines for Landscape and Visual Impact Assessment.* Abingdon, Oxon.
- **Ref. 8.24:** British Geological Survey. (2022). https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/
- **Ref. 8.25:** Historic England. (2022). National Historic List for England. https://historicengland.org.uk/listing/the-list/
- **Ref. 8.26:** Archwilio. (2022). https://www.archwilio.org.uk/arch/

- **Ref. 8.27:** Department of Environment, Food and Rural Affairs. (2022). LiDAR data online repository. https://environment.data.gov.uk/DefraDataDownload/?Mode=survey
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