SALINAE HYDROGEN STORAGE PROJECT

Scoping Report

Uniper UK Limited

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Environmental Impact Assessment (EIA) Quality Mark

This Environmental Scoping Report has been carried out to identify the likely significant environmental effects of the proposed development, were undertaken in line with the EIA Quality Mark Commitments.

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EIA Management

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EIA Context & Influence

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Glossary and Abbreviations

Abbreviation	Definition
AADT	Annual Average Daily Traffic
AEP	Annual Exceedance Probability
ALARP	As low as reasonably practicable
ALC	Agricultural Land Classification
APIS	Air Pollution Information System
APR	Air Quality Progress Report
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ASME	American Society of Mechanical Engineers
AURN	Automatic Urban and Rural Network
BAT	Best Available Techniques
BATC	BAT Conclusion (BATC) Document
BEIS	Department of Business, Energy and Industrial Strategy
BMV	Best and Most Versatile
BoD	Basis of Design
BREF	BAT Reference Document
CA	Competent Authority
Cavern	A man-made underground formation created by dissolving existing salt bed deposits with water. The impermeable qualities of salt mean that the cavity space can be used for the storage of a variety of gases and liquids
CEA	Cumulative Effects Assessment
CEP	Community Engagement Plan
CDM	Construction (Design and Management)
CEMP	Construction Environmental Management Plan
CMS	Continuous Monitoring Site
CNP	Critical National Priority
COMAH	Control of Major Accident Hazards
CRA	Concept Risk Assessment
CRR	Community Risk Register
CTMP	Construction Traffic Management Plan

Abbreviation	Definition
DCR	The Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996
DEFRA	Department for Environment, Food & Rural Affairs
DNO	Distribution Network Operator
DSEAR	Dangerous Substances and Explosive Regulations
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EERA	Escape, Evacuation and Rescue Assessment
EIA	Environmental Impact Assessment
EIA Regulations	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)
EMP	Environmental Management Plan
EMS	Environmental Management System
EPC	Engineering, Procurement and Construction
ENVIID	Environmental Impact Identification
EPR	Environmental Permitting Regulations
EPUK	Environmental Protection UK
ES	Environmental Statement
EU	European Union
FERA	Fire and Explosion Analysis
FP	Footpath
FRA	Flood Risk Assessment
GCN	Great Crested Newts
GHG	Greenhouse Gas
GI	Ground Investigation
GP	General Practice
GVA	Gross Value Added
HAZID	Hazard Identification
HAZOP	Hazard and Operability Study
HDD	Horizonal Directional Drilling
HDV	Heavy Duty Vehicle
HER	Historic Environment Record

Abbreviation	Definition
HGV	Heavy Good Vehicle
HLC	Historic Landscape Characterisation
HSBM	Hydrogen Storage Business Model
H_2S	Hydrogen Sulphide
HSC	Hazardous Substances Consent
HSE	Health and Safety Executive
Hydrogen Storage Facility	The drilling and solution mining of up to nine underground caverns and/or repurposing of up to four caverns, for the storage of hydrogen, including the construction and operation of a gas processing plant as part of the Hydrogen Storage Facility (including maximum 18m high buildings, and maximum 50m high ground flare); and other associated facilities.
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management (now ISEP)
ISEP	Institute of Sustainability and Environmental Professionals (formally IEMA)
LOPA	Layer of Protection Analysis
LCA	Landscape Character Area
LCC	Last Cemented Casing
LCHPP	Low Carbon Hydrogen Production Plant (including a hydrogen distribution pipeline connection, integration with the Hydrogen Storage Facility, electrical infrastructure, water supply and treatment infrastructure, wastewater treatment and disposal infrastructure); and other associated facilities.
LCT	Landscape Characterisation Type
LDP	Local Development Plan
LDV	Light Duty Vehicle
LGV	Light Good Vehicle
LLFA	Lead Local Flood Authority
LVIA	Landscape and Visual Impact Assessment
MA&D	Major Accidents and / or Disasters
MAHP	Major Accident Hazard Pipelines

Abbreviation	Definition
Main River	Main rivers are usually larger rivers and streams, designated as such, and shown on the Main River Map[1]. The Environment Agency carries out maintenance, improvement or construction work on main rivers to manage flood risk
MAPD	Major Accident Prevention Document
MPA	Mineral Products Association
MSA	Mineral Safeguarding Area
MSOA	Middle Layer Super Output Area
MW	Megawatt
MtCO2e	Million Metric Tons of Carbon Dioxide Equivalent
NACE	National Association of Corrosion Engineers
NAQS	National Air Quality Strategy
NCA	National Character Area
NHLE	National Heritage List for England
NIA	Noise Important Area
NMP	Noise Management Plan
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen
NPF4	National Planning Framework 4
NPPF	National Planning Policy Framework
NPSA	National Protective Security Authority
NSIP	Nationally Significant Infrastructure Project
NRMM	Non-Road Mobile Machinery
NRR	National Risk Register
NVD	Nitrate Vulnerable Zone
NWAWP	North West Aggregate Working Party
OBRA	Occupied Building Risk Assessment
Ordinary watercourse	Every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows and which does not form part of a Main River
PEA	Preliminary Ecological Appraisal

[1] Environment Agency (2023) Statutory Main River Map [online] Available at: Statutory Main River Map

Abbreviation	Definition
PCM	Pollution Climate Mapping
Permanent impact	A long-lasting change that is not reversible
PINS	Planning Inspectorate
PMW	Precautionary Method of Working
PM_{10}	Particulate Matter with a diameter of 10 microns or less
$PM_{2.5}$	Particulate Matter with a diameter of 2.5 microns or less
Proposed Development	The Salinae Hydrogen Storage Project
PEM	Proton-exchange membrane
PRoW	Public Rights of Way
PSS	Process Safety Strategy
PSSR	Pressure Systems Safety Regulations
RCP	Representative Concentration Pathway
RFFP	Reasonably Foreseeable Future Project
RNAG	Reasons for not achieving good status
RQF	Regulated Qualifications Framework
SIMOPs	Simultaneous Operations
SINC	Site for Importance of Nature Conservation
Site	The area within the Site Boundary
Order Limits	The maximum boundary within which the Proposed Development will be physically located, including the temporary works areas, as shown in Appendix A, Figure 1-1.
Sm^3	Standard cubic metres
SO_2	Sulphur dioxide
SPA	Special Protection Area
SPP	Scottish Planning Policy
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SDG	Standby Diesel Generator
SOC	Standard Occupational Classification
SuDS	Sustainable urban Drainage Systems
SWMP	Site Waste Management Plan

Abbreviation	Definition
TA	Transport Assessment
Temporary impact	Occurs for a limited period and the change at the receptor can be reversed once the activity stops
T&S	Transportation and Storage
The Applicant	Uniper UK Ltd.
ToR	Terms of Reference
TPO	Tree Preservation Order
UK	United Kingdom
UECE	United Nations Economic Commission for Europe
Well	A well is the drilled borehole lined with steel casings, used to access the salt formation for solution mining. The casings act as barriers between the stored gas and the surrounding geology, and prevent contamination from surface water.
WCH	Walking, Cycling and Horseriding
WFD	Water Framework Directive
WSA	World Steel Association
ZoI	Zone of Influence

1. Introduction

1.1. Background

1.1.1. Uniper UK Ltd. (the Applicant) intends to submit a Development Consent Order (DCO) application for the development of a Hydrogen Storage Facility incorporating a low carbon Hydrogen Production Plant (LCHPP) known as the Salinae Hydrogen Storage project ('the Proposed Development') at a site near to Warmingham in Cheshire, central grid reference: SJ 69947 60939.

1.1.2. The Proposed Development is for the drilling and solution mining of up to nine underground caverns and/or use of up to thirteen underground caverns (four of which are previously permitted), for the storage of up to 120 million standard cubic metres (Sm^3) of hydrogen (equivalent to 400 gigawatt-hours (GWh) of working gas energy value); the construction and operation of a gas (hydrogen) processing plant as part of the Hydrogen Storage Facility (including maximum 18m high buildings, and maximum 50m high ground flare); the construction and operation of a LCHPP with an installed electrolyser capacity of up to 50 megawatt (MW) (including a hydrogen distribution pipeline connection, integration with the Hydrogen Storage Facility, electrical infrastructure, water supply and treatment infrastructure, wastewater treatment and disposal infrastructure); and associated facilities, earthworks, pipelines, access roads, lighting, security fencing and a temporary construction compound.

1.1.3. The Proposed Development is expected to be delivered in phases, as set out in Chapter 2.

1.1.4. Hydrogen is a key fuel for industries that are difficult to electrify, such as chemical production and refining, steelmaking, cement production, and transport. Once produced, hydrogen can also be refined into renewable liquid fuels – such as synthetic diesel and sustainable aviation fuel – providing a clean energy source for vehicles and whole industries that currently rely on carbon-intensive fuels.

1.1.5. Hydrogen storage offers the potential to store renewable energy, enabling excess wind and solar power to be utilised for hydrogen production, rather than being curtailed as is currently the case. Underground cavern storage systems for hydrogen can compensate for short-, mid- and long-term fluctuations in production and demand, and are very efficient due to their rapid injection and withdrawal capabilities, contributing to security of supply.

1.1.6. The Applicant will need UK Government to develop a bespoke business model to bring forward this first of a kind technology.

1.1.7. The Site comprises the maximum area within which the development would be located and is approximately 204 hectares. The extent of the Site is shown in **Appendix A, Figure 1-1** and **Insert 1-1**. The Site is located in a semi-rural area near Warmingham in Cheshire, England. Land within the Site comprises agricultural and grazing land, existing industrial infrastructure, including active British Salt brine workings, underground natural gas storage and gas processing (Kistos) and farm buildings, including a residential farmhouse. There are some existing caverns within the Order Limits, previously solution mined by British Salt which now store natural gas. These caverns are unrelated to this Proposed Development.

1.1.8. The Proposed Development is considered to be a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008 (PA2008)[2], due to its proposed hydrogen storage volume and handling capacity. As such, a DCO application will be submitted to the Planning Inspectorate (PINS) who will examine the application and make recommendations to the Secretary of State for the Department for Energy Security and Net Zero (DESNZ) pursuant to PA2008, who will subsequently determine whether or not a DCO should be granted for the Proposed Development.

1.1.9. Operation of the Proposed Development would be governed by comprehensive health, safety and environmental related regulatory requirements, one of the key regulatory regimes being the Control of Major Accident Regulations 2015 (COMAH Regulations). It is anticipated that the proposed pressurised hydrogen storage would exceed 50 tonnes, and therefore the Proposed Development would be classed as a new upper tier COMAH site. The compliance with these regulations and associated guidance is regulated by the Health & Safety Executive (HSE), and the Environment Agency. Uniper will be implementing processes to meet the legislative requirements prior to operation and will be subject to routine audit by the HSE and EA to ensure these controls are effective.

1.1.10. The Applicant has commissioned AtkinsRéalis to prepare this Environmental Impact Assessment (EIA) Scoping Report (the Scoping Report) in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended). This Scoping Report supports the request for a formal Scoping Opinion from the Secretary of State pursuant to Regulation 10(1) of the EIA Regulations and outlines the proposed scope and methodology for the EIA, which will be reported in the Environmental Statement (ES) that will accompany the DCO application.

1.1.11. Pursuant to Regulation 8(1)(b) of the EIA Regulations the Applicant hereby provides notice that the application for a DCO will be accompanied by an ES. Further details of the Proposed Development are provided in Chapter 2 of this report.

[2] Planning Act 2008. Available at: https://www.legislation.gov.uk/ukpga/2008/29/part/3

Insert 1-1 Location Plan (Imagery © Google, Map data © Google)[3]

1.2. Need for an Environmental Impact Assessment

1.2.1. The requirement for certain projects to report their effects on the environment is derived from European Union (EU) legislation initially in Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. This legislation has been amended three times, in 1997, in 2003 and in 2009 with the amendments codified by Directive 2011/92/EU of 13 December 2011. The most recent changes have been adopted in UK legislation, for the purposes of planning applications, by the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 which transposes changes made to EU Directive 2011/92/EU1 ("the EIA Directive 2011") by EU Directive 2014/52/EU2. The related Infrastructure Planning (Environmental Impact Assessment) Regulations 2017[4] ("the EIA Regulations") govern development given planning consent through the NSIP regime. Their first revision in 2009 after the PA2008 was amended twice (2011 and 2012) prior to the revision made in 2017 to adopt EU Directive 2014/52/EU2.

1.2.2. The Proposed Development comprises an underground Hydrogen Storage Facility including surface infrastructure associated with the gas processing plant, and LCHPP. When determining whether the Proposed Development would require Development Consent under the PA2008, the relevant criteria in Sections 14 and 17 of the PA2008 must be considered. The Proposed Development comprises the creation of underground gas storage facilities in England and is therefore a project falling within section 14(1)(c) as consisting of "development relating to underground gas storage facilities" subject to the provisions of section 17. The Proposed Development will be in accordance with sections 17(2)(a) and (b) of the PA2008 which applies to development if:

"(a) it is the carrying out of operations for the purpose of creating underground gas storage facilities in England, or

(b) it is starting to use underground gas storage facilities in England,

and the condition in subsection (4) is met in relation to the facilities."

1.2.3. The condition referred to in subsection (4), is that:

''(a) the working capacity of the facilities is expected to be at least 43 million standard cubic metres, or

(b) the maximum flow rate of the facilities is expected to be at least 4.5 million standard cubic metres per day''.

1.2.4. The Proposed Development has a proposed working gas storage capacity of up to 120 million Sm^3 (400 GWh) and a maximum flow rate of up to 22 million Sm^3 per day import and 18.6 million Sm^3 export per day.

1.2.5. This means that a DCO application will need to be made to the Secretary of State under Section 37 of the PA2008 to seek authorisation to build the Proposed Development. The Planning Inspectorate's recommendation would be reviewed by the Secretary of State (in this case DESNZ) who would make the ultimate decision.

1.2.6. Schedules 1 and 2 of the EIA Regulations set out those categories of development and associated criteria to assess whether proposals are likely to require an EIA. An EIA is mandatory for Schedule 1 developments, whilst Schedule 2 developments may require an assessment if there is potential that the development may have significant environmental impacts.

1.2.7. The Proposed Development falls within Schedule 1 Part 6(b) covering:

''Integrated chemical installations, that is to say, installations for the manufacture on an industrial scale of substances using chemical conversion processes, in which several units are juxtaposed and are functionally linked to one another and which are for the production of basic inorganic chemicals''.

1.2.8. In the case of the Proposed Development, this is the process of splitting water into oxygen and hydrogen through electrolysis.

[3] Google (2025) Google Maps Satellite Hybrid (Raster data via QGIS)

[4] Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available at: The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

1.2.9. In addition, the underground storage of hydrogen for the Proposed Development means it also falls under Schedule 2, Part 3(d) which covers:

''Underground storage of combustible gases''.

1.2.10. Taken together, these classifications confirm that the Proposed Development must be assessed for its potential to give rise to significant environmental effects. Therefore, an ES is required to be submitted alongside a planning application for this development.

1.2.11. The aim of the EIA is to evaluate the potential effects on the environment by ensuring that the Secretary of State, when deciding whether to grant Development Consent for a project which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant environmental effects, and takes this into account in the decision-making process. The aim of the EIA is also to ensure that the public are given early and effective opportunities to participate in the decision-making process.

1.2.12. The EIA will be carried out by a team of specialists working in close collaboration with the design engineers responsible for the preliminary design of the Proposed Development as part of an iterative design, consultation and assessment process. This will maximise the opportunity to avoid or reduce adverse environmental effects at source and to identify the most effective mitigation of those effects that cannot be avoided.

1.2.13. To ensure that the EIA is proportionate and focuses only on the likely significant effects, a scoping stage is being undertaken. The purpose of the EIA scoping stage is to identify potential impacts from the Proposed Development that are likely to result in significant effects. These potential impacts will be 'scoped in' for detailed assessment in the ES. In the interest of proportionality, impacts that are minor in nature and not likely to result in significant environmental effects are proposed to be 'scoped out' of the ES. Chapter 6 sets out the approach to the scoping assessment, that will be a basis for the ES.

1.3. Purpose of the Scoping Report

1.3.1. This report has been prepared by AtkinsRéalis on behalf of the Applicant in accordance with the PINS Advice Note Seven: Environmental Impact Assessment: process, preliminary environmental information and environmental statements (republished June 2020, updated March 2025- version 7)[5].

1.3.2. Scoping is a precursor to the environmental assessment process that will lead to the preparation of the ES. The Applicant will undertake engagement, including on the environmental effects of the Proposed Development, as part of its preparation of the ES and the Application for a DCO, and that engagement will be undertaken in accordance with the requirements of legislation and guidance in place at the time.

1.3.3. The objectives of this Scoping Report are to:

- Present an initial understanding of the baseline conditions based on a review of existing data;
- Provide a preliminary evaluation of the sensitivity of identified resources and receptors;
- Provide justification, supported by evidence, for scoping in/out environmental factors (or any elements) from further environmental assessment;
- Define what level of environmental assessment (simple or detailed) is to be undertaken for those environmental factors (or any elements) scoped in;
- Specify the environmental assessment methodology and further data collection and survey requirements;
- Identify the study area for those environmental factors (or any elements) scoped in;
- Identify initial mitigation measures; and
- Consider the overall likely level of impact of the Proposed Development, including consideration of potential cumulative effects.

1.3.4. The Scoping Report also allows the 'scoping out' of environmental topics where little or no change to the existing situation will occur, thus leading to the preparation of a concise ES.

1.4. Structure and Contents of the Scoping Report

1.4.1. The EIA Regulations set out the requirements for an applicant who proposes to request a scoping opinion from the Secretary of State. Regulation 10 (1) sets out the minimum requirements a request for a scoping opinion must include. PINS Advice Note Seven[5] also provides advice on the information that should be provided in the Scoping Report.

1.4.2. **Table 1-1** lists the information requirements and identifies where they are presented in this Scoping Report.

[5] Planning Inspectorate Advice Note Seven (June 2020 (version 7)). Available online at: Nationally Significant Infrastructure Projects - Advice Note Seven: Environmental Impact Assessment: process, preliminary environmental information and environmental statements - GOV.UK

Table 1-1 Scoping Report contents required under Regulation 10 (1) and suggested inclusions from PINS Advice Note 7

Information Requirements	Location in the Scoping Report
A plan sufficient to identify the land	Appendix A, **Figure 1-1**
A description of the Proposed Development, including its location and technical capacity	Chapter 2
An explanation of the likely significant effects of the development on the environment	Chapters 9-22
Such other information or representations as the person making the request may wish to provide or make	Chapter 4, Chapter 6 and Chapter 8
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development e.g. design parameters	Chapter 2 and Chapter 8
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development	Appendix A, **Figure 2-1**
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	Chapter 3
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues	The construction and operation phase Tables in Chapters 9-22 state those elements scoped out.
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided	Chapters 9-22
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters	Chapter 5 (baseline across all topics) and Chapters 9-22 (aspects scoped in/out across all topics)
Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect e.g. criteria for determining sensitivity and magnitude	Chapters 9-22 (aspects scoped in) and Appendix C (EIA Methodologies for the environmental topics).
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects	Chapter 7
References to any guidance and best practice to be relied upon	Appendix C EIA Methodologies
Evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities)	Chapter 21 (only pre-application engagement with the Environment Agency on permitting at this stage)
An outline of the structure of the proposed ES	Chapter 23

1.4.3. The structure of this Scoping Report is as follows:

- Chapter 1: Introduction;
- Chapter 2: Description of the Proposed Development;
- Chapter 3: Consideration of Alternatives;
- Chapter 4: Policy Context;
- Chapter 5: Baseline Conditions;
- Chapter 6: Likely Impacts of the Proposed Development;
- Chapter 7: Mitigation;
- Chapter 8: Approach to Scoping;
- Chapters 9- 21: Biodiversity; Landscape and Visual; Historic Environment; Water Environment and Flood Risk; Geology, Hydrogeology and Soils; Noise and Vibration; Air Quality; Waste and Materials; Climate Vulnerability; Effects on Climate; Socioeconomics; Human Health; Major Accidents and Disasters;
- Chapter 22: Cumulative Effects;
- Chapter 23: Proposed Scope of the EIA and Consultation;
- Appendix A: Figures;
- Appendix B: Policy and Legislation; and
- Appendix C: EIA Methodologies.

1.4.4. A transport chapter has not been included within this Scoping Report; a stand-alone Transport Assessment report and travel plan will be prepared to support the DCO application. Transport movements associated with the Proposed Development have the potential to give rise to a range of secondary environmental effects. While the Transport Assessment will identify and quantify forecast traffic flows, the assessment of environmental effects arising from these traffic changes—such as changes in noise levels, air quality concentrations, severance, pedestrian amenity, dust generation, and human health—will be addressed within the respective technical chapters of the EIA. Each topic chapter will utilise the transport data to assess the significance of transport-related impacts in accordance with relevant guidance and methodology. All relevant transport issues will therefore be documented within these reports. The Local Highway Authority will be engaged on the scope of the Transport Assessment.

1.4.5. Impacts on trees are covered in the Landscape and Visual chapter (chapter 11) with respect to visual receptors and landscape character, and within the Biodiversity chapter (Chapter 10) with respect to habitat and species receptors. An Arboricultural Impact Assessment will be included with the DCO application.

1.5. The Applicant

1.5.1. Uniper UK Ltd. (the Applicant) is a European energy company with global reach and operations in more than 40 countries. It has about 7,500 employees and plays a key role in ensuring a secure energy supply in Europe, particularly in its core markets of Germany, the United Kingdom, Sweden, and the Netherlands. Uniper's 14 gigawatts of flexible power generating capacity make it a mainstay of reliable power production. Uniper is a leading gas trader and one of Northwestern Europe's most important LNG importers, and its broad procurement portfolio enhances supply security. Uniper's investments in renewables, hydrogen, and other low-carbon energy carriers propel the transformation of the energy system.

1.5.2. In the UK, Uniper owns and operates a flexible generation portfolio of six power stations, a fast-cycle gas storage facility, two high pressure gas pipelines, and regasification capacity at the Grain LNG terminal in Kent. We're also progressing CCS and hydrogen projects, and expanding our onshore wind and solar portfolio, to further support energy security in the UK.

2. Description of the Proposed Development

2.1. Introduction

2.1.1. This chapter provides an overview of the Proposed Development. It sets out the design and main components of the Hydrogen Storage Facility including the underground salt caverns and above ground infrastructure, and of the LCHPP. It also provides an overview of the key activities to be undertaken during construction, operation and maintenance, and decommissioning, including key parameters and indicative timescales.

2.1.2. At this early design stage (Pre- Front-end Engineering and Design (FEED), the Proposed Development description is indicative, and a design 'envelope' has been used to include sufficient flexibility to accommodate further refinement of the design throughout the EIA process. This chapter therefore sets out the parameters and maximum values to be used to constitute a realistic maximum design scenario for the Proposed Development for the purposes of obtaining a Scoping Opinion.

2.2. The Site

2.2.1. **Appendix A, Figure 1-1** and **Insert 1-1** show the 'Order Limits' that have been used to inform this Scoping Report. The Order Limits is the boundary within which the Proposed Development would be physically located, including the temporary works areas. At this stage, the Order Limits includes flexibility for decisions yet to be made on aspects of siting and therefore comprises a larger area than is required to deliver the Proposed Development. The term 'Order Limits' represents the legal limits for the DCO application.

2.2.2. The 'Site' is the area within the Order Limits. The Site extends to 204ha and is owned by a series of landowners, including British Salt who own the mineral rights and have a multi-stage land agreement in place with Uniper to progress a proposal for hydrogen storage.

2.2.3. The Site is within the Warmingham brine fields in Cheshire, England. The Site lies above salt deposits known as the Northwich Halite member, a Triassic evaporite deposit in the Cheshire Basin, between approximately 230m and 460m deep below ground level. It is composed of halite (rock salt) with thin interbeds and one thicker interbed of mudstone, also known as marl.

2.2.4. In the north eastern part of the Site is the British Salt Brinefield, Kistos Energy Storage and Hill Top Farm. Hill Top Farm is an existing facility operated by British Salt for the commercial extraction of salt as a result of the creation of underground caverns which are permitted under various historic planning permissions (3/1/1510; 3/5/12233; 4/5/9294; 5/4/7834, 14/5678W and 7/2007/CCC/21 amongst others), but these permissions do not allow for the storage of hydrogen within the caverns.

2.2.5. The facility at Hill Top Farm contains various pumps and tank and ancillary equipment to provide the water necessary for pumping down the wells and forwarding the produced brine back to the British Salt main facilities in Middlewich for commercial salt production. British Salt currently use some of the caverns at Hill Top Farm for brine strengthening activities (pumping weak brine into the caverns and extracting stronger brine back out). Some of the other empty caverns are now in operational use by Kistos for the storage of natural gas, which link to the Kistos gas processing facility in the south west of the Site.

2.2.6. Hill Top Farm also remains an operational farm with a tenant farmer using the land for agricultural purposes.

2.2.7. Drilling of two of the four wells under planning permission 14/5678W commenced in September 2025. The first two boreholes are scheduled to be completed by February 2026, with the start date for solution mining shortly thereafter. The Proposed Development includes for hydrogen storage within these caverns, once created under 14/5678W.

2.2.8. Planning permission was also granted for seven caverns in the west of the Site in 2008, for 'Brine Extraction and Underground (natural) Gas Storage together with a Gas Processing Plant, pipelines, link to a National Gas Transmission System & associated infrastructure' (7/2007/CCC/13). The permission was partially developed although the caverns were never mined. This permission will not be utilised for the Proposed Development but establishes the land use principle of cavern development in the west of the Site.

2.2.9. The Site largely comprises agricultural fields divided by established hedgerows and mature trees. An established tree belt lies to the south of the proposed caverns. The western boundary is formed by the main west coast rail line. In the south west of the Site is existing above ground plant relating to the existing gas storage facility owned and operated by Kistos Ltd.

2.2.10. A number of tracks cross the Site which are used to gain access to the existing facilities on the Site, to Hill Top Farm and, to Parkfield Farm located directly to the west of the rail line, via a bridge over the track. The main access into the Site is via an unmade track off the British Salt/Kistos private access road which leads from the village of Warmingham.

2.2.11. There are no Tree Preservation Orders (TPOs) on the Site, although there are some TPOs near to the Site, in Warmingham. A 132kV SPEN/SP Manweb overhead electricity transmission line runs north east to south west across the middle of the Site. Another 33kV overhead line runs north east to south west and clips the south east corner of the Site where it meets Warmingham Road. Public Rights of Way (Warmingham FP4 and FP7 and Minschill Vernon FP8 and FP13) cross the Site. There are no listed buildings or scheduled monuments within the Site.

2.2.12. The majority of the Site lies in Flood Zone 1. However, there are areas of Flood Zones 2 and 3 surrounding the River Wheelock, which meanders across land to the east, and in southern parts of the Site. Hoggins Brook runs north to south in the western part of the Site.

2.2.13. A more detailed description of the baseline conditions at the Site is included in Chapter 5 and the key environmental constraints are shown in **Appendix A, Figure 5-1**.

2.3. Design Envelope

2.3.1. The design envelope approach is widely recognised and is consistent with the Planning Inspectorate Advice Note Nine: Rochdale Envelope (July 2018, updated March 2025 (version 3))[6] which states that:

"The 'Rochdale Envelope' is employed where the nature of the Proposed Development means that some details of the whole project have not been confirmed (for instance the precise dimensions of structures) when the application is submitted, and flexibility is sought to address uncertainty".

2.3.2. The design of the Proposed Development is still indicative. The Proposed Development description sets out the parameters that have been used (the design envelope) constituting a realistic maximum design scenario, to allow for flexibility in the design as the EIA progresses. For environmental topic scoping, where elements of the design are still being considered, topics will assess a reasonable worst-case scenario as relevant to that topic.

2.4. Overview of the Proposed Development

2.4.1. The Proposed Development is for the drilling and solution mining of up to nine underground caverns and/or use of up to thirteen underground caverns (four of which are previously permitted), for the storage of up to 120 million standard cubic metres (Sm^3) of hydrogen (equivalent to 400 GWh) of working gas energy value); the construction and operation of a gas (hydrogen) processing plant as part of the Hydrogen Storage Facility (including maximum 18m high buildings, and maximum 50m high ground flare); the construction and operation of a LCHPP with an installed electrolyser capacity of up to 50 megawatt (MW) (including a hydrogen distribution pipeline connection, integration with the Hydrogen Storage Facility, electrical infrastructure, water supply and treatment infrastructure, wastewater treatment and disposal infrastructure); and associated facilities, earthworks, pipelines, access roads, lighting, security fencing and a temporary construction compound.

2.4.2. The Hydrogen Storage Facility would provide a flexible storage facility for connection to a third party hydrogen pipeline network operator, which would be subject to a separate consent.

2.4.3. The location of the Proposed Development has been subject to historical salt solution mining and natural gas storage, as set out in Section 2.2.

2.4.4. The Site is within the ownership of multiple landowners including British Salt, a Tata enterprise, which owns the mineral rights for the proposed caverns, and has mined the Warmingham brine field since the early 1970s, and continues to do so, connecting to the Middlewich saltworks facility to the north.

2.4.5. The Applicant and British Salt have agreed a Feasibility Development Agreement which gives the Applicant the sole rights to explore the Site's potential for hydrogen storage. British Salt will add steps to its existing approved solution mining plans to support Uniper in gathering data with the aim of evaluating the Site's potential.

2.4.6. The Proposed Development will be subject to Uniper being granted a DCO. In the absence of a hydrogen market, and as a precursor to a competitive market framework, the Applicant would also need UK Government to develop a bespoke business model to bring forward this first of a kind technology.

2.4.7. The indicative layout of the Proposed Development is shown in **Appendix A, Figure 2-1**.

2.4.8. The Proposed Development includes an "east cavern plot" and "west cavern plot". The east cavern plot comprises the area where the four caverns to be created under application 14/5678W are located. The gas processing plant as part of the Hydrogen Storage Facility, and the LCHPP would be located on and adjacent to the east plot. The west plot comprises the area within which up to nine proposed caverns would be sited.

2.4.9. Further information on the location of the caverns on the east and west cavern plots is described in section 2.4 and shown in **Appendix A, Figure 2-1**.

2.4.10. The Proposed Development considered by this Scoping Report includes the following key elements as displayed in **Table 2-1**.

[6] Planning Inspectorate (2025). Nationally Significant Infrastructure Projects – Advice Note Nine: Rochdale Envelope. Available at: Nationally Significant Infrastructure Projects - Advice Note Nine: Rochdale Envelope - GOV.UK

Table 2-1 Key elements of the Proposed Development construction and operational activities

Construction
General activities • Temporary construction compound, laydown and welfare; • Permanent diversion of an existing Public Right of Way (PRoW) around the proposed above ground works in the east of the Site and around a well pad in the west area; • All associated earthworks and remodelling, access roads to new wellheads, lighting & flood lighting and security fencing; • Permanent landscaping features and reinstatement of temporary works areas.
Hydrogen Storage Facility • Drilling of wells using mobile rigs; • Installation of well integrity and downhole equipment for solution mining; • Construction of underground pipelines to carry water from, and brine to, Hill Top Farm to facilitate leaching of caverns in the west cavern plot; and for the pumping of brine to the British Salt Middlewich Plant via an existing pipeline; • Solution mining of up to nine cavern cavities (24/7 operation), which involves injecting water into the salt beds to create a brine solution. Each cavern is assumed to be up to 100 m in diameter and 100 m in height. For the four east plot caverns, the above activities will be carried out under existing permissions (14/5678W), including the creation of underground pipelines to carry water from, and brine to, Hill Top Farm to facilitate leaching of the caverns; • Debrining and first fill of each cavern with hydrogen; • Completion of the wells for hydrogen storage (i.e. running tubing into the well, fitting packers and valves below surface and fitting the production wellhead); • Construction of an above ground interface for connection to a hydrogen pipeline from a third party undertaker; • Construction of an above ground gas processing plant in three phases including maximum 18m high compressor buildings; maximum 15m high dehydration vessels; a maximum 50m high ground flare; control building; workshops; sub-station; welfare facilities; car parking; Sustainable urban Drainage Systems (SuDS); laydown areas; • Pipeline connections for hydrogen and electrical services from the gas processing plant connecting to the wellpads, and pigging facilities; • Installation of cables for power and communications. At this stage it is anticipated that an electricity supply would be provided via two new 33kV underground double circuit feeder cables (including fibre and telephone cables) (approx. 1.5km long) from an existing Scottish Power Energy Networks (Local Distribution Network Operator (DNO)) distribution network, terminating in a new 33kV sub-station at the gas processing plant, providing 10MW of electricity to the gas processing plant.
LCHPP • Construction of a LCHPP with an installed electrolyser capacity of up to 50 megawatt electrical (including a hydrogen distribution pipeline connection, integration with the Salinae Hydrogen Storage facility, electrical infrastructure, water supply and treatment infrastructure, wastewater treatment and disposal infrastructure, and other ancillary infrastructure/services).
Operation
Hydrogen Storage Facility • Use of up to 13 underground caverns for hydrogen storage (including the 4 caverns consented for solution mining under 14/5678W), with a total storage capacity of up to 120 million Sm^3 (400 GWh) of hydrogen;
LCHPP • Operation of the up to 50 MW LCHPP.

2.5. Construction

Site Access and Construction Traffic

2.5.1. The main access into the Site for construction is expected to be via an existing track shared with the British Salt and Kistos facilities, and a private site access road which leads from Warmingham Road (c-Road) from the village of Warmingham. This is an existing access and egress route which has been used for historical drilling and solution mining activities at the Site. It is unknown at this stage if any road improvements are required to this access. The suitability of this route will be further reviewed during design development and confirmed at the ES stage.

2.5.2. Construction traffic would only be permitted to travel along pre-defined haul routes that have been agreed with the local highway authority. The number of construction traffic movements are unknown at this stage.

Site Clearance and Temporary Works

2.5.3. The Site allows for temporary working areas including storage and welfare areas, material stockpiles and provision for compound(s) to be used during construction of the Proposed Development. At this stage, it has been assumed as a reasonable worst-case that construction would be up to the edge of the Order Limits, and a construction compound(s) would be required for all three phases of the gas processing plant construction.

2.5.4. The details of Site clearance and vegetation removal requirements are not known at this stage, although the requirement for significant removals is not expected. No demolition is anticipated to be required.

Utilities and Internal Roads

2.5.5. Buried pipelines would be constructed, connecting the gas processing plant to the wellheads for hydrogen transport. Brine handling and disposal piping would also be required to transport water to/from the wellheads during leaching.

2.5.6. Internal access roads to each wellhead and other facilities on Site would be constructed.

Hydrogen Storage Facility

2.5.7. The Hydrogen Storage Facility is proposed as a phased development with four caverns developed within the east cavern plot (under 14/5678W) forming the initial storage plant once debrined / first fill has taken place, followed by the development of up to nine additional caverns, forming the west cavern plot.

Solution Mining

2.5.8. Solution mining of salt caverns is a method of extracting underground salt minerals (mostly halite) through drilled wells. The storage caverns are created by a process known as solution mining, which involves injecting water into salt beds to create a brine solution, which is then forced up to the surface.

2.5.9. This section describes the three stages of the salt cavern construction process: drilling of the well; leaching of the cavern; and debrining / first fill for conversion to gas service. The first two stages apply to the nine caverns on the west cavern plot only, and the third stage (debrining / first fill) applies to all 13 caverns across the west cavern plot and the east cavern plot.

Drilling of the wells

2.5.10. The drilling rig would operate 24 hours a day, 7 days a week until the well is drilled to the target salt layer. This is estimated to take approximately 3 months per well.

2.5.11. A below ground, concrete well cellar would be provided at each well head. This would provide support for the drilling rig and would house the wellhead equipment.

2.5.12. The drilling rig would be erected on the drilling platform and would be lit during dark hours.

2.5.13. The borehole is drilled in stages. At each stage, casing (a steel pipe) is installed and cemented in place to provide structural integrity, protect water-bearing layers and ensure pressure integrity and containment of the borehole during the cavern solution mining and storage operations (extraction and injection of gas). The casing consists of decreasing size concentric layers. This multi-layer design provides multiple layers of protection to the surrounding environment. The innermost or deepest cemented casing is called the last cemented casing (LCC) and is installed ten meters into the clean salt of the Northwich Halite formation. This is followed by drilling an open hole into the target salt depth to enable access to the salt formation for solution mining of the cavern.

Leaching

2.5.14. Salt caverns are formed by injecting water through one of the two suspended leaching strings (a tubing string suspended inside the well to control water injection and brine removal), while brine is extracted through the other string located within the borehole. The strings are arranged one inside the other to create separate flow channels for both water and brine. In general, two different ‘leaching modes’ for cavern development can be applied

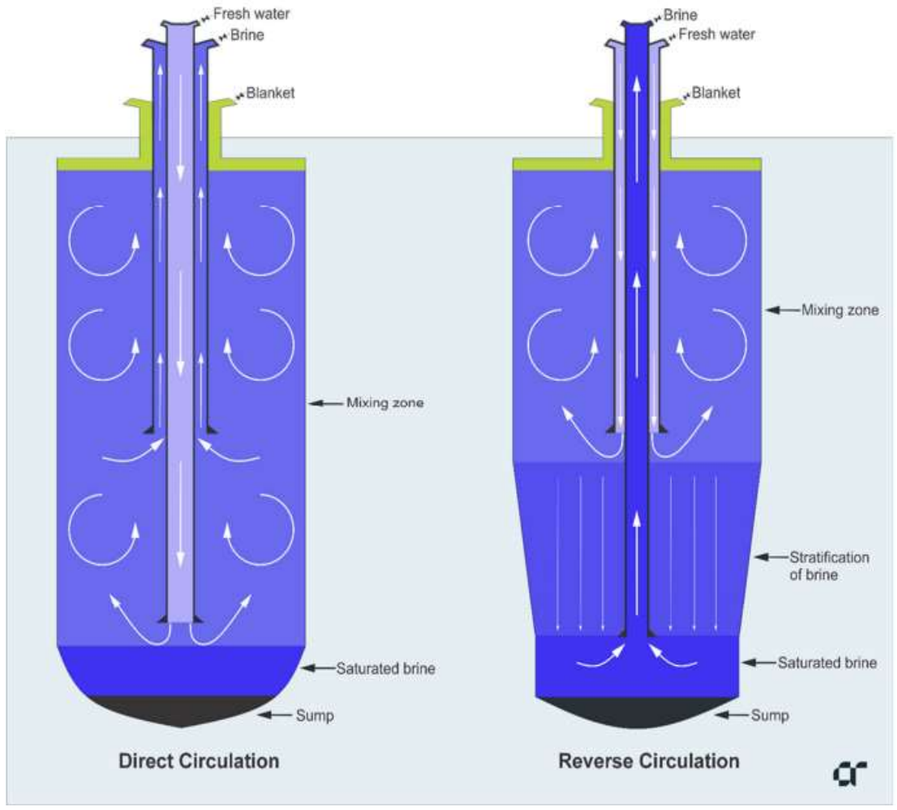
- direct mode (bottom injection): injection through the inner leaching string,
- reverse mode (top injection): injection through the annulus between inner and outer leaching string.

2.5.15. The annulus between the outer leaching tubing and the borehole casing (or cavern wall) is filled with a ‘blanket’ to protect the cavern roof from dissolving. At this stage nitrogen is planned to be the blanket medium. By switching between the leaching modes, changing the depths of the leaching strings and moving of the blanket, the cavern would be shaped as desired.

2.5.16. The displaced brine would be pumped to the British Salt Middlewich facility via an existing pipeline which connects to the British Salt pumping facility on Site. The brine

will be used for the production of salt at the Middlewich facility, with recycled water returned to the pumping station for reuse in solution mining activities.

2.5.17. Leaching of the west plot caverns (nine) could take up to 35 years in total (based on a rate of up to seven years per two caverns leached concurrently).



Insert 2-1 Direct and reverse leaching modes

Debrining / First fill

2.5.18. Once solution mining has been completed, the cavern and well are then prepared for conversion from leaching to hydrogen service by installing a wellhead[7] specifically designed for this service type, performing Mechanical Integrity Tests for confirmation of the integrity of the cavern/well and ensuring the cavern is suitable for hydrogen storage. A debrining string would be installed and the cavern debrined by injecting hydrogen gas into the cavern. Under sufficient pressure, the hydrogen gas would displace the saturated brine upwards through the debrining string to the gas processing plant and downstream to the brine disposal plant (British Salt).

2.5.19. Once debrined, the debrining string and wellhead would be removed. If required, biocide or chemical inhibitors can be injected into the cavern via a surface tie-in point to minimise risk from microbial reactions within the cavern during storage.

2.5.20. It is anticipated that the hydrogen would be delivered from the LCHPP, and / or via a dedicated pipeline, subject to a separate third party consent.

Hydrogen Pipeline Connection at an Above Ground Interface

2.5.21. It is expected that a third party pipeline would connect into the Proposed Development at an Above Ground Interface, rising to the surface at this point where it would connect to the Hydrogen Storage Facility. The Above Ground Interface would be constructed by the Proposed Development for the pipeline developer to connect into.

2.5.22. The hydrogen would be sourced from storage users (these could be hydrogen producers, hydrogen users, or others) in the Northwest. Pipeline specification hydrogen would be delivered via a connecting network pipeline, consented under a separate third party consent.

2.5.23. Hydrogen produced at the LCHPP may also be exported to the third party pipeline via the Above Ground Interface.

Gas Processing Plant

2.5.24. A processing area, comprising a gas processing plant, would be constructed on the eastern cavern plot, covering an area of 68 ha with connections between the gas processing area and wellheads, including access roads and a new 33kV sub-station which would tie into the existing utility 22kV electrical distribution network. The gas processing plant would contain buildings for control, administration and personnel welfare, a workshop, security gatehouse, parking, and equipment housings for compressors and metering equipment.

2.5.25. To align with anticipated demand for storage capacity three phases of equipment would be installed at the gas processing plant each comprising new compressors, process and electrical equipment. The first phase of construction for the gas processing plant would comprise of the majority of construction works required, taking approximately three years. The following two phases of construction is expected to take up to two years each. The timing of phases two and three would be driven by storage demand, therefore it is unknown at this stage at what point these phases would come forward.

2.5.26. The electricity supply would be provided via two new 33kV underground double circuit feeder cables, terminating at the new 33kV sub-station at the gas processing plant. This would provide 10MW of electricity to power the gas processing plant

[7] A wellhead is the structural and pressure containing assembly installed at the surface of a well, providing the secure interface between the subsurface casing/tubing and the surface drilling or production equipment.

(sufficient for supporting phase one storage within the four east plot caverns). Future expansion (phases two and three) of the gas processing plant would be dependent on grid reinforcement works carried out by others. The DNO have indicated that they expect additional capacity to be available following transmission network reinforcement planned for 2038.

LCHPP

2.5.27. A LCHPP with a capacity of up to 50 MW would be constructed adjacent to and connect into the gas processing plant.

2.5.28. The key components of the LCHPP are:

- electrolyser units;
- air coolers for the electrolyser units and other auxiliary equipment;
- an electrical compound;
- a hydrogen dryer package;
- hydrogen and oxygen vents;
- a water treatment plant;
- storage tanks and pumps for raw process water and demineralised water;
- a liquid nitrogen receiver, storage and vaporisation package;
- an instrument air receiver and package;
- a hydrogen fiscal metering package;
- an uninterruptable power supply; and
- a waste management area.

2.6. Operation and Maintenance

2.6.1. The operational processes would be the import and export of hydrogen gas to/from the storage facility to meet market demands, and production of hydrogen by the LCHPP. Maintenance activities would comprise of preventative maintenance such as scheduled services and corrective maintenance such as replacing components and unexpected repairs. The scale of maintenance requirements is anticipated to be minimal.

Site Access and Operational Traffic

2.6.2. The main access into the Site during operation is expected to be via an existing track shared with British Salt and Kistos facilities and a private access road which leads from Warmingham Road (c-Road) from the village of Warmingham. The suitability of this route will be further reviewed during design development and confirmed at the ES stage.

2.6.3. Once operational, the level of traffic associated with the Proposed Development would be minimal. It is predicted that during the operational phase there would be approximately 15 staff on Site at any given time (a maximum of 30 two way movements per day), with limited daily HGV movements (maximum of 3 per day) and occasional maintenance periods.

Drainage

2.6.4. At this stage, it is anticipated that surface water runoff generated by the development would be attenuated and managed through the implementation of Sustainable Drainage Systems (SuDS).

Hydrogen Storage Facility

Operating modes

2.6.5. Operating modes for hydrogen storage would consist of:

- Import/ injection mode;
- Export/ Withdrawal Mode; and
- Cavern transfer.

Import mode

2.6.6. Hydrogen gas would be imported from the third party pipeline and transferred to the storage caverns. The imported gas would pass through import metering and manifold on entering the gas processing plant. Depending on the pressure differential between the pipeline operating pressure and the cavern storage pressure, the gas can be compressed (or let-down) and cooled for injection into one or more of the caverns.

Export mode

2.6.7. Hydrogen gas is exported from the caverns to the third party hydrogen pipeline. The gas withdrawn from the caverns is filtered, dried and cooled within the withdrawal train at the gas processing facility and exported via the manifold and export metering. If necessary, depending on the pressure differential between the caverns and the pipeline, the hydrogen can be compressed or let-down to meet the pipeline specification. The Hydrogen Storage Facility is expected to typically operate in either import or export mode but would be capable of operating in either mode simultaneously in normal operations.

Cavern transfer

2.6.8. The facility would be capable of transferring hydrogen from one cavern to another cavern via a dual manifold. Some additional compression of the hydrogen may be required depending on the pressure differential between caverns. This would be achieved by cycling the hydrogen back through the withdrawal train (at the gas processing plant), at least one compression stage and a cooling stage before returning to the dual manifold and alignment of relevant wellhead valves to inject the gas into the required cavern.

Simultaneous operations

2.6.9. The Proposed Development would adopt a phased approach, where the new caverns would be incrementally added to the Hydrogen Storage Facility. Therefore, both storage and debrining operations may need to be operational at the same time.

2.6.10. The facility would be capable of injecting or withdrawing hydrogen to the operational caverns whilst simultaneously debrining new caverns.

Gas Processing Plant Operations

2.6.11. Imported hydrogen would likely require compression for injection into the storage cavern depending on the pipeline and cavern pressures. If required, imported hydrogen would be compressed to just above cavern storage pressure in the compressors.

2.6.12. The gas withdrawn from the underground storage caverns would contain water/brine and may be contaminated with solids and gases, requiring purification, dehydration and dew-pointing to comply with the pipeline specification. The hydrogen gas would be extracted from the cavern via the wellhead and conveyed to the purification and dehydration vessels. By products from this process would be captured, with solid waste captured in filter media which would be periodically sent off-Site for disposal, and process wastewater would be captured by a closed drain system and removed periodically by tanker.

2.6.13. A ground flare would be used to safely burn excess hydrogen gas when equipment is to be shut down or maintenance carried out.

2.6.14. A 33kV substation provides 10 MW of electricity to power the equipment at the gas processing plant, and electrical services connecting to the wellpads. Other control and workshop buildings would be located at the gas processing plant.

2.6.15. The maximum height of buildings/structures would be:

- Compressor buildings – 18m;
- Dehydration vessels – 15m; and
- Ground flare - 50m.

LCHPP

2.6.16. The LCHPP would use electrolysis to produce 50 MW of hydrogen from demineralised water using electricity from renewable and other low carbon power sources.

2.6.17. During operation the process is expected to require up to 18 m^3 per hour of raw water demand, sourced from an existing abstraction point on the River Wheelock. The abstraction licence is held by British Salt who use the abstraction for their solution mining activities. The water demand for the Proposed Development is anticipated to be lower than headroom available on the existing abstraction licence.

2.6.18. Wastewater from the electrolysis process would be treated on Site at the water treatment plant and discharged to a suitable receptor. This may be via a surface water outfall or sewer and would be confirmed at the ES stage.

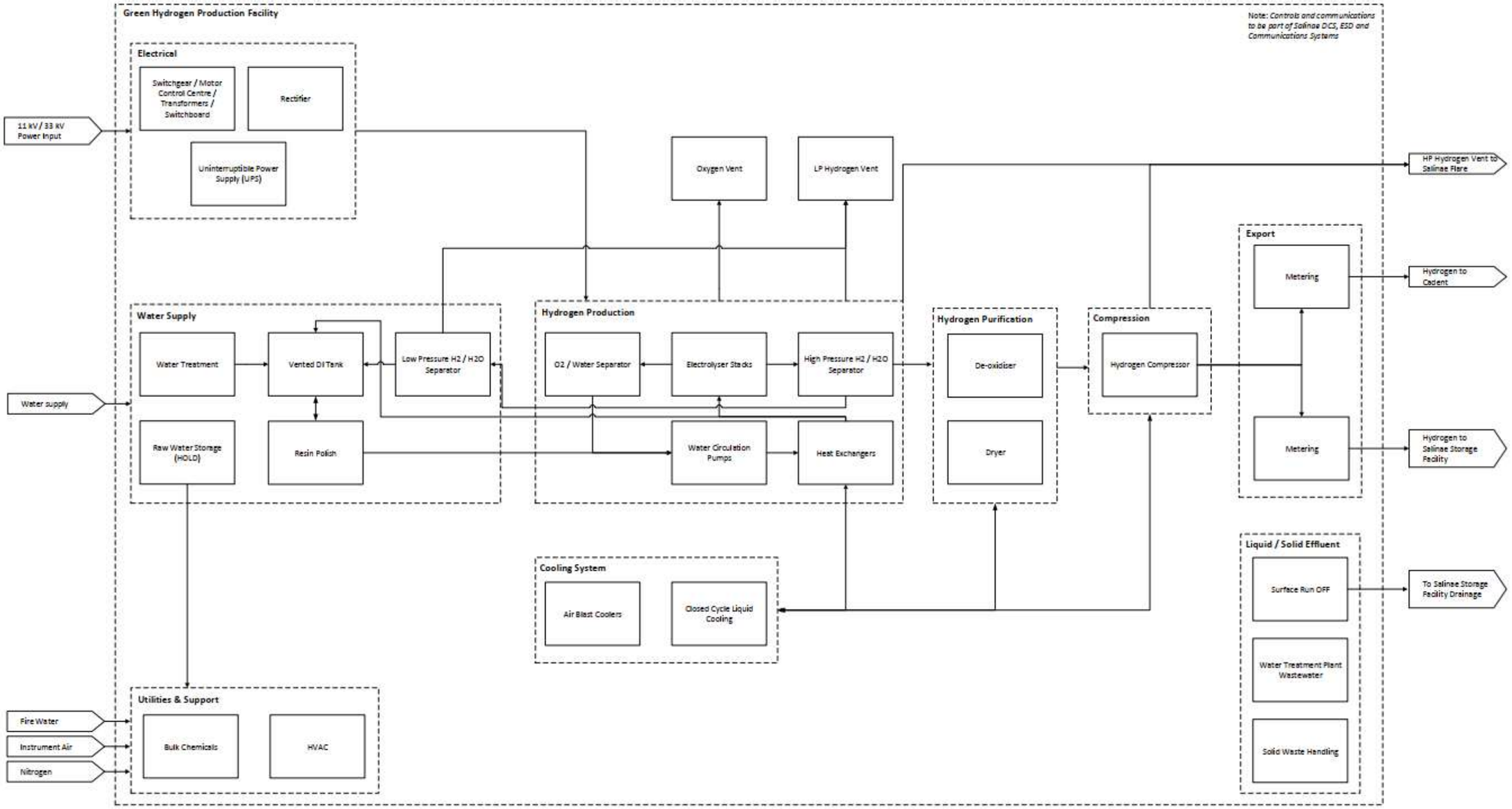
2.6.19. The LCHPP would include hydrogen and oxygen vent systems. Each electrolyser unit would have hydrogen and oxygen vents:

- Hydrogen vents (during shutdown or maintenance) would connect to a vent stack;
- Oxygen would be expelled continuously during electrolyser operation;
- Medium/high pressure hydrogen vents would be routed via above ground pipework to the ground flare at the gas processing plant; and
- Low pressure vents (degassers) would vent locally at safe locations.

2.6.20. A block flow diagram is shown in **Insert 2-2.**

2.6.21. The height of buildings/structures would be no greater than those required for the Hydrogen Storage Facility. The maximum heights are:

- Buildings – 15 m; and
- Hydrogen vents – 20 m.



Insert 2-2 Block flow diagram of the LCHPP

2.7. Construction / Operational Programme

2.7.1. The Proposed Development aims to take advantage of solution mining activities already being undertaken by British Salt Ltd, ensuring the caverns created are suitable for hydrogen storage, meanwhile developing surface facilities for the injection and withdrawal of hydrogen underground.

2.7.2. The development of caverns would occur in a sequential manner governed by British Salt's plans for solution mining, starting firstly in the eastern plot (covered by their existing permissions for cavern creation only) followed by the western plot. The initial caverns would be developed and suspended full of brine until the hydrogen storage surface plant facilities are available, and thereafter further storage capacity would be incrementally added as solution mining is completed on each cavern. As such, solution mining and hydrogen storage activities may take place concurrently.

2.7.3. The following programme for construction and operational activities is assumed for the purposes of this Scoping Report and is dependent on funding availability and securing the necessary consents.

2.7.4. Drilling of the four caverns on the east cavern plot started in 2025 and are covered under British Salt's existing permissions. The impacts of this activity are therefore not assessed in this report, although they will be considered in the cumulative assessment.

2.7.5. Construction for the hydrogen surface storage facilities would be phased. The first phase is scheduled to commence from 2030. Construction is expected to take up to three years for phase one and would include the majority of the facilities within the gas processing plant. The LCHPP would be constructed at the same time as the gas processing plant and associated infrastructure for the Hydrogen Storage Facility.

2.7.6. Additional compressor and dehydration vessel facilities would be added to the gas processing plant during phases two and three, with construction lasting up to two years for each. The construction of phases two and three would be at a later date, determined by demand for hydrogen storage. Therefore, the exact dates of phases two and three are unknown at this stage. The drilling and solution mining activities on the west plot are expected to start at the earliest in 2033 and could take up to 35 years, with caverns coming online for hydrogen storage as they are ready.

2.7.7. Operation of the Hydrogen Storage Facility would be phased. The first caverns in the east plot are assumed to become operational for hydrogen storage in 2033.

2.7.8. The earliest operation of the LCHPP would also be in 2033.

2.7.9. **Insert 2-3** indicates how the construction and operation stages for the Hydrogen Storage Facility and LCHPP could overlap.

2.7.10. To avoid ambiguity, the Scoping Report recognises that:

- Construction is a necessarily prolonged process, associated with ongoing cavern development, successive infrastructure packages, and staged commissioning across the Site.
- Operation of the Hydrogen Storage Facility and LCHPP may coincide with continued construction elsewhere within the Site.

2.7.11. At the ES stage, each environmental topic will present clear assumptions on the reasonable worst case scenario used in their assessments.

Year 1 of the Proposed Development (2030)

Application	Activities		Date / Year: 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73
			1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44
British Salt (14/5678W)	N/A	Drilling of wells 1-4 (14/5678W)	
		Leaching of caverns 1-4 (14/5678W)	
Uniper (The Proposed Development)	Construction	Earthworks and access roads for gas processing plant / LCHPP, lighting, security fencing	
		LCHPP	
		Construction of gas processing plant and above ground hydrogen interface	
		Construct LCHPP	
		Debrining / first fill of caverns 1-4	
		Earthworks, access roads, lighting, security fencing for wells 5-13	
		Underground pipeline connections and utilities for wells 5-13	
		Drilling of wells 5-13	
		Leaching of caverns 5-13	
		GPP Phase 2 and 3 Construction (add modules)*	
		Underground hydrogen pipeline connection between east and west cavern plots	
		Debrining / first fill of caverns 5-13	
	Operation	Operational Hydrogen Storage Facility	
		Operational LCHPP	
	Decommissioning	Decommissioning starts	

* note the construction phase for GPP phases 2 and 3 will be 2 years in duration for each phase; however, the timing of these phases coming forward will be driven by demand, therefore the expected years these come forward for construction is unknown at this stage

Insert 2-3 Indicative figure showing the potential overlap of the construction and operation stages of the Proposed Development

2.8. Decommissioning

2.8.1. The anticipated Proposed Development lifetime for the above ground infrastructure is expected to be 40 years, ending in 2073.

2.8.2. Towards the end of operation, an assessment would be made, based on the market conditions at the time, as to whether it is financiall viable and appropriate to extend the operational lifetime of either the Hydrogen Storage Facility or the LCHPP.

2.8.3. For the purposes of this Scoping Report, it is assumed that the Proposed Development would be decommissioned at the end of its anticipated 40 year operational lifetime (2073). This assumption enables a clear and reasonable worst case basis and reflects the fact that the current application is not seeking an open ended or time unlimited consent. While there may be potential in the future to extend the operational life of the Hydrogen Storage Facility or the LCHPP, such a decision would be informed by future market conditions and would be subject to a separate assessment and consenting process, if pursued. The Scoping Report therefore proceeds on the basis that decommissioning will occur in 2073.

2.8.4. Decommissioning impacts are likely to be similar to and no worse than during construction and have been scoped concurrently.

2.8.5. Limited information is currently available about the decommissioning phase of the Proposed Development and assumptions will be made and recorded within the ES. It will not be possible to undertake a detailed assessment of the potential impacts of decommissioning within the ES and a separate assessment would be required as the facility reaches the end of its life.

2.8.6. At the end of the operational life, a decommissioning plan would be implemented, including:

- Safe abandonment of wells including rewatering of caverns;
- Removal of above-ground infrastructure; and
- Restoration of the Site to an agreed after-use, in consultation with stakeholders and regulatory authorities.

2.8.7. A Decommissioning environmental Management Plan (DEMP) would consider in detail all potential environmental risks of the decommissioning activities and contain guidance on how risks can be removed or mitigated during the decommissioning and demolition.

3. Consideration of Alternatives

3.1. Introduction

3.1.1. Regulation 14(2)(d) and Schedule 4 of the EIA Regulations[4] require applicants to provide:

3.1.2. "a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the development on the environment."

3.1.3. Alternative options typically comprise:

- The 'Do Minimum or Do Nothing' alternative, where the development is not progressed;
- Consideration of alternative locations or uses; and
- Consideration of alternative designs/technologies.

3.1.4. This chapter presents a summary of the alternatives considered to date for the Proposed Development. The ES will provide further detail on the alternatives considered for the Proposed Development and the main reasons for selecting particular options, taking into consideration environmental effects. These documents will also further explain the selection processes including how the design and locations have evolved over time and any refinements that take place specifically as a result of the EIA process and in response to stakeholder feedback.

3.2. Do Nothing Alternative

3.2.1. The 'Do Nothing' alternative considers the future conditions of the Site, should the Proposed Development not progress. As discussed in Chapter 2, the Site lies above salt deposits within the Warmingham brine fields in Cheshire, England. The British Salt Brinefield, Kistos Energy Storage and Hill Top Farm are located within the Site, comprising an existing facility operated by British Salt for the commercial extraction of salt from underground caverns with the subsequent storage of natural gas. Four caverns are currently being drilled and scheduled for solution mining under British Salt's historic planning permissions within the eastern part of the Site, and once created, may be utilised for the storage of natural gas in the event of a do nothing alternative.

3.2.2. However, the Government has demonstrated a ''commitment to hydrogen as a central pillar of the UK's clean energy future (...) These plans have been backed up by the Spending Review, which confirmed over £500 million support for hydrogen infrastructure. This will enable the development of the first regional hydrogen transport and storage network, which will aim to connect producers with vital end users – such as power and industry – for the first time''[8].

3.2.3. Hydrogen is a key fuel for industries that are difficult to electrify, such as chemical production and refining, steelmaking, cement production, and transport. Once produced, hydrogen can also be refined into renewable liquid fuels – such as synthetic diesel and sustainable aviation fuel – providing a clean energy source for vehicles and whole industries that currently rely on carbon-intensive fuels.

3.2.4. The Proposed Development is one of many projects working to help deliver a net zero future for the UK and to decarbonise the north west region in particular. The development of hydrogen storage facilities such as the Proposed Development could help to provide confidence for industries looking to fuel switch to hydrogen and away from fossil fuels, by providing a reliable source of hydrogen, complementing other sources. It also offers the potential to store renewable energy, enabling excess wind and solar power to be utilised for hydrogen production, rather than being curtailed as is currently the case.

3.2.5. As such, the need for the Proposed Development has been determined, and the 'Do Minimum / Do Nothing' alternative has not been considered further.

3.3. Alternative Locations or Uses

3.3.1. Salt caverns are ideal for gas storage as they can withstand high internal pressures and are impermeable to gasses; their natural sealing properties make them safe and effective for operational use. Suitable salt beds are however only found in a few regions across the country, and the Cheshire salt basin is widely regarded as one of the most suitable of all Halite deposits in England for this purpose.

3.3.2. The Proposed Development is therefore only possible where the natural formation of salt beds are found. The region contains suitable salt bearing geology and already hosts established subsurface gas storage facilities that have demonstrated the safe use of salt caverns for gas storage. The Applicant has been safely operating its Holford natural gas storage facility in the Cheshire salt basin for nearly 15 years, located ~9km north of the Site.

3.3.3. Within the north west of England there are a cluster of hydrogen projects which have the potential to become a large regional hydrogen economy producing, storing and distributing hydrogen. Large scale hydrogen storage facilities must connect to hydrogen producers and off-takers via a pipeline. Cadent Gas is currently preparing a DCO application for the Hynet North West Hydrogen Pipeline' which will transport hydrogen from the Stanlow production site to industrial users and to blending points at Partington and Warburton for introduction into the existing gas network. The Hynet

[8] Department for Energy Security and Net Zero (2025). Hydrogen Update to the Market. Available at: https://assets.publishing.service.gov.uk/media/6880b2139fab8e2e86160efe/hydrogen-update-to-the-market-2025.pdf

pipeline will also need to connect with hydrogen storage facilities to help balance supply and demand on the pipeline.

3.3.4. British Salt owns the mineral rights for the Site and the majority of land within the Site. Typically, when developing salt cavern storage for gas, the brine pumped out to prepare the cavern for gas storage must be disposed of. Generally, brine is either pumped out to sea (risking ecological impact), left to evaporate/crystallise in lagoons (requires a lot of land) or, pumped down into other geological formations (high cost and requires suitable geology).

3.3.5. The Proposed Development's close proximity to the British Salt Middlewich site and commercial partnership with British Salt would enable all the displaced brine, extracted from the solution mining process, to be taken by British Salt to produce salt at their Middlewich plant. This unique synergy would result in environmental benefits, and would be mutually beneficial to both organisations and the local community. Sustainable brine offtake is a benefit specific to the location of the Proposed Development at this Site. There are also additional benefits associated with the use of the existing British Salt facilities, with the requirement for less infrastructure to be developed, minimising environmental impact and carbon footprint associated with needing to construct new facilities for solution mining.

3.3.6. In addition, co-locating hydrogen production from the LCHPP with the Hydrogen Storage Facility brings further benefits.

3.3.7. Onsite hydrogen production could supply initial and ongoing hydrogen capacity into the storage caverns, reducing the dependency on an external hydrogen supply. This could provide greater confidence for potential users looking to fuel switch to hydrogen and away from fossil fuels as the proposed Hydrogen Storage Facility would have an integrated supply of hydrogen.

3.3.8. Hydrogen storage offers the potential to store renewable energy, enabling excess wind and solar power to be utilised for hydrogen production, rather than being curtailed as is currently the case. Incorporating hydrogen production to the proposed facility would ensure that this potential is optimised with efficiency savings from the co-location.

3.3.9. For the reasons outlined in this section, alternative locations have therefore not been considered further.

3.4. Alternative Designs / Technologies

Hydrogen Storage Facility

3.4.1. There are several alternatives to salt caverns for storing large quantities of hydrogen, each with its own advantages and limitations depending on the scale, location, and purpose of the storage. Key alternatives include:

- Depleted oil and gas reservoirs;
- Aquifers (porous rock formations);
- Above-ground tanks;
- Liquid hydrogen storage;
- Solid-state storage (metal hydrides, chemical carriers); and
- Underground hydrogen storage in rock caverns.

3.4.2. As outlined in the above section, the Site is uniquely positioned to take advantage of the existing British Salt facilities for solution mining of salt caverns, including four caverns within the Site which are being solution mined under existing historic permissions. Alternative technologies for hydrogen storage have therefore not been considered further. It is worth noting however, the use of an underground hydrogen storage solution has the benefit of limiting visual impact since the majority of the infrastructure is below ground, with reduced noise and visual impact compared to an above ground storage solution.

LCHPP

3.4.3. At this stage it is unknown which electrolyser technology type would be used for the LCHPP.

3.4.4. The LCHPP would use a number of electrolyser units to split demineralised water into hydrogen and oxygen using low carbon electricity. The hydrogen produced will comply with the government's Low Carbon Hydrogen Standard. The two electrolyser technology options under consideration are proton-exchange membrane (PEM) and pressurised alkaline water electrolysis.

3.4.5. In PEM electrolysis water is split into oxygen and hydrogen ions (H+) at the positive electrode (anode), the H+ ions pass through a membrane to the negative electrode (cathode) where hydrogen is generated.

3.4.6. In alkaline water electrolysis water is split into hydrogen and hydroxide ions (OH-) at the cathode, the OH- ions diffuse through a liquid electrolyte of potassium hydroxide (KOH) to the anode, where the ions generate oxygen.

3.4.7. For the LCHPP, several factors will influence the choice of electrolyser technology for producing hydrogen, including but not limited to:

- hydrogen delivery temperature;
- turndown capability;
- start-up time;
- hydrogen production rate;
- stack efficiency;
- overall water requirement; and
- hydrogen product purity.

Next Stage

3.4.8. Consideration of alternative layouts within the design of the Proposed Development will be considered in the ES as the design evolves further through feedback in the Scoping Opinion, other consultation responses, environmental survey, assessment and engineering recommendations. The ES will also address alternative layouts within the Site where appropriate.

3.4.9. At the scoping stage, atmospheric flaring and venting options are still being considered and therefore the choice of technology will be considered further in the ES. Both venting and flaring options for emergency depressurisation and maintenance have advantages. This decision will be taken specifically for the Proposed Development based on increased engineering design and will be evaluated against safety and environmental impacts (namely landscape and visual impact and air quality impacts).

4. Policy Context

4.1. Introduction

4.1.1. NSIP proposals are considered against policy contained in the appropriate National Policy Statements (NPSs) which set out national policy relating to the development of energy infrastructure. These have effect for decisions by the Secretary of State on applications for energy developments that are nationally significant under the PA2008. Decisions should therefore accord with the terms of the NPS.

4.1.2. The National Planning Policy Framework (NPPF)[9] does not contain specific policies for NSIPSs. NSIPs are determined in accordance with the decision-making framework in the PA2008 and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the NPPF). The NPPF has therefore been reviewed for completeness to explore matters that may be considered relevant, for example, in guiding design or mitigation approaches.

4.1.3. The Local Development Plan is the Cheshire East Local Plan, formed of a number of documents dating from 2017-2022[10]. Consultation on a new Local Plan is ongoing.

4.1.4. An overview of the relevant policy within the key planning policy documents is set out below. Further, the national and local planning policy and legislation specifically relevant to each environmental discipline has also been reviewed and is reported in **Appendix B.** (It should be noted that Appendix B does not include discipline related policy from National Policy Statement EN-4 for the reason that EN-4 states, with regard to generic impacts and potential mitigation, those set out in EN-1 are relevant to the consideration of applications for underground natural gas storage facilities and gas pipeline networks.)

4.2. National Policy Statements

NPS EN-1: Overarching NPS for Energy - December 2025[11]

4.2.1. EN-1 sets out national policy for the development of nationally significant energy infrastructure to meet the government's energy objectives. This NPS, combined with any technology specific energy NPS where relevant, provides the primary policy for decisions by the Secretary of State. For infrastructure outside one of the technology specific NPSs, including hydrogen pipeline and storage infrastructure, EN-1 will be the primary basis for the Secretary of State's decision making. Where there may be a conflict between the terms of either the National Planning Policy Framework or a Local Plan EN-1 will prevail for the purpose of Secretary of State decision making given the national significance of the infrastructure.

4.2.2. EN-1 references the Clean Power 2030 Action Plan, produced by the government in 2024. The plan sets out the infrastructure requirements that will ensure by 2030 clean sources of power produce at least 95% of Great Britain's generation. Government has committed to the Clean Power 2030 Mission, subject to security of supply, to underpin its 2050 net zero ambitions. EN-1 acknowledges that meeting the clean Power 2030 Mission will necessitate significant investment in new energy infrastructure ensuring supply of energy always remains "secure, reliable, affordable, and consistent with net zero emissions in 2050" (paragraph 3.2.1) with planning policy being used to support the government's ambitions.

4.2.3. The Secretary of State is directed to give 'substantial weight' to NSIP applications for the types of infrastructure covered by EN-1 on the basis of urgent need, this includes applications for hydrogen infrastructure. Paragraph 3.3.49 states "Low carbon hydrogen is essential to achieve the government's Clean Energy Superpower and Growth Missions and will be a crucial part of our future energy system" and, that the development of both blue and green hydrogen production will be needed to meet the scale of low carbon hydrogen production required for net zero.

4.2.4. Paragraph 3.4.23 states "to support the urgent need for low carbon hydrogen infrastructure, hydrogen distribution, pipelines and storage, are considered to be CNP [critical national priority] Infrastructure" and the Secretary of State will expect applicants for new hydrogen pipelines and underground storage to consider foreseeable future demand. "Applicants may therefore propose pipelines with a greater capacity than demand might suggest at the time of consenting" (paragraph 3.4.22). Significantly, paragraph 3.3.63 of EN-1 states, "subject to any legal requirements, the urgent need for CNP infrastructure to achieving our energy objectives, together with the national security, economic, commercial, and net zero benefits, means that it is likely the need case will outweigh any other residual impacts

[9] Department for Levelling Up, Housing and Communities (2024). National Planning Policy Framework. Available online at: National Planning Policy Framework - Guidance - GOV.UK
[10] Cheshire East Local Plan. Available online at: Cheshire East Local Plan

[11] Department for Energy Security & Net Zero (2025). Overarching National Policy Statement for Energy (EN-1) [online]. Available at: EN-1 Overarching National Policy Statement for Energy

not capable of being addressed by application of the mitigation hierarchy, in all but the most exceptional circumstances. Government strongly supports the delivery of CNP infrastructure and it should be progressed as quickly as possible".

4.2.5. EN-1 includes general policies for the assessment of energy infrastructure applications. Paragraph 4.1.3 states "Given the level and urgency of need for infrastructure of the types covered by the energy NPSs…the Secretary of State will start with a presumption in favour of granting consent to applications for energy NSIPs". Although the Secretary of State should take into account environmental, social and economic benefits and adverse impacts, at national, regional and local levels, where residual adverse effects may remain, after mitigation, "it is likely that the need case will outweigh the residual effects not capable of being addressed by application of the mitigation hierarchy, in all but the most exceptional cases" (paragraph 4.1.7). This presumption, however, does not apply to residual impacts which present an unacceptable risk to, or interference with, human health and public safety, defence, or irreplaceable habitats.

4.2.6. An overview of *inter alia* the assessment principles in Section 4 of EN-1 and the generic impact criteria in Section 5 is reported in **Appendix B**.

NPS EN-4: Natural Gas Supply Infrastructure and Gas and Oil Pipelines November 2023[12]

4.2.7. In relation to the type of infrastructure covered by EN-4, Paragraph 1.6.2 states, "pipelines which meet the Planning Act threshold could be carrying different types of gas, fuel or chemicals. This NPS only has effect for those nationally significant infrastructure pipelines which transport natural gas". Notwithstanding, the paragraph also states ''information in this NPS may be useful in identifying impacts to be considered in applications for pipelines intended to transport other substances".

4.2.8. Although sections 2.8 to 2.11 of EN-4 relate to the storage of natural gas, which Hydrogen is not, the principles have relevance for the Project. It states that applicants for this type of facility must supply a detailed geological assessment to demonstrate the suitability of the geology at the site for the type of underground gas storage proposed and include borehole evidence specific to the proposal where up to date geological data does not exist.

4.2.9. Applicants must also comply with the requirements around HSC and provide information on relevant impacts and proposed mitigation relating to safety, noise and vibration, gas emissions, water quality and disposal of brine in particular. However, Paragraph 2.8.4 states that "many of the generic impacts set out in EN-1 are relevant to the consideration of applications for underground natural gas storage facilities". This also extends to the consideration of generic impacts relating to gas pipeline networks which extend between storage and distribution facilities (Paragraph 2.20.2).

4.3. National Planning Policy Framework (NPPF) December 2024

4.3.1. The current NPPF is dated December 2024. A revised NPPF is currently out for consultation until 10 March 2026. Any updates to this document will be considered at the time of preparing the ES.

4.3.2. The NPPF[9] states that the *"purpose of the planning system is to contribute to the achievement of sustainable development"* through pursuit of three overarching objectives – economic, social and environmental. Accordingly, plans and decision-makers at every level should apply a presumption in favour of sustainable development, unless the application of policies in the Framework that protect areas or assets of particular importance provides a strong reason for refusing the development proposed or, any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the NPPF taken as a whole.

4.3.3. In building a strong competitive economy, planning policies and decisions should recognise and address the specific locational requirements of different sectors, including making provision for inter alia clusters or networks of high technology industries; and for new, expanded or upgraded facilities and infrastructure that are needed to support the growth of these industries (including grid connections).

4.3.4. Paragraph 161 states that the planning system should support the transition to net zero by 2050 and in doing so support renewable and low carbon energy and associated infrastructure. Planning decisions should however recognise the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; minimise impacts on and provide net gains for biodiversity, and prevent new and existing development from contributing to, or being put at unacceptable risk from unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality.

4.3.5. With regard to the sustainable use of minerals, Section 17 of the NPPF recognises the finite and locational nature of the resource and the need for a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the UK needs.

[12] Department for Energy Security & Net Zero (2024).Gas Supply Infrastructure and Gas and Oil Pipelines. Available at: National Policy Statement for natural gas supply infrastructure and gas and oil pipelines (EN-4) - GOV.UK

4.3.6. Paragraph 224 states that Local Planning Authorities are encouraged to give great weight to the benefits of mineral extraction in the determination of applications, including to the economy. They are directed to *inter alia*:

- "ensure that there are no unacceptable adverse impacts on the natural and historic environment, human health or aviation safety, and take into account the cumulative effect of multiple impacts from individual sites and/or from a number of sites in a locality;
- ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties;
- provide for restoration and aftercare at the earliest opportunity, to be carried out to high environmental standards, through the application of appropriate conditions".

4.4. Local Policy

4.4.1. The Development Plan is the Cheshire East Local Plan[10] which includes:

- Local Plan Strategy, adopted 2017 – sets out strategic priorities for development and policies;
- Site Allocations and Development Policies Document, adopted 2022 – sets out detailed planning policies and land allocations;
- Saved policies from the Cheshire Replacement Waste Local Plan, adopted 2007, saved 2010 – provides policies regarding waste and waste management;
- Saved policies from the Cheshire Minerals Local Plan, adopted 1999, saved 2007 – policies and planning info on mineral development; and
- Completed neighbourhood plans – none relevant to this Site.

4.4.2. Preparation of a new Local Plan is ongoing. Consultation on an issues paper took place in 2024. A New Minerals and Waste Plan will be integrated with the new Local Plan Minerals and Waste Plan.

4.4.3. The entire Site is allocated as Open Countryside (Policy PG6) within the current Local Plan. The southern part of the western plot and the majority of the eastern plot is within an Ecological Network Restoration Area (Policy ENV1). Adjacent to the north of the western plot and to the south and west of the eastern plot, are areas allocated for extensions to the Controlled Brinefield (Minerals Local Plan Policy 52). The HS2 Safeguarding Zone covers part of the western plot (Policy CO2) and an Aerodrome Safeguarding Zone (Policy GEN5) covers both plots. Cognisance of the HS2 safeguarding zone is being considered in the design of the Proposed Development.

5. Baseline Conditions

5.1.1. This section describes the current environmental conditions at and around the Site. It provides baseline information for each topic area to assess how the Proposed Development might affect the environment.

5.1.2. The key environmental constraints within 2 km of the Site are shown in **Appendix A, Figure 5-1**.

5.2. Biodiversity

5.2.1. A preliminary ecological walkover survey was undertaken in September 2025, including a desk-based records centre search. The results of these activities are reported in this baseline section, rather than as a separate Preliminary Ecological Appraisal (PEA) Report.

5.2.2. There is one statutory designated site for nature conservation within 2 km of the Site which is Sandbach Flashes Site of Special Scientific Interest located approximately 645 m east of the Site. There are no European designated sites for nature conservation within 2 km or within 10 km with hydrological connectivity to the Site. Mersey Estuary Special Area of Protection (SPA) and Mersey Estuary Ramsar site are located downstream (>20 km from the site) and may be hydrologically connected. A Habitats Regulation Assessment (HRA) will be undertaken to determine any likely significant effects.

5.2.3. There are several non-statutory designated sites for nature conservation within 2 km of the Site. The closest is Ridding Farm Ponds Local Wildlife Site (LWS) which is located within the Site.

5.2.4. The southern part of the western plot and the majority of the eastern plot is within an Ecological Network Restoration Area outlined in policy ENV 1 in the Cheshire East Local Plan.

5.2.5. The desk study did not identify any irreplaceable habitats, including ancient or veteran trees, within 500 m of the Site. The walkover survey did not record any irreplaceable habitats, including ancient or veteran trees, within the Site.

5.2.6. A search using The Woodland Trust's Ancient Tree Inventory returned no ancient or veteran trees and woodlands within 500 m of the Site. Several priority habitats are located within and surrounding the Site, including deciduous woodland, hedgerows, waterbodies, and watercourses.

5.2.7. Designated sites for nature conservation and priority habitats are shown in **Appendix A, Figure 5-1**. The non-statutory designated site Ridding Farm Ponds LWS has been included on **Figure 5-1**.

5.2.8. The Site generally comprises grasslands (pastures) and cereal crops bordered by native hedgerows with mature trees. Blocks of broadleaved woodland, Hoggins Brook and the River Wheelock (both watercourses), and several waterbodies are present within and surrounding the Site.

5.2.9. The Site contains suitability for a range of protected and priority species, including great crested newts (GCN), badgers, roosting/foraging/commuting bats, otters, water voles, breeding/wintering birds, widespread reptiles species, white clawed crayfish, and aquatic species (such as fish and invertebrates). Further details are provided below:

- Several mature trees were present which likely contain roosting suitability for bats. Hedgerows, woodland, watercourses, and waterbodies likely provide suitable foraging and commuting habitat for bats;
- Hoggins Brook which flows through the western aspect of the Site, and the River Wheelock on the eastern aspect of the Site were both identified as suitable habitat for otters, water voles, white clawed crayfish, and aquatic species (including invertebrates and fish);
- The habitats within the Site were suitable for both breeding and wintering bird species (including barn owls and kingfisher);
- Several records of GCN were identified within and surrounding the Site indicating presence. Several waterbodies were identified within and surrounding the Site which may be suitable for breeding along with abundant suitable terrestrial habitat for GCN; and
- The longer sward grassland and woodland edge habitats provided suitable habitat for widespread reptile species.

5.3. Landscape and Visual Amenity

5.3.1. The topography of the Site and wider area is relatively flat, as such a study area of 1 km is deemed appropriate as significant effects beyond this are highly unlikely.

5.3.2. The area within 1 km of the Site comprises of mostly agricultural land and scattered buildings. The village of Warmingham is located adjacent to the eastern boundary of the Site. Aerial imagery shows there is existing above ground infrastructure within the Site, most notably at the southwest corner, associated with the existing Kistos facilities, as well as the outbuildings and pump facilities at Hill Top Farm to the north east. Field boundaries are generally hedges with intermittent trees and there are small blocks of woodland. The River Wheelock runs along the Site Boundary to the east, and the West Coast Main Line railway (Crewe to Hartford) forms the western boundary.

5.3.3. The Site is within Shropshire, Cheshire and Staffordshire Plain National Character Area (NCA). This NCA comprises most of the county of Cheshire, the northern half of Shropshire and a large part of north west Staffordshire.

5.3.4. The Site is within Cheshire Plain East (4) Landscape Characterisation Type (LCT) and the Wimboldsley (4d) Landscape Character Area (LCA), as designated in the Cheshire East Landscape Character Assessment (2018)[13]

5.3.5. Cheshire Plains East LCT is described as a large expanse of flat and very slightly undulating land comprising a relatively large proportion of the Cheshire East landscape. Woodland cover is low, with small coverts scattered intermittently across the area, however numerous hedgerow trees create the perception of a well-treed landscape. It is a working, farmed landscape.

5.3.6. Wimboldsley LCA is described as a predominantly flat, large-scale landscape with relatively few hedgerow trees or dominant hedgerows. In this area there is a great difference in the perceived tranquillity of the more remote rural areas, with scattered and dispersed settlement linked by narrow country lanes. The area is traversed by two very dominant overhead powerlines, one along a north-south axis, the other along the area's western flank, and these further diminish the area's rural character.

5.3.7. Visual receptors within 1 km of the Site are mainly residential, local employees or PRoW users. The following visual receptors are proposed to be assessed in the Landscape and Visual Impact Assessment (LVIA), depending upon the outcome of the site visit:

- People in existing residential properties adjacent, or close, to the Site along and just off the following roads: Warmingham Road, School Lane, Cornmill Close, Drury Lane, Moss Lane, A530 and Forge Mill Lane; these may include listed buildings;
- Users of PRoW: Warmingham: FP3, FP4, FP7 and FP13, Minsull Vernon: FP8, and FP13, that are within the Site;
- Users of PRoW: Warmingham: FP16, FP18 and Minsull Vernon: FP3 FP5, FP6, (part of Crewe and Nantwich Circular Long Distance Walk), FP7, and FP12, that are within 1 km of the Site.
- Viewpoints from within the Conservation Area of Warmingham;
- Viewpoints from the Scheduled Monument Minshull Vernon;
- Users of the St Leonard's Church located 53 m east (including potential views from the Scheduled Monument here);
- Users of Warmingham C of E Primary School;
- Users of the Old Hough House Fishery located approximately 250 m north of the Site;
- Workers within the Site and study area (e.g. farm workers);
- Users of local roads and railways.

5.3.8. The key visual receptors within 1 km are shown in **Appendix A, Figure 5-2**.

5.3.9. Note that representative photographic viewpoint locations for the identified visual receptors will be defined following site visits during the preparation of the ES to ensure the locations present the *"worst case"* scenario. Site photographs will be taken to indicate winter and summer views. Visual receptors may also be scoped out during the site visit if views are not available towards the Proposed Development. Similarly, if additional visual receptors are identified on site with views towards the proposed development these will be scoped in.

5.4. Historic Environment and Archaeology

5.4.1. The baseline conditions have been identified from the following sources:

- National Heritage List for England (NHLE) maintained by Historic England, for listed buildings, scheduled monuments, registered parks and gardens, and registered historic battlefields.
- The Cheshire Historic Environment Record (HER), for information relating to non-designated assets, including non-designated buildings and structures of historic interest, known archaeological sites and areas of archaeological potential, Historic Landscape Characterisation (HLC), find spots and past archaeological investigations (events).

5.4.2. A full assessment of the value of heritage assets will be undertaken at ES stage in accordance with the methodology for historic environment set out in **Appendix C**.

Designated heritage assets

5.4.3. A total of 44 heritage assets were identified within a 1 km study area from the above data sources. These comprise:

- Two scheduled monuments;
- 13 listed buildings
  - two grade II* listed buildings;
  - 11 grade II listed buildings;
- One conservation area; and
- 28 non-designated heritage assets.

[13] Cheshire East Landscape Character Assessment (2018). Available on line at cheshireeast.gov.uk/pdf/environment/landscape/landscape-character-areas-and-strategies.pdf and Public Map Viewer

5.4.4. There are no registered battlefields or registered parks and gardens within 1 km of the Site.

5.4.5. The location of designated assets is shown in **Appendix A, Figure 5-3**.

Scheduled Monuments

5.4.6. There are two scheduled monuments in the study area, both of which are assessed to be of high sensitivity (value). These are as follows:

- Stepped cross base in the churchyard of St Leonard's Church (NHLE 1017839) located 89 m north east of the Site. The former free-standing cross would have been used for outdoor processions in the church yard, alluding to its medieval origins of a church at this location. Though the cross has since been removed, the three steps and red sandstone base remain *in situ*. In the 18th century, a limestone pillar and sundial were added, although the latter was subsequently removed. This asset is also a grade II listed building (NHLE 1138698); and
- Moated site, fishpond and connecting channel, Minshull Vernon (NHLE 1012077) is located 276 m west of the Site. Minshull Vernon consists of a grass-covered trapezoidal island, formerly consisting of a double moated site which would have surrounded a manor house. There was a silted inner moat and a polygonal dry outer moat with dry inlet/outlet channels into the outer moat from the southeast and north east corners of the site, and a channel connecting the outer moat with a D-shaped silted fishpond to the southwest. The presence of a moated site here indicates the residence of a higher status owner.

Listed Buildings

5.4.7. There are 13 listed buildings within 1 km of the Site. Given the built nature of the study area and character of the relatively flat topographical landscape, all listed buildings have been raised for consideration in future assessments. These range from high to medium sensitivity (value), and are summarised below:

- Church House (Grade II* listed building, NHLE 1310880) is located approximately 34 m north east of the Site, and is of high value for its historical, evidential, and aesthetic values. Originally dating to the late 16th century, the two storey farmhouse was amended during the 19th century with the addition of a southern extension, resulting in a 'T'-plan layout. The northern portion of the farmhouse has a timber-framed section, the southern section is made of red brick in Flemish Bond, and other walls are replaced with brickwork in English Bond. The entrance on the southern section is framed by a porch with a pitched roof with a four-panel part-glazed door. Notable external architectural features include the old slate roof of diminishing courses, close studding with middle rail up to coved jettying with full chevron panel infilling, and an oak-studded door on strap hinges in a heavy moulded frame, and multiple types of fenestration;
- The Church of St Leonard (Grade II* listed building, NHLE 1330059) is located approximately 87 m east of the Site and is of high value for its historical, aesthetic, and communal values. The parish church was built in a cruciform plan with a four-bay nave and a singular bay chancel. The church was formerly timber framed however, the west tower dates to 1715 and is made of small bluish brick in Flemish Bond on a high stone plinth and quoins, clock faces, louvred openings around the bells, and windows replaced in 1899 with Y tracery. The main church is made of red sandstone and squared rubble and dates to 1870 with Perpendicular Gothic features including its projecting entrance porch with quatrefoil windows, drip mould, quatrefoil openings, crenelations on the nave parapet, intricate masonry window tracery, and stained glass in the chancel;
- Warmingham Bridge (Grade II listed building, NHLE 1310884) is located approximately 51 m east of the Site and is of medium sensitivity (value). The bridge was built in c. 1750 and spans the River Wheelock. It is made of red sandstone with a rusticated arch over the river, and solid slab parapets which curve towards square end piers;
- K6 Telephone Kiosk opposite the parish church, near the river (Grade II listed building, NHLE 1159771) is located 62 m northeast of the Site and is of medium sensitivity (value) for its historical and aesthetic values. The K6 Telephone Kiosks were designed by Sir Gilbert Scott in 1935 and are located throughout the country. The square kiosk is made of cast iron with a domed roof, unperforated crowns to top panels, and margin glazing to windows and door.
- Medieval Cross in Grounds of St Leonard's Church (Grade II listed building NHLE 1138698) is located approximately 90 m north east of the Site and is of medium sensitivity (value) for its historical and aesthetic values. The monument was built in c. 1298 and consists of a two-step, red-sandstone base which would have previously supported the medieval cross. There are added bevelled blocks supporting a Tuscan column, where there are fixings for a sundial. This asset is also Scheduled Monument (NHLE 1017839);
- Park House (Grade II listed building, NHLE 1159752) is located approximately 115 m north of the Site and is of medium sensitivity (value) for its aesthetic and historical values. The two-storey farmhouse was built in the early to mid-19th century. It is constructed of red brick in Flemish Bond with a gable end stack, slate roof, and a single course stone plinth. Architectural features include a framed ledged and battened door, retained recessed sashes with glazing bars, timber eaves cornice with moulded cast iron gutter, and lead ridge;
- Warmingham Grange (Grade II listed building, NHLE 1330058) is located approximately 153 m northeast of the Site and is of medium sensitivity (value) for its aesthetic and historical values. Built in the early 19th century, the former rectory has since been converted to a club and restaurant. The exterior consists of rendered brickwork, slate roof, double pile, and stone plinth. The entrance porch is flanked by Tuscan columns and plain pilasters supporting a plain entablature and flat roof. The sash windows on the ground floor are recessed, and in a Regency style on the first floor;

- Mill Lodge (Grade II listed building, NHLE 1159755) is located approximately 531 m north of the Site is of medium sensitivity (value) for its aesthetic and historical values. It was originally built as a farm building in the 17th century with 20th-century alterations, before it was converted to dwellings. The single storey plus attic structure features full timber framing to its southern and rear elevations, weather boarded apex and tiled roof and is 15 frame panels in length;
- Old Hough Farm House (Grade II listed building, NHLE 1138697) is located approximately 573 m north of the Site and is of medium sensitivity (value) for its historical and aesthetic values. The farmhouse was built in the early 17th century and subsequently altered and extended in the 19th century. The two storey structure is built in an H-plan and constructed of red brick laid in Flemish Bond with a slate roof and some timber framing. There is a two-storey projecting porch made of brick with stone dressings, a Tudor arch, and restored timber framing on the first floor. Other notable features include the barge boards and finials on the front façade and porch gables, a bolection moulded four-panel door, and a semi-circular fanlight;
- The Dairy Farm House (Grade II listed building, NHLE 1138695) is located approximately 781 m west of the Site and is of medium sensitivity (value). The two storey farmhouse was built in the early to mid-19th century. The two-storey farmhouse is made of red brick in English Garden Wall Bond set on a brick plinth with a top weathered upper course of masonry. Features adorning the structure include an arched recessed entrance with a bolection moulded door and semi circular fanlight with circles and mouchette features, sash windows with stone sill and skewback heads, and timber eaves cornice;
- Summer House in Grounds of Newfield Hall (Grade II listed building, NHLE 1138696) is located approximately 830 m north west of the Site is of medium sensitivity (value) for its aesthetic and historical values. The small red brick summer house with a slate hipped roof was built in the early 19th century, potentially as a privy. Its architectural features include ball finials, casement windows with moulded pilaster surrounds, roundels at angles, and pulvinated frieze;
- Newfield Hall (Grade II listed building, NHLE 1159743) is located approximately 845 m north west of the Site and is of medium sensitivity (value). The two storey mansion was built in the early 19th century as a double pile plan. It is made of red brick with a slate roof and mostly sash windows. Architectural features include a single storey entrance porch with a stone plinth and cornice, parapet and ball finials, square sunk ends to the purlins of the twin west gables, and similar treatment to the brackets which support the cornice; and
- Woodhouse Farm House (Grade II listed building, NHLE 1159702) is located 961 m west of the Site and is assessed to be of medium sensitivity (value). It consists of a two storey and an attic farmhouse built in the early 19th century. The two storey farmhouse is made of red brick in Flemish Bond with a slate roof. Architectural features include a semi-circular fanlight with roundel and mouchette features, sash windows, timber eaves cornice, lead ridge, and gable copings and stacks.

Conservation Areas

5.4.8. Warmingham Conservation Area borders the eastern edge of the Site. Designated in 1984 and amended in 2008, the conservation area encompasses the linear village established along Warmingham Road and School Lane, with the River Wheelock framing its eastern border. The conservation area encompasses the village of Warmingham which has medieval origins as per the identification of medieval earthworks and the medieval stone cross in the church yard, albeit a majority of the structures date to the 19th century. The architectural character of the conservation area includes red and natural orange brick as the dominant material, plain roof tiles, and sandstone for decorative features. The river and the surrounding countryside form important elements to the character of the conservation area and are regarded in the viewshed through, across, and into the conservation area[14]. The conservation area is considered to be of medium sensitivity (value).

Non-designated heritage assets

5.4.9. There are a total of 28 non-designated heritage assets recorded in the 1 km study area. These assets primarily date to the medieval and post-medieval buildings, although there are also a few Roman findspots and evidence of road (MCH20817, MCH5475, MCH9236), and one Iron Age find spot (MCH9022) and a possible Bronze Age burial mound (MCH5425). This indicates the presence of activity at the Site since the Bronze Age.

5.4.10. Those assets which warrant particular consideration given their proximity and/or location within the Site are as follows:

- Warmingham Moss (MCH24921), a key historic landscape feature with potential for early prehistoric archaeology;
- Ridge and furrow earthworks at Park House Farm (MCH25765);
- Linear Earthwork North of Park House Farm (MCH25766);
- Ridge and Furrow Earthworks East of Moat at Minshull Vernon (MCH25987);
- Pond and Leat southeast of Moat and Minshull Vernon (MCH25988); and
- Findspot: Church House Farm Brooch (MCH18018).

[14] Cheshire East Council. (2008). *Warmingham Conservation Area: Character appraisal and management strategy*. Cheshire East Council. Available from: WARMINGHAM CONSERVATION AREA CHARACTER APPRAISALAND MANAGEMENT STRATEGY

5.4.11. The location of non-designated assets are shown in **Appendix A, Figure 5-4**.

5.4.12. As well as those sites and deposits as contained within the Cheshire Historic Environment Record there is potential for the Site to contain previously unknown archaeological deposits associated to monuments as shown on **Figure 5-4**. This may include buried remains of past human activity that have not been recorded in existing datasets. Such deposits could be of local, regional, or national significance depending on their nature and extent.

5.4.13. Further assessment will be required to establish the archaeological potential of the area. This may involve a review of existing baseline data, consultation with the local Historic Environment Record, and, where appropriate, field evaluation such as geophysical survey or trial trenching.

5.5. Water Environment and Flood Risk

5.5.1. This section outlines baseline information for surface water bodies only. This includes the associated scoping in Chapter12: Water Environment and Flood Risk . Groundwater is considered in section 5.6 Geology, Hydrogeology and Soils.

Surface Watercourses

5.5.2. The Site is intersected by River Wheelock (GB112068055380), which is classified as a Statutory Main River[15] and Water Framework Directive (WFD) classified river (2022 cycle 3[16]). The River Wheelock flows from the south to the north, through the eastern part of the Site, and along the eastern boundary (two waterways).

5.5.3. Water abstraction of the River Wheelock is currently undertaken within the Site through a pre-existing British salt license for the purpose of salt cavern mining.

5.5.4. This watercourse forms part of the Weaver Gowy catchment, specifically within the sub catchments of Wheelock (Fowle Brook to Dane) (GB112068055380) and Weaver (Valley Brook to Winsford Flashes) (GB112068060462) that both run within the Site.

5.5.5. Additional surface water features include Hoggins Brook, which flows south to north through the western part of the site. Other watercourses within the 1km study area are Fowle Brook, located approximately 500 m south of the Site, and Croco Brook, located approximately 830 m to the east. There is also a culverted watercourse within Hilltop Farm, the location of which is to be confirmed.

5.5.6. Other surface waterbodies include the Sandbach Flashes SSSI, which are located within 2 km of the Site. Crabmill flash specifically, is within the 1 km study area of the site.

5.5.7. Additional surface standing water such as ponds and The Old Hough Coarse Fishery are located within 1 km of the Site, approximately 260m north.

5.5.8. The location of the River Wheelock WFD surface watercourse and main river is shown in **Appendix A, Figure 5-5**.

Surface Watercourse Status

5.5.9. The River Wheelock is recognised within the Statutory Main River map[15]. Under the WFD 2022 cycle 3[16], the River Wheelock (Fowle Brook to Dane waterbody: GB112068055380) is classified as Bad status based on ecological parameters. The River Wheelock also falls within the protected area River Weaver (Dane to Frodsham) nitrate vulnerable zone (NVZ)[17].

5.5.10. Reasons for not achieving good status (RNAG) relate to physical modifications and pollution from waste water from Industry and water industry activities[17].

Flood Risk

5.5.11. Initial mapping indicates that parts of the Site intersect with designated Main River corridors, which may be associated with fluvial flood risk. According to the Environment Agency's Flood Map for Planning, portions of the Site fall within Flood Zone 2 (medium probability of flooding) and Flood Zone 3 (high probability of flooding). These zones are defined based on the likelihood of river or sea flooding, ignoring the presence of flood defences.

5.5.12. Flood Zone 2 represents areas with an annual probability of flooding between 0.1% and 1%, while Flood Zone 3 includes areas with a greater than 1% annual probability of flooding from rivers. The presence of these zones within the Site Boundary indicates a need for further assessment to determine the Site's vulnerability to fluvial, surface water, and groundwater flooding.

5.5.13. The extent of the fluvial flood risk areas is shown in **Appendix A, Figure 5-5**.

5.5.14. The initial mapping has also shown that areas in the south east, and west of the Site are at high risk of surface water flooding, defined as 3.3% annual probability of flooding.

5.5.15. Surface water flood risk is shown in **Appendix A, Figure 5-6** and **Figure 5-7** shows the extent of surface water flood risk under a climate change scenario. The climate change dataset presents the risk which takes account of the following climate change

[15] Environment Agency Statutory Main River Map (2025). Available online at: Statutory Main River Map - data.gov.uk

[16] Environment Agency Water Framework Directive (WFD) Cycle 3 Classification (2025) Available online at: Water Framework Directive (WFD) River, Canal, and Surface Water Transfer Water Bodies Cycle 3 Classification 2022 (Simplified)

[17] Environment Agency Catchment Data Explorer Wheelock (2025) Available online at: Wheelock (Fowle Brook to Dane) | Catchment Data Explorer | Catchment Data Explorer

allowances based on the latest UK Climate Projections (UKCP18) from the Met Office, using the Representative Concentration Pathway (RCP) 8.5. The 'Central' allowance for the 2050s epoch (2040-2060) for risk of flooding from surface water for the Weaver Gowy Catchment is 20% for 3.3% Annual Exceedance Probability (AEP), and 25% for 1% AEP.

5.5.16. A detailed Flood Risk Assessment (FRA) will be required to inform the design of the Proposed Development and identify appropriate mitigation measures. This will include consideration of flood pathways, flood depths, climate change allowances, and potential impacts on surrounding receptors.

5.6. Geology, Hydrogeology and Soils

5.6.1. This section outlines the existing baseline conditions related to geology and soils and utilises information from the geotechnical desk study report which has been completed during the Pre-FEED stage[18]. To consider the effects associated with land contamination, the study area includes the Site and the area of land immediately beyond the Site to a distance of up to 250 m (off-site).

5.6.2. The study area which has been used to consider effects on geology and soil resources is defined by the Site.

Artificial Ground

5.6.3. Artificial ground is likely to be present on Site associated with existing buildings and infrastructure, including Hill Top Farm and Kistos Energy Storage.

Bedrock and Superficial Geology

5.6.4. The Site is predominantly underlain by the Sidmouth Mudstone Formation. The Wilkesley Halite Member is present underlying the east of the Site.

5.6.5. The majority of the bedrock is overlain by superficial deposits of diamicton Glacial Till which typically consist of clay, sand and gravel. Alluvium comprising clay, silt, sand and gravel is present in two areas in the north and east of the site, associated with watercourses. Glaciofluvial sand and gravel deposits are present in the southeast of the Site.

Geological Hazards

5.6.6. Ground instability and subsidence is a potential risk across the Site, particularly in areas where underground mining has taken place. This should be considered in the design of any future ground investigation.

5.6.7. There is a low hazard rating for running sands and a moderate hazard rating for compressibility in the north west of the Site associated with the superficial deposits of Alluvium present.

5.6.8. There is a low hazard rating for ground dissolution of soluble rocks across the Site that increases to high in the very east of the site. This may lead to localised subsidence, particularly in areas where solution mining activities have taken place and surface workings.

5.6.9. There are two major north-south trending faults on Site and in the vicinity, with the closer King Street Fault to the east, and a more distant Winsford Fault to the west.

Soils and Agricultural Land Classification

5.6.10. The majority of the soils underlying the Site are mapped as the Crew association. These soils are described as slowly permeable seasonally waterlogged reddish clayey and fine loamy over clayey soils. The Blackwood association is present underlying a small area in the southeast of the Site. These are typically seasonally wet, deep permeable sandy and coarse loamy soils.

5.6.11. Reference to provisional Agricultural Land Classification (ALC) mapping indicates that the majority of the land within the Site is classified as Grade 3 land (good – moderate quality). An area of Grade 4 (poor quality) land is present in the southeast of the Site.

5.6.12. Grade 3 land may be classified as best and most versatile (BMV) agricultural land under the NPPF, if it falls within Subgrade 3a. The provisional ALC mapping does not sub-divide into Subgrade 3a and Subgrade 3b. Further assessment is required to derive a definitive ALC grading for the Grade 3 land to determine the presence or absence of BMV agricultural land.

5.6.13. The extent of Grade 3 agricultural land as per the provisional ALC mapping is shown in **Appendix A, Figure 5-1**.

5.6.14. There are no designated areas located within the Site where sensitive soils could be impacted by the Proposed Development.

Ground Contamination

5.6.15. The Site largely comprises agricultural land and undeveloped open land. Made Ground may be encountered underlying agricultural land associated with the historical redevelopment of farm buildings. Potential contamination associated with Made Ground may be present in soils and groundwater may include organic compounds (including petroleum hydrocarbons), pesticides and possibly asbestos containing material.

[18] AtkinsRealis, July 2025, Project Salinae Hydrogen Storage Pre-Feed Geotechnical Desk Study. Ref. 100117376-ATR-ZZ-ZZ-TREP-C-002.

5.6.16. Historical unspecified tanks are indicated to have been present in the south of the Hilltop Farm estate in the north east of the Site, between 1982 and 1992. Therefore, organic contamination, that includes hydrocarbons, may be present in surface soils and groundwater in this area.

5.6.17. Historical cuttings are shown to be located along the western boundary of the Site on mapping dated between 1897 and 1938. Made Ground may be present in the vicinity of this area, with possible metals, organic compounds (such as hydrocarbons and polyaromatic hydrocarbons) and asbestos.

5.6.18. Several landfill sites are present within the Site and all appear to be operated by British Salt Limited:

- Hilltop Brinefield, Hilltop Farm – located across the majority of the Site (centre and east), is a historical inert landfill site associated with brine extraction and waste management activities. The licence was issued in 1990, but the date of closure is not recorded;
- British Salt Ltd – broadly located in the centre of the Site 250 m to the west of Hilltop Farm, is registered as a licensed waste site (borehole). The licence was issued in 1990 and its status is listed as transferred; and
- Hilltop Farm Brinefield – located at Hilltop Farm in the north east of the Site, is registered as an authorised landfill taking other wastes. The licence was issued in 2008 and is listed as expired in 2019. It is not known whether this landfill is lined.

5.6.19. Information has been requested from British Salt and the Environment Agency as to the type of landfill and material that has been deposited, and construction of the landfill, to inform any ongoing future mitigation measures if required. The Environment Agency have confirmed records for the authorised landfill at Hilltop Farm Brinefields (EPR/GP3334XL) for the disposal of waste from potash and rock salt processing. Engagement is ongoing to ascertain if any mixed wastes have been accepted at this landfill.

Groundwater / Hydrogeology

5.6.20. The Sidmouth Mudstone Formation is recorded as a secondary B aquifer and the Wilkesley Halite Member is an unproductive strata and has a low permeability. The overlying superficial Glacial Till is recorded as a secondary (undifferentiated) aquifer and the Alluvium and Glaciofluvial deposits as secondary A aquifers.

5.6.21. The Site is not located within a Source Protection Zone (SPZ).

5.6.22. There are no licensed groundwater abstractions on Site and in the immediate vicinity. In addition, there are no potable abstractions listed.

5.6.23. There are three historical licensed surface water abstractions to the east of the Site associated with the River Wheelock.

5.7. Noise and Vibration

5.7.1. The study areas for noise and vibration during the construction phase are 300 m and 100 m from the closest construction activity respectively. During the operational phase a compressor station will be in use and therefore a study area of 1 km is considered sufficient to encompass noise sensitive receptors.

5.7.2. The closest sensitive receptors to the Site include residential properties located immediately east along School Lane and Warmingham Road. Additional sensitive receptors include St Leonards Church within 80 m, Warmingham Church of England Primary School and Warmingham village hall situated approximately 470 m to the north east of the Site.

5.7.3. The predominant source of noise in the area is road traffic noise from existing roads, including School Lane and Warmingham Lane and noise from the railway line to the west of the Site.

5.7.4. Within the Site lies the existing Kistos Energy Storage facility, a gas processing plant that contributes to the existing baseline as an industrial noise source.

5.7.5. A Noise Important Area (ID 1149) is located partially within the western part of the Site along the railway line, and is associated with rail noise.

5.7.6. The location of the NIA is shown in **Appendix A, Figure 5-1**, and potential noise sensitive receptors are shown in **Appendix A, Figure 5-8**.

5.8. Air Quality

Local Air Quality Management

5.8.1. The Site is not within any Air Quality Management Areas (AQMA). The closest AQMA is in the local authority administrative area of Stoke on Trent approximately 13.7 km to the southeast and therefore unlikely to be impacted by the Proposed Development.

Monitoring

5.8.2. Cheshire East operates a network of air quality monitoring sites, both automatic and passive diffusion tubes. There are no monitoring sites within 1 km of the Site. The closest diffusion tube is an urban background monitor (CE322), located on the outskirts of Middlewich, 2.8 km to the north of the Site. The monitored annual mean concentrations in the last two years of available data (2023 and 2024) were well below (<75%) the relevant annual mean Air Quality Strategy (AQS) objective for NO_2 of 40 µg/m^3.

5.8.3. Automatic Urban and Rural Network (AURN) site Crewe Coppenhall is located 2.3 km south of the Site and measures both NO_2 and particulate matter (PM_{10} and $PM_{2.5}$). No exceedances of the relevant AQS objectives or targets have been recorded at this site in the last five years of available monitoring data (2020-2024).

Defra Background Maps

5.8.4. Estimates of background pollutant concentrations are published on the Defra website for every 1 km grid square in the UK. Estimated annual mean background concentrations for the grid squares covering the immediate study area for the key pollutants (NO_x, NO_2, PM_{10} and $PM_{2.5}$) indicate that background concentrations in the study area in the current year (2025) are below the relevant objectives and targets.

Receptors

5.8.5. The closest sensitive receptors to the Site include residential properties located immediately east along School Lane and Warmingham Road, with Warmingham Church of England Primary School situated approximately 470 m to the north east.

5.8.6. The closest ecological receptor containing habitats sensitive to nitrogen deposition is Sandbach Flashes SSSI, located approximately 645 m to the southeast of the Site.

5.9. Waste and Materials

5.9.1. The baseline has been established through a desk-based review of regional and national data from the publicly available sources listed below (most up to date at the time of writing) and is based on the Institute of Environmental Management and Assessment's (IEMA) Guide to Materials and Waste in Environmental Impact Assessment[19] herein referred to as the 'IEMA Guidance':

- Environment Agency Remaining Landfill Capacity, 2022-2024[20];
- Mineral Products Association (MPA), Profile of the UK Mineral Products Industry, 2023[21];
- MPA, Regional Overview of Construction and Mineral Products Markets in Great Britain, 2024[22];
- MPA, Profile of the UK Mineral Products Industry 2023 Worksheet[23];
- North West Aggregate Working Party (NWAWP), Annual Monitoring Report 2023[24];
- Cheshire East Local Plan Strategy 2010-2030[25];
- World Steel Association (WSA), World Steel in Figures 2025[26]; and
- Local Plan Draft Minerals and Waste Policies Map 2022[27].

Materials

5.9.2. As set out in the IEMA guidance, materials are defined as 'substances used in each lifecycle stage of a development, with a particular focus on the construction, operation and maintenance, and decommissioning or 'end of first life' (deconstruction, demounting, demolition and disposal) phases'. They are considered a sensitive receptor as consuming materials impacts upon their immediate long term availability.

5.9.3. The regional (North West) and national (UK) breakdown of annual sales for materials are summarised in **Table 5-1** below. Regional data is not reported for steel. Regional data for crushed rock, sand and gravel and recycled and secondary aggregate is taken from NWAWP Annual Monitoring Report and all other regional and national data is taken from the MPA Profile of the UK Mineral Products Industry 2023 Worksheet. Data for steel is taken from WSA, World Steel in Figures 2025 report.

5.9.4. Materials identified in the table are based on the main construction materials it is estimated will be required for the Proposed Development's construction, based on experience and professional judgement.

5.9.5. Given that the number, type, and size of construction developments varies from year to year, the demand for materials also fluctuates. As such, this data should be considered representative.

Table 5-1 Materials Baseline (million tonnes per annum)

Materials	Regional (North West) sales baseline	National (UK) sales baseline
Crushed rock	6.5	116.2
Sand and gravel	1.8	52.1
Recycled and secondary	1.3	74.0
Asphalt	2.1	21.8
Ready-mixed concrete*	3.4	35.4

[19] IEMA (2020). IEMA guide to: Materials and Waste in Environmental Impact Assessment. IEMA. [online] Available at: iema-materials-and-waste-in-eia-march-2020.pdf
[20] Data.gov.uk. (2024). Remaining Landfill Capacity - data.gov.uk. [online] Available at: Remaining Landfill Capacity - data.gov.uk
[21] mineralproducts.org. (2023). Profile of the UK Mineral Products Industry. [online] Available at: Profile of the UK Mineral Products Industry
[22] Mineralproducts.org. (2023). Regional Overview of Construction and Mineral Products Markets in Great Britain, 2024 [online] Available at: MPA_Regional_overview_of_construction_and_mineral_products_markets_in_GB_2024.pdf
[23] Mineralproducts.org. (2023). Profile of the UK Mineral Products Industry 2023 Worksheet [online] Available at: Profile of the UK Mineral Products Industry
[24] North West Aggregates Working Party Annual Monitoring Report 2023 (2022 Data). (2023). Available at: North West Aggregates Working Party - Annual Monitoring Report 2023 (2022 Data)
[25] Cheshire East Local Plan Strategy 2010-2030. (2017). Available at: local-plan-strategy-web-version-1
[26] worldsteel.org. (2025). World Steel in Figures 2025. [online] Available at: World Steel in Figures 2025 - worldsteel.org
[27] Youd, B. (2022). Local Plan Draft Minerals and Waste Policies Map 2022. [online] Cheshireeast.gov.uk. Available at: Local Plan Draft Minerals and Waste Policies Map 2022

Materials	Regional (North West) sales baseline	National (UK) sales baseline
Steel	Not Available	4.0

*cubic metres (m3) have been converted to tonnes using density of 2.4 tonnes/m3 ((MPA), Profile of the UK Mineral Products Industry)

Waste

5.9.6. In line with the Waste Framework Directive and as set out in IEMA guidance, waste is defined as “any substance or object which the holder discards or intends or is required to discard”.

5.9.7. Remaining landfill capacity is considered a sensitive receptor as defined in the IEMA Guidance as it is a finite resource. The data for remaining landfill capacity is provided by the Environment Agency.

5.9.8. **Table 5-2** below summarises this information in the north west region for hazardous waste and Cheshire East for inert and non-hazardous waste (for the most recent years for which data is available).

Table 5-2 Landfill Void Capacity (millions of m3)

Landfill type	2022	2023	2024
Hazardous landfill void capacity (North West)	0.22	3.01	2.83
Inert and non-hazardous landfill void capacity (Cheshire East)	0.32	0.58	0.55

Mineral Safeguarding Areas (MSA) and Peat

Resources

5.9.9. The key safeguarded mineral resources in Cheshire East are silica sand, sand and gravel, sandstone (including building stone), salt and surface coal.

5.9.10. Cheshire East Minerals and Waste Plan draft Policies Map show that the footprint of the Proposed Development does overlap with MSA for Salt (wet-rock head & dry-rock head) and sand and gravel.

5.9.11. There are no Blanket Bogs, Lowland Fens, or Lowland Raised Bog areas within the footprint of the Proposed Development. Therefore, there are no areas that are / could give rise to peat reserves.

5.10. Climate Vulnerability

5.10.1. Climate is defined as the typical weather conditions experienced in a place over a period of time, conventionally expressed as average weather over a 30-year period.

5.10.2. The study area for the climate vulnerability baseline is the Site (including compounds and temporary land take) as well as the area of all the receptors examined by the other environmental topics outlined within this Scoping Report.

5.10.3. The climate vulnerability baseline comprises two parts:

- Current climatic conditions – which comprise of the latest Met Office regional dataset of 30-year averages and data from nearby long running meteorological stations. It also requires a review of any significant historical climate related events that have happened in the study area, for example flooding from storm surges or rainfall induced landslides; and
- Future climate projections - which present the latest climate projections from the United Kingdom Climate Projections 2018 (UKCP18). These projections have been developed by the Met Office Hadley Centre Climate Programme which is supported by the Department for Energy Security and Net Zero and the Department for Environment, Food and Rural Affairs (DEFRA). They provide the most up-to-date assessment of how the climate of the UK may change over the 21st century.

5.10.4. A summary of the above two aspects of the climate vulnerability baseline; current and future climate, is presented in the following sub sections.

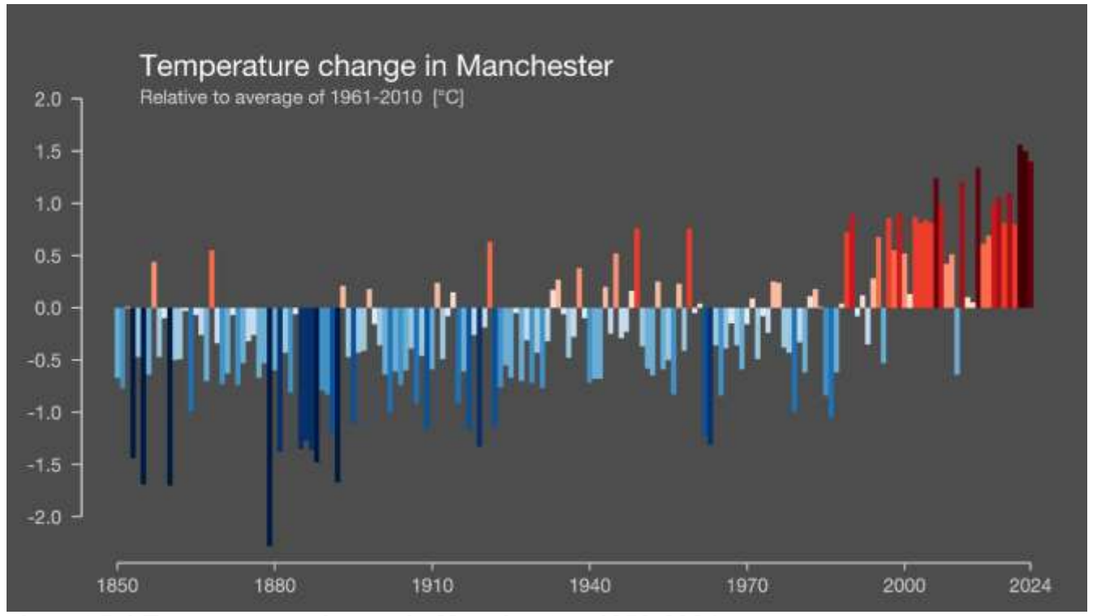
Current Climate

5.10.5. The study area has a temperate climate with cool summers and mild winters. Rain can occur in any season, but late autumn and winter are the wettest periods.

5.10.6. Climate change is impacting the study area now, and the pace of change is accelerating. Over the last few decades the region has experienced a warming trend and shifting rainfall patterns. Key trends in historical meteorological data recorded in Manchester (~40 km from the Site) are summarised below and illustrated in insert **5-1**:

- Five of the warmest years on record have occurred since 2006, and the most recent decade (2012 to 2021) has been on average 1.0°C warmer than the 1961 to 1990 average28 (see also **Figure 5-1**);
- Seasonal rainfall has also changed significantly, with decreasing summer rainfall and increasing winter rainfall[28].

[28] https://www.greatermanchester-ca.gov.uk/media/qtrhgi2y/gm-ccra-report_final.pdf



Insert 5-1 Temperature change in Manchester, 1850-2024

Projected Climate

5.10.7. Key future changes to the climate in the study area by 2100 reported by UKCP18[29] (scenario RCP8.5[30]) are summarised below:

- Wetter in winter and drier in summer. Winters are projected to become wetter, in terms of both the total amount of rainfall and the number of wet days. The intensity of rainfall on the wettest days is also expected to increase;
- Warmer, as average temperatures will increase across all seasons. Linked to this there will be reduced frost and snowfall;
- Weather will become more variable and unpredictable, with extreme weather events, such as wind storms or droughts, becoming more frequent.

5.11. Effects on Climate

5.11.1. This section provides the baseline conditions with respect to the emissions of greenhouse gas emissions (GHGs), termed the Effects on Climate. The baseline is defined by the:

- Total background emissions from all sources, i.e., all UK emissions, at all scales; and
- Predicted total emissions assuming the Proposed Development is not constructed.

National emissions baseline

5.11.2. In 2024, net territorial GHG emissions[31] in the UK are provisionally estimated to have been 371 million tonnes of carbon dioxide equivalent ($MtCO_2e$), a decrease of 4% from 2023. Emissions were 54% lower than they were in 1990. In 2024, electricity supply accounted for 10% of all territorial GHG emissions, which is a 15% decrease in emissions from 2023, primarily due to a decrease in gas and coal use in power stations.

5.11.3. The UK is currently in the fourth carbon budgetary period (2023-2027), for which the budget is 1,950 $MtCO_2e$. This means the UK cannot legally emit more than this quantity of GHG within this budgetary period. Successive carbon budgets are outlined in **Table 5-3**. Whilst budgets are not set beyond 2037, there is a legal requirement for the UK to reach 'net zero' emissions (0 $MtCO_2e$) by 2050.

Table 5-3 UK Government Carbon Budgets

Carbon budget	Carbon budget total (tCO2e)
1st carbon budget (2008 to 2012)	3,018 MtCO2e
2nd carbon budget (2013 to 2017)	2,782 MtCO2e
3rd carbon budget (2018 to 2022)	2,544 MtCO2e
4th carbon budget (2023 to 2027)	1,950 MtCO2e
5th carbon budget (2028 to 2032)	1,725 MtCO2e
6th carbon budget (2033 to 2037)	965 MtCO2e
7th carbon budget (2038 to 2042)[32]	535 MtCO2e

Site-specific emissions baseline

5.11.4. The Site extends to 204ha and is owned by a series of landowners. As detailed in Chapter 2, there are a number of industrial and agricultural activities that take place across the Site.

5.11.5. No site-specific emissions have been calculated for the Site at this stage, however this will be produced as part of the ES assessment. Using professional judgement, it

[29] https://www.metoffice.gov.uk/research/approach/collaboration/ukcp
[30] https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-guidance---representative-concentration-pathways.pdf

[31] https://assets.publishing.service.gov.uk/media/67e4060df356a2dc0e39b4cd/2024-provisional-greenhouse-gas-emissions-statistics-statistical-release.pdf
[32] Note: The 7th UK Government carbon budget has been recommended by the Climate Change Committee but not yet been legislated by the UK Government.

is determined that the level of emissions resulting from the agricultural and industrial activities taking place currently on Site is minor and does not impact the UK Government's ability to meet its carbon budgets.

5.12. Socioeconomics

5.12.1. Prior to considering the socio-economic effects, it is necessary to establish a clear understanding of baseline socio-economic conditions within the geographical areas relevant to the Site. Trends in key socio-economic indicators will be analysed and compared to national conditions.

5.12.2. The socio-economic assessment will detail existing local socio-economic conditions, including a full analysis of the following issues:

- Population;
- Employment/unemployment;
- Labour market; and
- Deprivation.

5.12.3. As part of the baseline analysis, consideration will be given to how the baseline would evolve in absence of the Proposed Development, albeit recognising the impact of wider macro-economic factors.

5.12.4. Baseline data will be collected from the following key indicator groups based on area of impact and comparators. This data will be used to enable a comparison of baseline socio-economic conditions for the local area with the region and national benchmarks. The impact area considered will be Cheshire East as this is where Proposed Development sits alongside the Crewe Travel to Work Area. An initial snapshot is presented in **Table 5-4**.

Table 5-4 Baseline data[33]

Socio-Economic Indicator	Cheshire East	Crewe Travel to Work	England
Resident population (January 2025) google total and include 16-14[34]	421,300	N/A	45,783,800
Working age population (16-64) (July 2024-June2025)	228,100	195,700	35,353,600
Economic activity (Jun 2025)			
Economically active	188,300	168,100	27,960,800
In employment	182,300	161,300	26,782,200
Unemployed	6000	6,700	1,178,500
Employment by occupation (June 2025)			
Standard Occupational Classification (SOC) 1-3 (higher-skilled occupations)	58%	54.2%	53.8%
SOC 4-6 (medium-skilled occupations)	24.2%	24.5%	25.9%
SOC 7-9 (lower-skilled occupations)	17.6%	21%	20.1%
Qualifications (2024)			
Regulated Qualifications Framework (RQF)[35]4+	48.5%	44.1%	46.8%
RQF3+	72%	69.2%	67.3%
RQF2+	92%	91.6%	86.5%
RQF1+	93.1%	93%	89.0%
Other qualifications (RQF)	3%	2.6%	4.4%
No qualifications (RQF)	3.9%	4.4%	6.6%
Earnings (2024)			
Annual Earnings By place of residence	£40,991	N/A	37,617
Annual earnings by place of work	£39,459	N/A	37,630

[33] Dataset Selection - Query - Nomis - Official Census and Labour Market Statistics
[34] Cheshire East Council Current Facts and Figures

[35] The RQF classifications are defined by the UK Government. Available at: UK https://www.gov.uk/what-different-qualification-levels-mean/list-of-qualification-levels

5.13. Human Health

5.13.1. There are three types of human health receptors that may be scoped into human health assessment, to accord with current ISEP best practice guidance. The receptor groupings comprise the following:

- The wider population, residents within the human health study area, which comprises the entirety of the Church Minshull, Kingsbourne and Sound Middle Layer Super Output Area (MSOA), as defined in the Census 2021;
- Sensitive sub-populations within the wider population, who share specific characteristics that may mean that they respond differently to changes in health determinants from the generalised wider population; and
- Specific geographic sub-populations who, by virtue of their proximity to the Proposed Development, may experience a greater magnitude of impacts from changes in health determinants than the generalised wider population.

5.13.2. The human health baseline is used to inform the identification of receptors, as well as understand the characteristics of the environment that form determinants of human health. This second aspect is fundamental to the human health assessment – developing an appreciation of the baseline across environmental factors that influence physical and mental health (e.g. air quality, noise levels, landscape amenity), as well as how the study area is used, valued and moved through by people (e.g. location and type of assets, characteristics of the transport network, economic opportunity) is key to isolating the impacts of the Proposed Development on determinants of human health, and it is these impacts that lead to effects on receptors.

5.13.3. Human health baseline analysis explores three aspects, in order to inform the proportionate scoping of future EIA:

- A health profile is generated from published third party data sources. The health profile allows the characteristics of the wider population of the study area to be understood, and it is used to identify the presence of any sensitive sub-populations that should form additional human health receptors;
- Identifying key environmental characteristics of the Study Area, to understand the current conditions and factors that form determinants of human health; and
- Examining the spatial distribution of human health receptors (e.g. considering proximity to Site, construction activities and access routes, and intervisibility). This leads to the identification of any specific geographic sub-populations that should be scoped in as human health receptors.

Health profile and sensitive sub-populations

5.13.4. The wider population of the Human Health study area exhibits the following key demographic and health characteristics, compared to regional and national data, as shown in **Table 5-5**.

Table 5-5 Human health and Population baseline data

Topic	Church Minshull, Kingsbourne and Sound MSOA	Cheshire East	England
Age			
<15	17.1%	19.6%	17.4%
16 - 64	66.6%	61.2%	64.1%
>65	16.3%	19.2%	18.4%
Ethnicity			
Asian/ British Asian	1.7%	14.7%	9.3%
Black/ Black British	0.3%	1.3%	4.0%
White	95.6%	79.9%	81.0%
Mixed	1.7%	2.7%	2.9%
Other	0.7%	1.4%	2.8%
Self-Reported Health			
Very Good	-	51.3%	47.5%
Good	-	32.9%	34.2%
Fair	-	11.4%	13.0%
Bad	-	3.4%	4.1%
Very Bad	-	1%	1.2%
Deprivation			
Not Deprived	64.6%	54.8%	48.4%
Deprived 1 Way	26.8%	31.6%	33.5%
Deprived 2 Way	7.5%	11.2%	13.0%
Deprived 3 Way	1.1%	2.3%	4.3%
Deprived 4 Way	0.0%	0.1%	0.8%
Education			
No Qualification	10.5%	15%	18.1%
Level 1,2,3	43.7%	39.2%	42.7%
Apprenticeship	4.9%	5.9%	5.3%
Level 4 +	39.1%	37.6%	33.9%
Sensitive Sub-Populations			

Topic	Church Minshull, Kingsbourne and Sound MSOA	Cheshire East	England
Disabled under the equality act	N/A	15.3%	17.7%
Elderly (over 65)	16.3%	22.4%	18.4%
Black and Minority Ethnic	4.4%	5.6%	19%
Single Family Household	71.6%	65.3%	66.9%
Materially Disadvantaged (at least one dimension)	35.4%	45.2%	51.6%

5.13.5. Church Minshull, Kingsbourne and Sound presents a mixed demographic profile with relevance to sensitive sub-populations.

Age: sensitive sub-population

5.13.6. Individuals aged 65 and over comprise 16.3% of the local population, which is notably lower than both Cheshire East (22.4%) and the national average (18.4%). This suggests a relatively smaller elderly community, potentially reducing immediate demand for age-specific infrastructure such as mobility support, healthcare services, and sheltered accommodation. However, the rural nature of the area may still pose accessibility challenges for this group, particularly in relation to transport and emergency services.

5.13.7. 17.1% of the population is aged under 15, indicating the presence of families with children. While this figure is slightly below the Cheshire East average (19.6%), it remains broadly consistent with the national average (17.4%). This demographic may require consideration of child-friendly infrastructure and services, including safe transport routes, recreational spaces, and access to education and healthcare. Environmental impacts such as air quality, noise, and traffic safety should be assessed with regard to potential exposure risks for both children and elderly residents, who may be more vulnerable to adverse effects.

5.13.8. Together, the younger and older age groups represent key sensitive sub-populations whose needs should be factored into any development or environmental planning within the area.

Materially disadvantaged: sensitive sub-population

5.13.9. Church Minshull, Kingsbourne & Sound has a comparatively lower proportion of materially disadvantaged residents than both Cheshire East and the national average. Census data indicates that 35.4% of the population is materially disadvantaged in at least one dimension, significantly below the levels observed in Cheshire East (45.2%) and England (51.6%). Census data also shows that 64.6% of residents are classified as not deprived, suggesting a relatively stable socioeconomic profile across the area, which is higher than the Chesire East (54.8%) and England (48.4%) average.

5.13.10. Among those experiencing deprivation, 26.8% are deprived in one dimension, 7.5% in two dimensions, and 1.1% in three dimensions. Notably, no residents are recorded as being deprived in all four dimensions, compared to 0.1% in Cheshire East and 0.8% nationally.

5.13.11. This profile suggests that while the majority of the population enjoys relative material stability, a meaningful minority still experiences disadvantage, particularly in single or dual deprivation categories. These may relate to income, employment, education, or housing quality. Residents facing multiple deprivation dimensions may be more vulnerable to environmental and development-related impacts due to reduced resilience, limited access to services, and financial constraints.

Mentally and/or physically disadvantaged

5.13.12. There is currently no available data at the MSOA level for Church Minshull, Kingsbourne and Sound regarding residents who are disabled under the Equality Act 2010 [36]. However, broader geographic indicators suggest that this sub-population may still be present in similar proportions. In Cheshire East, 15.3% of residents are identified as disabled under the Equality Act, while the figure for England stands at 17.7%.

5.13.13. Although direct data is unavailable for the local area, these regional and national benchmarks provide a reasonable proxy for understanding potential needs. Individuals within this sub-population may face barriers related to mobility, access to services, and environmental exposures. As such, any development or environmental planning in Church Minshull, Kingsbourne and Sound should incorporate inclusive design principles and consider accessibility, health protection, and engagement strategies to ensure equitable outcomes for disabled residents.

Determinants of human health

5.13.14. A wider search extending beyond the immediate 500 m buffer to include 1 km, 2 km, and 5 km zones has been undertaken to identify assets relevant to the Human Health assessment. This approach reflects the rural and agricultural nature of the area, where local amenities are limited and residents often rely on facilities located further afield. The extended search ensures that key community, educational, healthcare, recreational, and open space assets are captured, as these are critical for assessing access and potential severance impacts.

5.13.15. Understanding the location and accessibility of these assets, such as schools, general practice (GP) surgeries, hospitals, green spaces, and community hubs, will allow the assessment to consider how construction or operational activities could affect travel routes, access to essential services, and overall wellbeing for local populations. Severance is a key consideration in rural communities because

[36] Equality Act 2010 (as amended). Available online at: Equality Act (2010)

residents typically depend on longer journeys to reach essential services, meaning any disruption to transport routes can have a disproportionate impact on health and quality of life.

5.13.16. The baseline names specific assets up to and including the 1 km buffer. The 2-5 km buffer encompasses major towns including Middlewich, Sandbach (with Elworth, Ettiley Heath, and Wheelock Heath), Haslington, Coppenhall, and a large part of Crewe. These towns provide the majority of essential services and amenities for the wider area and connectivity to them is therefore important to understand for the human health assessment.

5.13.17. The determinants of human health scoped into the assessment are considered in turn in this sub-section. Details of the current baseline position are either cross-referenced to the relevant lead sub-topic, or provided here.

Community, recreational and educational facilities

5.13.18. The human health assessment will consider impacts of the Proposed Development on access to the following, to understand potential effects on relevant human health receptors:

Within 500 m of the Site

- Warmingham Church of England Primary School, located on School Lane in Warmingham, approximately 487 metres to the north east of the Site;
- St Leonard's Church, located on Warmingham Road in Warmingham, approximately 10m east of the Site; and
- Warmingham Village Hall, located on School Lane in Warmingham, approximately 523m north east of the Site.

Within 2 km of the Site

- Cornerstone Academy Crewe (primary education) located approximately 1.73 km to the south of the Site;
- Oakfield Lodge School (secondary education) situated approximately 1.6 km to the south of the Site;
- Sheryl's Little Stars childminders, based in Middlewich, approximately 1.7 km to the south of the Site;
- St Peter's Church, located in Leighton, approximately 1.36 km to the south west of the Site;
- Minshull Vernon, located approximately 300 m to the southwest of the Site;
- Winton Equestrian Centre located approximately 1.53 km to the south of the Site;
- Greenbank Company of Archers located approximately 1.71 km to the south of the Site;
- Elton Golf Driving Range located approximately 1.67 km to the south east of the Site;
- Warmingham Lane MX, located approximately 1.02 km to the north east of the Site; and
- Pilates Studio Cheshire located approximately 1.62 km to the south west of the Site.

Green space and open space

5.13.19. The human health assessment will consider impacts of the Proposed Development on access to and enjoyment of the following, to understand potential effects on relevant human health receptors:

Within 500 m of the Site

- Larch Wood, located approximately 105 m to the southwest of the Site;
- Burnt Covert Woods, located approximately 40 m to the southwest of the Site;
- Minshull Vernon Moated Site, located approximately 300 m to the west of the Site; and
- Warmingham Wood, located within the Site.

Within 2 km of the Site

- Perry Fields Play Area, located approximately 1.65 km to the south of the Site;
- The Bazzi Playground, located approximately 1.79 km to the south of the Site;
- Sandbach SSSI, located approximately 1.77 km to the southeast of the Site;
- Polestead Wood, located approximately 1.5 km to the west of the Site;
- Weaver Wood Rookery, located approximately 1.73 km to the west of the Site; and
- Worsley Covert, located approximately 848 m to the west of the Site.

Access to healthcare facilities

5.13.20. No healthcare facilities have been identified within 500 m of the Site.

5.13.21. The rural nature of the Study Area means that a search of healthcare assets relevant to human health assessment has been extended to 5 km from the Site, then further again to identify the closest provision to the Study Area communities.

Within 5 km of the Site

- Minshull Nursing Home – Minshull New Road, a short distance beyond the 5 km buffer from the Site, to the southwest;
- Leighton Hospital – on the northern edge of Leighton, extending from just beyond 5 km southwest of the Site;
- Hungerford Medical Centre, just to the north east of Crewe town centre, within c. 10 km of the Site; and
- Ashfield Primary Health Centre – Middlewich Road, Sandbach, which is approximately 10 km from the Site, to the east.

Characteristics of the transport network

5.13.22. The A530 passes through the 1 km buffer to the Site, providing a north-south connection between Leighton and Middlewich. Transport connectivity beyond this distance (to 5 km buffer) is provided by major roads including the A532, A530, A534, A533, A54, and key B roads (B5079, B5076, A5019), which are essential for linking the neighbouring towns to the settlement closest to the Site.

5.13.23. The West Coast Main Line passes within 1 km of the western boundary of the Site.

5.13.24. The Study Area includes the following walking, cycling and horse riding routes, within or in close proximity to the Site:

- FP3, which runs through the southeast corner of the Site;
- FP4, which bisects the Site and connects to the village of Warmingham;
- FP7, which passes through the centre of the Site in the vicinity of Hill Top Farm;
- FP8, running along the western edge of the Site;
- FP13, passing from the western side of the Site towards Warmingham Village;
- FP1, running north-east from Warmingham connecting the village to surrounding farmland and scattered properties;
- FP2, running east-west through Warmingham;
- FP5, passing through agricultural land to the south of Warmingham;
- FP6, located to the south of Warmingham, connecting to a network of paths near Crabmill Farm; and
- FP12 to the east of Warmingham, connecting rural paths.

Air quality

5.13.25. The air quality baseline will be used to inform the human health assessment. This identifies no AQMAs within or in proximity of the study area.

Noise pollution and vibration

5.13.26. The noise and vibration baseline will be used to inform the human health assessment.

Pollution of soils and water

5.13.27. The geology and soils baseline will be used to inform the human health assessment.

Landscape amenity

5.13.28. The landscape and visual baseline will be used to inform the human health assessment. The scoping cites the following visual receptors, which are relevant to the human health assessment:

- People in existing residential properties adjacent, or close, to the Site, along and just off Warmingham Road, School Lane, Cornmill Close, Drury Lane, Moss Lane, A530 and Forge Mill Lane;
- Users of PRoW: Warmingham: FP3, FP4, FP7 and FP13; and Minshull Vernon: FP8 and FP13, that are within the Site
- Users of PRoW: Warmingham: FP16, FP18; and Minshull Vernon: FP3, FP5, FP6 (part of Crewe and Nantwich Circular Long Distance Walk), FO7 and FP12, that are within 1 km of the Site;
- Users of religious ground in proximity, including St Leonard's Church located c. 50m east;
- Users of Warmingham C of E Primary School; and
- Users of the Old Hough House Fishery located approximately 250 m north of the Site.

Transport user safety

5.13.29. At the scoping stage, specific baseline conditions cannot be isolated. These will be determined at the next stage of the EIA, once there is more information available relating to construction transport movement requirements.

Employment and income

5.13.30. The socioeconomics baseline will be used to inform the human health assessment.

5.13.31. Specific consideration will be given to the impacts of the Proposed Development on the following businesses and agricultural land holdings, which are within 500 m of the Site:

- Hill Top Farm, within the Site;
- Church House Farm;
- Parkfield Farm;
- Stoccia Farm;
- Ridding Farm;
- Five Oaks Farm;
- Moat House Farm;
- Park Hall Farm;
- Park House Farm;
- Ardens Sports Lighting, Macclesfield;
- Kistos Energy Storage, Hole House Gas Storage and Hill Top Farm;
- The Bear's Paw, Warmingham (gastropub and boutique hotel);
- Old Hough Coarse Fishery;
- Cheshire Annex, Warmingham (private holiday rental);
- Island Cottage, Warmingham (private holiday rental); and
- Five Oaks Farm (private holiday rental).

5.13.32. Extending the buffer to 1 km from the Site brings the outer edges of Leighton, located to the south, within the study area. This has a greater range of employment provision than Warmingham and will be considered as a clustered location.

Geographic sub-populations

5.13.33. The closest settlement to the Site is Warmingham, to the east. Residents of Warmingham will form a specific geographic sub-population assessed as a receptor cluster due to their proximity to the Site and likelihood of greater impacts from construction activities than the wider population of the Study Area as a whole. Included within this receptor cluster will be consideration of users of community, recreational, educational and leisure assets in Warmingham, recognising that they may experience locationally specific impacts to determinants of human health that will not affect the wider population of the study area in the same way.

5.13.34. The Site includes land that is in active commercial use, for a combination of agricultural and commercial activities. Existing Site users will form a geographic sub-population that will be considered as a clustered receptor. Construction workers for the Proposed Development will form a further geographic sub-population for assessment in the construction phase only, present at the Site.

5.13.35. The Site is within an agricultural landscape, with a number of agricultural landholdings within 500m. This land use typology will be clustered as a specific geographic sub-population for assessment, distinct from the experience of the local resident population, and the wider population of the Study Area.

5.14. Major Accidents and Disasters

5.14.1. The baseline data in relation to setting, receptors and the extents of the study areas that are described in the other environmental topic sections are deemed to be sufficient for use in the consideration of Major Accidents and Disasters (MA&D). For example, offsite human receptors are discussed in the Air Quality and Noise and Vibration sections; ecologically designated sites in the Biodiversity section, built heritage in the Historic Environment section, surface and ground water bodies in the Water Environment and Flood Risk section and non-designated land use in the Geology and Soils section.

5.14.2. Of specific relevance to the assessment of MA&D, the ‘Groundsure’ reports[37] record that there are a number of Control of Major Accident Hazard (COMAH) sites on / close to the Proposed Development, for example, EDF Trading Gas Storage Limited, Hole House Farm Storage Area, which was acquired by Kistos Energy in 2024 and which is within the Site for the Proposed Development.

5.15. Future baseline

5.15.1. The baseline environment at the Site and within the study areas, may change over time without the Proposed Development in place, particularly where there are long lead in times before construction or operation. As such, it is necessary to define the current baseline conditions and determine whether these conditions are likely to change by the ‘assessment years’ that are selected for the construction and operation of the Proposed Development. If this future baseline is more likely to occur than the current baseline, the future baseline is used for the assessment of likely significant effects.

5.15.2. At the scoping stage, the future baseline has not been defined or reported; this will be detailed at the ES stage. The ES will be based on a series of assumptions about how the current and future baseline will change during construction and operation of the Proposed Development, taking into account the progression of other developments in the study area that are considered reasonably likely to come forward within comparable timeframes. The baseline conditions within the Site are known to be changing as a result of the commencement of British Salt solution mining activities on the east cavern plot.

[37] Groundsure Ltd., “Enviro+Geo Insight Report, Uniper west boundary, GS-IMO-4IX-4QG-NCV,” 2025 and Groundsure Ltd., “Enviro+Geo Insight Report, Uniper east boundary, GS-27U-KH3-L9W-QW8,” 2025.

6. Likely Impacts of the Proposed Development

6.1.1. Potential environmental impacts from the Proposed Development have been presented in tables for the construction and operational phases, as set out in **Table 6-1** and **Table 6-2.** These tables describe the potential impacts in detail so that they can be concisely referenced in the scoping assessment in Chapters 9 to 22 without undue duplication. These potential impacts will be assessed and mitigated for through the EIA process, therefore the list in **Table 6-1** is to demonstrate the potential impacts that need to be considered.

Table 6-1 Potential construction phase impacts

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
Construction	Construction dust	Adverse	Direct	Temporary	Reversible	Dust from construction sites can occur from a variety of activities including aggregate handling, excavations, earthworks, groundbreaking activities, vehicle track out, demolition activities (if any), cutting and grinding etc.	Biodiversity Air Quality Human Health
Construction	Construction noise	Adverse	Direct	Temporary	Reversible	Noise from construction may occur from solution mining which will involve the drilling of the wells, construction of the gas processing facility and pipework, construction of the LCHPP and associated works.	Biodiversity Noise and Vibration Human Health
Construction	Construction vibration	Adverse	Direct	Temporary	Reversible	Construction sites can generate vibrations, creating new vibration sources, including heavy machinery operations, drilling, pile driving, excavation, compaction, and the movement of construction vehicles.	Biodiversity Noise and Vibration
Construction	Construction Traffic	Adverse	Direct	Temporary	Reversible	Construction traffic will comprise heavy goods vehicles (HGVs) transporting construction plant, equipment, and materials to the Site, as well as removing waste from the Site. In addition, car journeys will be generated by the construction workforce commuting to and from the Site. HGV movements will be restricted to designated, pre-agreed haul routes. Cumulative impacts of operational and construction traffic may need to be considered, should the construction phase within the wider Site area fall alongside the early operational years of the Proposed Development.	Biodiversity Noise and Vibration Air Quality Human Health
Construction	Site clearance, excavation, earthworks, and installation of hardstanding areas	Adverse	Direct	Temporary	Reversible	Site clearance and earthworks during construction will be required for the development of drilling well pads, the creation of hardstanding areas for the gas processing facility and LCHPP, remodelling of access roads to new wellheads, installation of underground pipes, installation of drainage and above ground lighting, and erection of security fencing.	Biodiversity Water Environment Geology and Soils
Construction	Drilling within deep geology	Adverse	Direct	Permanent	Irreversible	Drilling within deep geology is a fundamental stage in the creation of underground salt caverns and involves the controlled penetration of geological strata to access the target halite (rock salt) formation. The process typically extends several hundred metres below ground level.	Geology and Soils
Construction	Drilling of the subsurface	Adverse	Direct	Permanent	Irreversible	Drilling of the subsurface is the process of creating a borehole into the ground to access and investigate soil, rock, or groundwater below the surface.	Geology and Soils

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
Construction	Construction of underground pipework	Adverse	Direct	Temporary	Reversible	Underground pipework will be implemented in order to transport hydrogen, water and utilities.	Geology and Soils
Construction	Fluvial Flood Risk	Adverse	Direct	Temporary	Reversible	Site is partially within the Flood zone 3 and Flood zone 2, indicating a medium to high risk of fluvial flooding. The Proposed Development may increase the risk of fluvial flooding during construction.	Water Environment and Flood Risk
Construction	Change in land use during construction	Adverse	Direct	Temporary	Reversible	The presence of temporary laydown areas and construction activities will result in a temporary change in land use from agricultural or undeveloped land to a construction site with temporary land take areas e.g. hardstanding areas, haul roads, construction compound etc.	Human Health Landscape and Visual Historic Environment Water Environment and Flood Risk Geology and Soils
Construction	Greenhouse gas emissions	Adverse	Indirect	Permanent	Irreversible	The construction of the Proposed Development will result in greenhouse gas emissions. These will come from the combustion of fossil fuels used to power construction plant and machinery, and construction vehicles travelling to and from the Site. There will also be embedded carbon emissions generated in the manufacture of the construction materials.	Effects on Climate
Construction	Changes to amenity	Adverse	Direct	Temporary	Reversible	The combination of visual, noise and vibration, and air quality impacts can have an effect (including cumulatively) on the residential amenity within and nearby the Site.	Historic Environment Human Health
Construction	Permanent use of materials during construction	Adverse	Indirect	Permanent	Irreversible	Constructing the Proposed Development will consume non-renewable raw materials such as primary aggregates (crushed rock and sand and gravel), recycled and secondary aggregates, asphalt, concrete, steel and other metals. Smaller quantities of materials may include plastic, wood, and glass, amongst others.	Waste and Materials
Construction	Pollution incidents during construction	Adverse	Direct	Temporary	Reversible	Leaks and spills of fuels and other chemicals used during construction can occur due to the use of poorly maintained construction plant and vehicles and accidental spillages from refuelling and the handling of construction chemicals and materials.	Biodiversity Water Environment and Flood Risk
Construction	Permanent use of landfill void from construction waste	Adverse	Indirect	Permanent	Irreversible	Permanent use of landfill void refers to the long-term occupation or repurposing of a previously excavated or unused space within a landfill site. In the context of a development project, this typically means that part of the landfill void is being permanently used.	Waste and Materials
Construction	Sterilisation of Mineral Safeguarding Area (MSA)	Adverse	Direct	Permanent	Irreversible	The presence of a mineral resource directly underneath the Proposed Development could lead to the long-term sterilisation of a mineral resource that is protected within an MSA. However, the construction of the Proposed Development will not result in sterilisation of an	Waste and Materials

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
						unexploited mineral resource as this salt is already being extracted for solution mining by British Salt in the baseline.	
Construction	Landfill leachate release	Adverse	Direct	Permanent	Irreversible	The construction of underground pipelines to Hilltop Farm may pierce any potential lining present within the landfill in the centre and east of the Site, particularly within the cell that has accepted mixed wastes. This is a risk to surrounding ground, groundwater and migration to surface water.	Water Environment and Flood Risk
Construction	Permanent land take during construction	Adverse	Direct	Permanent	Irreversible	There will be the permanent loss of land in areas of permanent land take.	Water Environment and Flood Risk Geology and Soils Human Health
Construction	Mobilisation of contaminants	Adverse	Direct	Permanent	Irreversible	There may be contamination of soils and underlying groundwater in the vicinity of the historical tanks in Hilltop Farm area.	Geology and Soils
Construction	Changes in access to community, recreational and educational facilities	Adverse	Direct	Temporary	Reversible	Access to Warmingham Primary School, Village Hall, and St Leonard's Church may be disrupted by construction traffic and temporary PRoW diversions.	Human Health
Construction	Changes in access to green space and open space	Adverse	Direct	Temporary	Reversible	Access to green and open space may be disrupted due to temporary closure or diversion of several PRoW and other Walking, Cycling and Horseriding (WCH) routes, which pass through or adjacent to the Site.	Human Health
Construction	Changes in access to healthcare facilities	Adverse	Indirect	Temporary	Reversible	Access to healthcare facilities may be disrupted due to construction traffic.	Human Health
Construction	Changes in air quality, affecting people	Adverse	Direct	Temporary	Reversible	Activities such as drilling, earthworks, and vehicle movements associated with maintenance and logistics may generate dust and emissions, including particulate matter and nitrogen oxides, potentially affecting people.	Human Health
Construction	Changes in noise and vibration, affecting people	Adverse	Direct	Temporary	Reversible	Construction activities including drilling, vehicle movements, and use of heavy machinery will introduce new sources of noise and vibration into a predominantly rural setting, potentially affecting people.	Human Health
Construction	Changes in risks of pollution of soils and water, affecting people	Adverse	Indirect	Temporary	Reversible	Construction activities may result in accidental spills, fuel leaks, or runoff from compounds and stockpiles, which could enter nearby watercourses such as the River Wheelock or affect agricultural land.	Human Health
Construction	Changes in employment and income	Beneficial	Direct	Temporary	Reversible	The construction phase may generate short-term employment opportunities for contractors, suppliers, and support services. Local businesses in nearby settlements, and accommodation providers may benefit from increased demand.	Human Health
Construction	Uncertainty and anxiety	Adverse	Indirect	Temporary	Reversible	The introduction of hydrogen infrastructure, visible construction activity, and perceived risks (e.g. explosions, pollution) may cause anxiety	Human Health

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
						among residents. This is particularly relevant for vulnerable sub-populations, who may be more sensitive to change. Uncertainty and anxiety can lead to stress, reduce trust in the Proposed Development, and affect mental health during the construction phase.	
Construction	Construction plant emissions	Adverse	Direct	Temporary	Reversible	There may be temporary changes in local air quality due to exhaust emissions from construction plant and Non-Road Mobile Machinery (NRMM) used on Site. Plant would be used, for example, for demolition, piling, excavation, creation of hard surfaces, and the construction of a new internal access roads. In addition, diesel powered drilling rigs will be required to operate for a period of approximately three months at each cavern location, and debrining centrifugal pumps will be used for up to seven years for each two caverns concurrently.	Air Quality
Construction	Extreme weather observed in the current climate	Adverse	Indirect	Permanent	Irreversible	Extreme weather in the current climate refers to increasingly frequent and intense events such as heatwaves, heavy rainfall, storms, droughts, and cold snaps. These are driven by shifts in global and regional climate patterns, often linked to rising greenhouse gas concentrations and altered atmospheric dynamics. Such events pose risks to infrastructure, ecosystems, and human health.	Climate Vulnerability
Construction	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Adverse	Indirect	Permanent	Irreversible	Changes to the future climate e.g. warmer wetter winters and hotter drier summers as a result of climate change. The Proposed Development could both cause and be affected by climate change impacts.	Climate Vulnerability
Construction	Construction lighting	Adverse	Direct	Temporary	Reversible	During construction lighting will be needed.	Biodiversity
Construction	Water Abstraction for Solution Mining	Adverse	Direct	Temporary	Reversible	Water abstraction currently under the existing British salt license for the River Wheelock.	Water Environment and Flood Risk
Construction	Drainage Outfalls	Adverse	Direct	Temporary	Reversible	Run-off, spills and contamination during construction works may flow into outfalls and therefore may reduce quality of receiving watercourses.	Water Environment and Flood Risk

Table 6-2 Potential operational phase impacts

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
Operation	Change in land use during operation	Adverse	Direct	Permanent	Irreversible	The operational phase of the proposed Hydrogen Storage Facility and LCHPP will result in a change in land use from agricultural or undeveloped land to industrial energy infrastructure, impacting the landscape through permanent installation of wellpads, gas processing plant, and associated utilities.	Biodiversity Landscape Historic Environment Water Environment and Flood Risk Geology and Soils Human Health
Operation	Changes in access to community, recreational and educational facilities	Adverse	Indirect	Temporary	Reversible	Several PRoW cross the Site and connect residential properties directly into Warmingham village, including routes to Warmingham Primary School, Village Hall, and St Leonard's Church. It is known that certain PRoW will be diverted permanently, while it is currently unclear whether other PRoWs will remain open once the Proposed Development becomes operational.	Human Health
Operation	Changes in access to green space and open space	Adverse	Indirect	Temporary	Reversible	PRoW that cross the Site and link residential areas to nearby green spaces such as Burnt Covert Woods, Warmingham Wood, and Larch Wood may be affected by the operational footprint of the Proposed Development. One permanent diversion is planned, but it is not yet confirmed which others of these routes will remain open or be permanently diverted.	Human Health
Operation	Changes in access to healthcare facilities	Beneficial	Indirect	Temporary	Reversible	The operational phase will require skilled workers for hydrogen storage and production monitoring, maintenance, and gas processing. This may create long-term employment opportunities and support local economic resilience. Stable income can improve access to healthcare, reduce financial stress, and support overall wellbeing.	Human Health
Operation	Changes in air quality, affecting people	Adverse	Indirect	Permanent	Irreversible	Operation of the Hydrogen Storage Facility and LCHPP will involve regular maintenance activities, vehicle movements, and operation of the gas processing plant, which includes compressors, standby diesel generators and flaring / venting equipment.	Human Health
Operation	Changes in employment and income	Beneficial	Indirect	Temporary	Reversible	The operational phase will require skilled workers for hydrogen storage and production monitoring, maintenance, and gas processing. This may create long-term employment opportunities and support local economic resilience.	Human Health
Operation	Changes in noise and vibration, affecting people	Adverse	Direct	Temporary	Reversible	Operational noise sources include compressors, flare stack, and vehicle movements. The gas processing plant and LCHPP will operate continuously, and although mitigation (e.g. acoustic barriers) is expected, residual noise may affect nearby receptors such as Warmingham residents, school pupils, and users of PRoWs. Vibration impacts are	Human Health

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
						expected to be minimal but may arise during maintenance or emergency operations.	
Operation	Changes in risks of pollution of soils and water, affecting people	Adverse	Indirect	Permanent	Irreversible	The Site is underlain by aquifers and includes authorised landfill sites. Operational risks include accidental leaks of hydrogen, brine, or chemicals used in cavern maintenance. These could contaminate soils or groundwater, affecting drinking water sources or ecological receptors. While mitigation (e.g. bunding, monitoring) will be in place, residual risk remains, particularly during cavern transfer or debrining operations.	Human Health
Operation	Changes to amenity	Adverse	Direct	Temporary	Reversible	Amenity impacts include increased industrial activity, noise, air emissions, and visual intrusion, potentially diminishing the rural character and tranquillity of the surrounding environment. The gas processing plant includes structures up to 50m high (flare stack) and the LCHPP also includes venting and stacks up to 20 m in height.	Historic Environment Human Health
Operation	Drainage outfalls	Adverse	Direct	Temporary	Reversible	Drainage outfalls to nearby watercourses, which may reduce water quality.	Water Environment and Flood Risk
Operation	Emission of combustion products from the flare, standby diesel generator (SDG) and firewater pumps	Adverse	Direct	Permanent	Irreversible	Intermittent and infrequent emissions due to the operation of the flare only expected during its use for general process release and emergency relief or blowdown activities. The pilot light for the flare will operate continuously. The Proposed Development will also include an emergency standby generator (anticipated to be capacity <1MW) and firewater pumps. These would operate only for limited periods infrequently throughout the year for backup and emergency use only. Intermittent emissions of combustion products would occur during the operation of the equipment. No other additional combustion sources (e.g. to satisfy any potential additional power demand associated with the operation of the British Salt pumping station) are assumed to be used.	Air Quality
Operation	Vented hydrogen and oxygen emissions	Adverse	Direct	Permanent	Irreversible	Hydrogen emissions due to the operation of vents installed at each electrolyser unit of the LCHPP will occur from a dedicated stack (during shutdown and maintenance) and from medium/high pressure and low pressure hydrogen vents. Medium/high pressure hydrogen vents will be routed via above ground pipework to the flare. Local emissions of hydrogen are expected from the low pressure hydrogen vents, which will vent at safe locations.	Air Quality
Operation	Greenhouse gas emissions	Adverse	Indirect	Permanent	Irreversible	The operation of the Proposed Development will likely result in greenhouse gas emissions. These will come from the combustion of fossil fuels used to power operational plant and machinery, and vehicles travelling to and from the Site. Additionally, a small amount of Hydrogen will be released from the Proposed Development during normal operation. Hydrogen is considered an indirect GHG. However, hydrogen stored and produced as a result of the Proposed Development will have the potential to replace fossil fuels in the	Effects on Climate

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
						generation of energy. The use of the Hydrogen gas could lead to a decrease in overall emissions if it replaces fossil fuel. This potential beneficial impact will be explored during the ES assessment.	
Operation	Increasingly severe and frequent extreme weather in the future	Adverse	Indirect	Permanent	Irreversible	In the future the UK is expected to experience warmer temperatures, wetter winters, drier summers, more frequent heatwaves, and rising sea levels	Climate Vulnerability
Operation	Odour emissions discharged by the hydrogen gas regeneration system and from the release of hydrogen sulphide (H_2S) from the cavern	Adverse	Indirect	Permanent	Irreversible	There is the potential for odour emissions due to the discharge of hydrogen gas being odourised using a methyl mercaptan compound. Odour emissions from the release of H_2S generated through bacterial action in the caverns might occur.	Air Quality
Operation	Operational noise	Adverse	Direct	Temporary	Reversible	Noise impacts may arise from compressors, pumps, and other mechanical equipment at the gas processing plant, LCHPP and wellpads, potentially affecting nearby receptors depending on the effectiveness of mitigation measures and operational scheduling.	Biodiversity Noise and Vibration Human Health
Operation	Operational Maintenance Noise	Adverse	Direct	Temporary	Reversible	Operational maintenance noise impacts are predicted to be minimal. Maintenance and flaring activities, although noise producing, are to be infrequent in nature and will be scheduled to take place during low sensitivity periods.	Noise and Vibration Landscape and Visual
Operation	Operational permanent use of landfill void from waste generation	Adverse	Direct	Permanent	Irreversible	The operational waste volumes that could be generated are likely to consist of waste generated by staff, visitors and any maintenance work. The management of this waste would prioritise non-landfill methods such as recycling or processing via Energy from Waste facilities with energy recovery and therefore minimal waste would go to landfill. The potential effect of waste generated during operational phase is the low volume, long-term, permanent use of landfill void capacity.	Waste and Materials
Operation	Operational permanent use of materials	Adverse	Direct	Permanent	Irreversible	The use of non-renewable raw materials that could be used during operational phase are likely to be similar those in the construction phase, although they would be due to planned and un-planned maintenance activities and likely to be in smaller volumes. The potential effect of materials use during the operational phase is the permanent removal of these materials from the market.	Waste and Materials
Operation	Operational traffic	Adverse	Indirect	Permanent	Irreversible	Additional road journeys will be made by staff travelling to and from the Proposed Development, plus maintenance and delivery vehicles, which could lead to an increase in road traffic emissions. However, operational staff and vehicle trips are anticipated to be minimal.	Biodiversity Noise and Vibration Air Quality Human Health Landscape and Visual

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
Operation	Operational vibration	Adverse	Direct	Temporary	Reversible	Vibration impacts are expected to be minimal, as activities like gas injection and withdrawal, and electrolysis typically do not generate significant ground vibrations compared to the construction or drilling phases.	Noise and Vibration
Operation	Pollution incidents during operation	Adverse	Direct	Permanent	Irreversible	During the operational phase, pollution incidents may arise from leaks or spills of chemicals, poor maintenance of pipelines, wellheads, or storage tanks.	Biodiversity Water Environment and Flood Risk
Operation	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Adverse	Indirect	Permanent	Irreversible	Changes to the future climate e.g. warmer, wetter winters and hotter drier summers as a result of climate change. The Proposed Development could both cause and be affected by climate change impacts.	Climate Vulnerability
Operation	Surface water flood risk	Adverse	Direct	Temporary	Reversible	The Site has areas at high risk of surface water flooding. The Proposed Development may change the amount of impermeable surface within the Site which could change surface water flows. Surface water flood risk may also be greater due to the Statutory main river (Wheelock) within the Order Limits and areas of fluvial flooding (flood zone 3), potentially leading to inundation of infrastructure and contamination from chemical or hydrogen-related spills.	Water Environment and Flood Risk
Operation	Fluvial flood risk	Adverse	Direct	Temporary	Reversible	Portions of the Site are affected by high likelihood of fluvial flood risk (flood zone 3) and permanent infrastructure may displace this natural floodplain storage during operation over the lifetime of the Proposed Development including the effects of Climate Change.	Water Environment and Flood Risk
Operation	Operational lighting	Adverse	Direct	Temporary	Reversible	Any permanent lighting could result in impacts to receptors (e.g. human, ecological and landscape/visual) within and surrounding the Site.	Biodiversity Human Health
Operation	Loss of vegetation and presence of new buildings and infrastructure on the Site	Adverse	Direct	Temporary	Reversible	There will be loss in vegetation and the presence of new infrastructure and buildings on the Site, including Hydrogen Storage Facilities and the LCHPP. There will be no loss of irreversible habitats.	Landscape and Visual
Operation	Sterilisation of MSA	Adverse	Direct	Permanent	Irreversible	The presence of a mineral resource directly underneath the Proposed Development could lead to the long-term sterilisation of a mineral resource that is protected within an MSA. However, the operation of the Proposed Development will not result in sterilisation of an unexploited mineral resource as this salt is already being extracted for solution mining by British Salt in the baseline.	Waste and Materials
Operation	Landfill gas release	Adverse	Direct	Permanent	Irreversible	Potential release of landfill gases due to the presence of below ground pipework.	Geology and Soils
Operation	Flow Pathways	Adverse	Direct	Permanent	Irreversible	Any below ground structures could cause a barrier to groundwater flow.	Geology and Soils

Phase	Name	Adverse / Beneficial	Direct / Indirect	Permanence	Reversibility	Description of impact	Relevant Topic
Operation	Landfill leachate release	Adverse	Direct	Permanent	Irreversible	Potential disturbance to the landfill at Hill Top Farm during construction could increase the risk of landfill leachate release during operation, particularly within the cell that has accepted mixed wastes. This is a risk to surrounding ground, groundwater and migration to surface water.	Geology and Soils
Operation	Mobilisation of contaminants	Adverse	Direct	Permanent	Irreversible	There may be contamination of soils and underlying groundwater in the vicinity of the historical tanks in Hilltop Farm area.	Geology and Soils
Operation	Water abstraction for LCHPP operations	Adverse	Direct	Temporary	Reversible	Water abstraction is currently under the existing British Salt license for the River Wheelock which will continue to be used for the Proposed Development. Water demand is predicted to be 18m^3/hr and there is anticipated to be sufficient headroom on the licence alongside continuing British Salt operations.	Water Environment and Flood Risk
Operation	Waste water discharge for the LCHPP	Adverse	Direct	Temporary	Reversible	Processed water is planned to be treated and discharged to a suitable receptor. Discharge location is to be confirmed i.e. whether this is to a surface water course, via a new or existing outfall or sewer. If discharged to surface water via a new or existing outfall, this could lead to a reduction in water quality depending on the process and quantity (currently unknown). Potential solid contamination from: spent filtration media, polishing resins and waste oils. If discharged into surface water receptor, water treatment will be needed prior to discharge. If discharged into sewer a trade effluent permit will be required which will contain stipulations regarding discharge.	Water Environment and Flood Risk

7. Mitigation

7.1.1. As design is at an early stage of development and is not yet fixed, there is limited scope for identifying mitigation that can be committed to, particularly in relation to the design. Nevertheless, there are standard practices, particularly for construction, that any reputable contractor would implement as a matter of course. These, along with other embedded measures to be included in the design, are detailed in **Table 7-1**. The requirement for any additional mitigation will be determined at the ES stage when the significance of effects has been assessed. During decommissioning a DEMP would be in place which will consider all potential environmental risks of the decommissioning activities, containing similar measures to those proposed during construction, alongside any additional measures to remove or mitigate potential impacts.

Table 7-1 Mitigation Measures

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
Construction	Air quality	Implementation of the mitigation measures specified in the IAQM guidance for all construction activities.	The Institute of Air Quality Management (IAQM)'s guidance on the assessment of dust from demolition and construction sets out the required mitigation measures to ensure that significant effects from dust cannot arise. Where necessary, mitigation measures for construction dust and traffic emissions will be identified for inclusion within a Construction Environmental Management Plan (CEMP) and/or Construction Traffic Management Plan (CTMP) or equivalents. These documents will be included as part of the ES which will include an assessment in accordance with the IAQM guidance and identify the specific mitigation measures required for the construction of the Proposed Development to ensure that significant adverse effects from dust do not arise. Best practicable means for dust and emissions control during construction would be in place regardless of the outcome of the dust risk assessment and all regulations such as those for NRMM will be followed. These measures would, where appropriate, be augmented and implemented through the CEMP and CTMP.	Management	Reduce
Construction	Biodiversity	Creation and improvement of habitats	Creation of new habitats and/or improvements to existing habitats to mitigate any permanent loss of habitats. Under the Environment Act 2021, it will be mandatory for all (terrestrial) NSIPs to deliver Biodiversity Net Gain from May 2026.	Design	Remediate
Construction	Biodiversity	Retention and protection of existing vegetation, where possible	Existing trees and vegetation within the Site that do not require removal must be protected, where possible, during the construction phase with protective fencing where necessary. Excavations should be avoided within the root protection zone.	Design	Avoid
Construction	Biodiversity	Species-specific mitigation plans and method statements.	Will involve obtaining relevant protected species licences as well as precautionary methods of workings.	Management	Reduce
Construction	Biodiversity	Obtaining protected species licences where necessary prior to construction.	Will be updated based upon the Preliminary Ecological Appraisal (PEA) report. Will involve obtaining relevant protected species licences as well as precautionary methods of workings.	Management	Reduce
Construction	Biodiversity	Precautionary Method of Working (PMW) and prework checks where appropriate.	Will be updated based upon the PEA report. Will involve obtaining relevant protected species licences as well as precautionary methods of workings.	Management	Reduce
Construction	Climate vulnerability	Extreme weather mitigation	The Proposed Development's CEMP will include a requirement to monitor weather forecasts, allowing for any necessary measures, such as stop work protocols or change management plans, to be put in place prior to expected adverse weather conditions. The CEMP will also outline flood control measures and contingency actions that will be in place should flooding occur on the	Management	Reduce

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
			construction site. Risk management procedures, such as toolbox talks, will highlight any potential weather conditions that could create health and safety hazards for workers.		
Construction	Climate vulnerability	Climate mitigation for water resources	If not mitigated the Proposed Development could both cause and be affected by water supply and demand impacts. The region's climate is not vulnerable to extreme droughts and mitigation will be embedded into the design to ensure impacts do not significantly affect construction activities. Moreover, climate risks to water supply and demand are already being actively managed by others at a regional / water company scale through the Water Resource Management Planning process.	Design	Reduce
Construction	General	Adoption of mitigation hierarchy	Adoption of the mitigation hierarchy, prioritising avoidance of land take and other impacts wherever practicable, followed by minimising impacts, before considering mitigation and, finally, compensation.	Design	Avoid
Construction	General	Implementation of the CEMP	A CEMP describes the specific mitigation measures that the Proposed Development plans to follow to control and reduce impacts on the environment and local community during the construction phase. For the Proposed Development, a framework CEMP will be developed, taking into account the findings of the ES and which will include potential impacts from: • construction traffic • earthworks • noise and vibration • dust generation • waste generation This will provide a framework from which a final detailed CEMP will be prepared by the Engineering, Procurement and Construction (EPC) Contractor prior to the beginning of construction.	Management	Reduce
Construction	General	Implementation of a Construction Traffic Management Plan	The CTMP outlines the approach to carrying out temporary traffic management for the safe construction of the Proposed Development. It will explain the management measures required by the contractor to reduce the impact on the local community (including journey time reliability, access, and safety), accounting for the potential cumulative impacts of construction and operational traffic, should the construction phase within the wider Site area continue alongside the early operational years of the Proposed Development.	Management	Reduce
Construction	Geology and soils	Construction practices in accordance with Soil Management Plan	Preparation and implementation of a Soil Management Plan where soils are to be excavated and reinstated to minimise the disturbance to site soil resources and support the protection and conservation of the soil for reuse.	Management	Reduce
Construction	Geology and soils	Ground investigation in line with BS10175:2011 +A2:2017	A ground investigation in line with BS10175:2011+A2:2017 that targets areas of potential contamination, particularly in the landfill areas and historical tanks. Further records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed, any construction details and any maintenance measures. This information will inform necessary mitigation measures to limit the impact of contamination on the design, the Site and Site users during construction.	Design	Reduce

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
Construction	Geology and soils	Well / cavern design	Well / cavern design measures: • Use of well integrity system at surface including blow out preventer (barrier envelope to prevent unplanned flow of fluids from well/cavern) • Drilling work programme to be designed in accordance with Health and Safety Executive (HSE) Regulations and signed off by an independent well examiner • Mud system[38] to apply overbalance to well bore pressure (formation/rocks) to prevent unplanned flow or fluids • Water based mud system (as oppose to oil based mud) used to prevent contamination with groundwater/water table. • Water table cased off to prevent contamination when drilling deeper sections • Pore pressure and fracture gradient profiles created for the expected formations and mud weight designed in accordance with the profile • Fluid loss control chemicals prepared on Site to handle fluid loss management scenarios • Mechanical Integrity Testing to confirm the integrity of the well and the cavern.	Design	Avoid
Construction	Greenhouse gases	Carbon reduction and management	The Publicly Available Specification (PAS) 2080:2023 Carbon reduction hierarchy should be followed to reduce emissions within the design and construction of the Proposed Development. The hierarchy should be used to identify options for carbon reduction through the use of improved design, low carbon materials and low carbon construction plant. These carbon reduction opportunities should be implemented and captured using a carbon management plan and following the processes outlined in the standard PAS 2080:2023.	Design	Reduce
Construction	Historic environment	Archaeological mitigation works	Mitigation works which may include for but not be limited to geophysical survey, evaluation trenching and potentially wider excavation. These works will be agreed in consultation with primary stakeholders and undertaken via an agreed written scheme of investigation. Where archaeological remains cannot be preserved in situ, preservation by record is recommended.	Management	Reduce
Construction	Noise and vibration	Implementation of Best Available Techniques (BAT) as set out in BS 5228:2009+A1:2014 Part 1 and 2	Where practicable the control measures set out in British Standard (BS) 5228:2009+A1:2014 Part 1 and 2, Sections 8 will be implemented. Generic noise and vibration measures to be used include: • Employing only modern, quiet and well-maintained equipment; any plant, equipment, or items fitted with noise control equipment found to be defective will not be operated until repaired • Careful planning of the sequence of work in order to minimise the transfer of noise / vibration to nearby receptors • Where reasonably practicable, fixed items of construction plant will be electrically powered from the mains supply in preference to being diesel or petrol driven • Locate noisy processes and equipment (such as temporary site generators) as far as is reasonably practicable from sensitive receptor locations • Where practicable, avoidance of percussive pile driving methods, in favour of alternatives such as vibro-piling, or auger piling, which provide less potential impact from ground vibration.	Design	Avoid

[38] Drilling mud is a fluid used during drilling operations to keep the well pressure under control. Water based mud is a combination of water and chemicals.

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
			• Use of screws and drills rather than nails for fixing hoardings, etc • Careful handling of materials and waste such as lowering rather than dropping items • Loading / unloading material into vehicles within designated areas only • Taking care when erecting or striking scaffolds to avoid impact noise from banging steel • Avoidance of unnecessary noise (such as engines idling between operations, shouting, loud radios or excessive revving of engines) by effective site management • Potential fitting of exhaust silencers to vehicles and mechanical plant utilised for any activity associated with the construction works. Any silencers or noise control measures will be maintained in good working order and operated in a manner such that noise emissions are controlled and limited as far as reasonably practicable • Site induction and toolbox talks for all staff on the nuisance effects of noise and vibration and ways to minimise noise and vibration at the source • Raising awareness among sub-contractors and suppliers of the environmental constraints of the Site and of the obligation to follow the necessary procedures to minimise noise and vibration levels • Supervision of staff to prevent any unnecessary noise such as shouting or banging at all times • Displaying of signs within the Site to raise awareness and to stress the importance of noise and vibration control to prevent impacts on the local residents. • Informing local residents of the works prior to commencement.		
Construction	Human Health	Pro-active community liaison through a Community Liaison / Relations Agency	Pro-active community liaison activities to be delivered by the Community Liaison / Relations Agency, to be co-ordinated with the Principal Contractor activities. The Community Liaison / Relations Agency will be responsible for pro-actively providing information to and communicating with residents and stakeholders, managing interactions including complaints and feedback between the public, stakeholders and the construction process and coordinating responses to community concerns, particularly around severance and amenity.	Management	Remediate
Construction	Human Health	Construction phase planning	Construction phase planning, with the intention of delivering efficient construction activities that minimise the duration of temporary disturbance impacts. This may include efficient scheduling of road and footpath closures and diversions and phasing of works to reduce severance impacts and distance of any diversions.	Management	Reduce
Construction	Human Health	Construction practices in accordance with standard process and adhering to national and international safety standards	During the construction, contractors will follow appropriate national and international health and safety management systems, audits and checks to avoid any incidents or accidents leading to risk of injury or fatality. Construction safety process would ensure that the potential for accidents associated with natural hazards / disasters (e.g. electrical, working at height, working in confined spaces, traffic etc,.) are minimised.	Management	Reduce
Construction	Human Health	Development and implementation of a Community Engagement Strategy and Plan	Development and implementation of a suitably tailored Community Engagement Plan (CEP), via the Community Liaison / Relations Agency. This should be reflective of the community characteristics, including any specific linguistic or specialist communication needs and be tailored to the area's demographics, including older residents, families and materially disadvantaged groups. It should include arrangements and commitments for the provision of advance information on the construction programme to enable affected persons to plan ahead, as well as procedures	Management	Remediate

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
			and mechanisms for managing complaints and triggering corrective actions, should the need arise. The plan should be in accessible formats and utilise inclusive communication strategies.		
Construction	Human Health	Landscape measures for construction works	Landscape measures for construction works, which seek to, retain as much mature vegetation as practicable, reinstate visual screening as early as practicable, accelerate the establishment of new landscaping, through the earliest practicable formation of earthworks and introduction of new planting, to accelerate landscape recovery.	Management	Reduce
Construction	Human Health	Maintaining access to all private property throughout construction	Preservation of vehicular access to all relevant assets, including private residences, community assets (e.g. schools, healthcare facilities and community venues), development land and businesses, green and open spaces. This should be supported by clear signage, advanced notice of closures, and alternative routing where necessary	Design	Reduce
Construction	Human Health	Pollution control measures for human health	Pollution control measures in relation to determinants of human health, including (but not limited to), site waste arisings, targeting dust generation, noise levels and sources, vibration levels and sources, protection of water and air quality, contamination/ spill risk and avoidance of surface water flooding/ ponding and protection of sensitive receptors including residential clusters and green spaces.	Management	Reduce
Construction	Human Health	Targeted management plans, supplementing the CEMP	Targeted management plans relating to pollution prevention; Site waste arisings; noise and vibration; air quality; public rights of way and promoted routes; emergency response plan; emergency vehicle movement plan; and landscape management plan.	Management	Reduce
Construction	Waste and resources	Adherence to waste hierarchy	The Proposed Development will take into account the use of recycled materials to reduce the use of primary materials and will be committed to following the waste hierarchy, proximity principle and implementing Circular Economy principles to both materials and waste. There are several different measures that will be implemented, as follows: • Designing out material use and waste generation • On-site management of materials and waste • Treatment and disposal Decisions taken during design phase to reduce material use and waste generation are an example of primary (embedded) mitigation. Excessive material use and waste generation can be designed out early in the development process to ensure materials are: • Reused/reclaimed, where practicable, to reduce waste generation and/or • Recycled, where practicable; and • Project specific measures to reduce material use and waste generation will be developed and recorded as the design develops At design and procurement stage, specification can be made that materials are sourced locally, where possible. The Proposed Development will be committed to achieving high recycling and recovery rates (following actions to design out and reduce waste) to recycle or recover waste that leaves site through disposal via Energy from Waste facilities, therefore diverting from landfill. This mitigation should be supported by the production and implementation of a Site Waste Management Plan (SWMP) and a CEMP.	Management	Avoid

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
Construction	Waste and resources	Site Waste Management Plan	A SWMP can be produced to describe the construction works to be undertaken on a site. It records decisions made on the nature, design and construction method or materials adopted on a project to minimise the quantity of waste produced on a site. The SWMP will be produced during early design stages, reviewed and updated during later design stages and reviewed and updated during construction.	Management	Reduce
Construction	Waste and resources	Use of extracted salt from the brine in British Salt Production	Use of the waste product (brine) in the British Salt production facility for salt production. This is a key benefit of the design of the Proposed Development compared to other solution mining projects.	Design	Avoid
Construction	Water environment	Adherence to pollution prevention guidance (Guidance for Pollution Prevention[39], and Construction Industry Research and Information Association (CIRIA))[40]	All work will be carried out in accordance with the relevant guidelines (Guidance for Pollution Prevention, and CIRIA).	Management	Avoid
Construction	Water environment	Water Contamination and Dewatering Mitigation	To protect water resources, safety steps will be taken to prevent leaks and manage water removal. Corrosion-resistant materials and barriers will help brine from reaching nearby water bodies. Dewatering will be done carefully to protect groundwater levels, with removed water treated or reused to avoid environmental harm.	Management	Reduce
Construction	Water environment	Best practice methods to minimise impacts - trenchless techniques	Use trenchless construction methods where possible and appropriate, such as Horizontal Directional Drilling (HDD), microtunnelling, and pipe jacking to avoid open-cut works near or within watercourses. When implemented correctly, these methods minimize direct contact with the stream, prevents contamination from construction runoff, and protects aquatic habitats during installation.	Design	Reduce
Construction	Water environment	Proposed civil drainage and levels design	Surface water runoff, generated by the development, will be attenuated and managed through Sustainable Drainage Systems, reducing the risk of surface water flooding.	Design	Reduce
Operation	Air quality	Odour Management Plan	An Odour Management Plan would outline the measures to identify, assess, and control odour emissions from a site or activity to minimise impacts and ensure compliance with environmental regulations.	Management	Reduce
Operation	Air quality	Embedded pollution control measures	The Proposed Development will be designed to ensure that it will reflect the Best Available Techniques (BAT) requirements and does not result in unacceptable effects to sensitive receptors and minimise hydrogen and waste oxygen emissions from the LCHPP.	Management	Reduce
Operation	Biodiversity	Creation and improvement of habitats	Creation of new habitats and/or improvements to existing habitats to mitigate any permanent loss of habitats. Under the Environment Act 2021 it will be mandatory for all (terrestrial) NSIPs to deliver Biodiversity Net Gain from May 2026	Design	Remediate
Operation	Biodiversity	Sensitive lighting strategy	Sensitive lighting strategy for wildlife following best practice guidance.	Management	Reduce

[39] The Pollution Prevention and Control (England and Wales) Regulations 2000. Available online at: The Pollution Prevention and Control (England and Wales) Regulations 2000
[40] Construction Industry Research and Information Association (2001). Control of water pollution from construction sites. Guidance for consultants and contractors (C532).

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
Operation	Climate vulnerability	Climate mitigation for structures	Climate related impacts on structures will be mitigated by design. Adhering to best practice ground GI and design will ensure the stability of structures and scour damage to assets will be avoided by the installation of drainage which is already part of the design.	Design	Reduce
Operation	Climate vulnerability	Climate mitigation for materials	Effects will be mitigated by design, for example by use of materials that have specifications that are resilient to projected future climate conditions.	Design	Reduce
Operation	Climate vulnerability	Climate mitigation for power and tele-communications equipment	Climate related impacts will be mitigated by design, for example any assets considered critical in detailed design will have backup power and/or manual operation controls.	Design	Reduce
Operation	Climate vulnerability	Climate mitigation for water resources	If not mitigated the Proposed Development could both cause and be affected by water supply and demand impacts. The region's climate is not vulnerable to extreme droughts and mitigation will be embedded into the design to ensure impacts do not significantly affect operational activities. Moreover, climate risks to water supply and demand are already being actively managed by others at a regional / water company scale through the Water Resource Management Planning process.	Design	Reduce
Operation	Climate vulnerability	Climate mitigation for drainage infrastructure	The Proposed Development's Flood Risk Assessment will provide a detailed assessment of these potential effects and will include consideration of climate change in determining appropriate mitigation measures.	Design	Reduce
Operation	Climate vulnerability	Climate mitigation for major accidents and disasters	The design includes a range of safety measures. Prior to the storage of hydrogen these include assessments to confirm the stability of the cavern and to demonstrate that the loss of containment of the cavern/well is very low risk.	Design	Reduce
Operation	Greenhouse gases	Carbon reduction and management	The PAS 2080:2023 Carbon reduction hierarchy should be followed to reduced emissions within the operation of the Proposed Development. The hierarchy should be used to identify options for carbon reduction within the operation of plant, machinery, processes and personnel at the Site. These carbon reduction opportunities should be implemented and captured using a carbon management plan and following the processes outlined in the standard PAS 2080:2023.	Management	Reduce
Operation	General	Sympathetic design	Mitigation is largely embedded in the design. Such as avoiding vegetation loss, or heritage assets, siting above ground aspects in balance with the landscape / existing setting and providing suitable new screening vegetation where appropriate. This would include consultation with relevant stakeholders.	Management	Reduce
Operation	Noise and Vibration	Implementation of Best Available Techniques (BAT)	Where possible, mitigation will be incorporated within the design; the selection of low noise equipment will be prioritised, and the layout of noise and vibration generating infrastructure will be optimised to reduce effects at nearby receptors as the design progresses. Where necessary, additional operational mitigation (such as utilisation of acoustic sheds/enclosures to mitigate noise produced by the compressor station and associated plant) will be identified and described within a Noise Management Plan (NMP), to be produced alongside the Environmental Statement (ES).	Management	Reduce
Operation	Human Health	Communication and engagement	Communication and engagement– this should focus on ensuring that people have information that allows them to adapt to the permanent changes associated with the Proposed Development. This should include changes to access routes, WCH networks and bus stops and timetables; as well as information about the activities and employment opportunities generated by the Proposed Development so that there is an understanding of how the facility plays a role in supporting local employment, infrastructure resilience, and energy provision, as well as reassuring the public regarding safety and environmental performance.	Management	Reduce

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
Operation	Human Health	Delivery of PRoW connectivity	The Proposed Development to be designed to deliver effective PRoW connectivity through the operational Site, to support continued access into and through the Site for WCH users.	Design	Remediate
Operation	Human Health	Operation in accordance with appropriate health and safety management systems, audits and checks	Industry will follow appropriate health and safety management systems, audits and checks to avoid any incidents or accidents leading to risk of injury or fatality. Design standards would ensure that the potential for accidents associated with natural hazards / disasters (e.g. geological / geotechnical conditions and resultant seismic activity, landslip etc.) are minimised. The operation of the Proposed Development would be undertaken in accordance with standard good practices and in adherence to environmental and safety legislative requirements (e.g. environmental permitting regulations and the COMAH regulations). In particular it is noted that under the COMAH regulations, an operator must demonstrate that: • All major accident hazards have been adequately identified and assessed • All measures necessary to prevent major accidents and to limit their consequences have been taken • All risks have been reduced to a level which is 'as low as reasonably practicable' (ALARP)	Management	Reduce
Operation	Human Health	Operational Traffic Management Plan	Operator to be responsible for the preparation and implementation of an operational traffic management plan. This should include suitable control measures on heavy duty vehicle movements and deliveries, and the promotion of sustainable travel patterns for the workforce, as well as lower carbon fuel use. Measures to manage modal conflict and protect the safety of all transport users should be included.	Management	Reduce
Operation	Geology and soils	Ground investigation in line with BS10175:2011 +A2:2017	GI in line with BS10175:2011+A2:2017 to target areas of potential contamination, particularly in the landfill areas and historical tanks. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed, any construction detailsand any maintenance measures. This information will inform necessary mitigation measures to limit the impact of contamination on the design, the Site and Site users during operation.	Design	Reduce
Operation	Geology and soils	Well / cavern design	Well/cavern design measures: • Use of barrier management system in operation (barrier envelope to prevent unplanned flow of fluids from well/cavern) • Wellbore design in accordance with the Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 and Borehole Sites and Operations Regulations 2025 including multiple cementing and casing strings (to seal off well) • Verification of wellbore design through equipment integrity testing (pressure testing and inflow testing) and annuli monitoring • Salt is impermeable, preventing fluid loss from the cavern and cavern neck. • Last cemented casing string set and cemented within the salt layer. Pressure tested via mechanical integrity test.	Design	Avoid
Operation	Waste and resources	Adherence to waste hierarchy	During operation phase the Proposed Development will take into account the use of recycled materials to reduce the use of primary materials and will be committed to following the waste hierarchy, proximity principle and implementing Circular Economy principles to both materials and waste. To support the recycling and recovery aspect of the waste hierarchy and ensure waste	Management	Avoid

Mitigation					
Phase	**Topic**	**Name**	**Description**	**Type**	**Hierarchy**
			produced during operation phase is diverted from landfill a robust Operational Waste Management Strategy should be produced and implemented.		
Operation	Water environment	Monitoring and Containment Strategies	Water quality will be regularly checked and sampled. Emergency plans will be in place to ensure any leaks are quickly contained and repaired in as short a time as practicable.	Management	Reduce
Operation	Water environment	Treatment, process and discharge management.	Surface water discharge from the WTP will need to be treated and processed appropriately (further assessment is required as to what is appropriate). Discharge management will also need to be considered depending on the receptor (to be confirmed), to control discharge rates, for example, to avoid hydraulic shock to the receiving watercourse. This may include seasonal discharge restrictions if there are low flows or designated ecological sensitivities.	Management	Reduce
Operation	Water environment	Pollution Prevention and site infrastructure	Pollution prevention through hard engineering (e.g. secondary containment, impermeable surfacing and bunded drainage) and operational controls (e.g. spill response plans, good housekeeping protocols). Water quality monitoring of discharge (e.g. through continuous monitoring or manual sampling programmes). May include auto-shut down systems if effluent quality breaches permit limits.	Design	Avoid
Operation	Water environment	Proposed civil drainage and levels design	Surface water runoff generated by the development will be attenuated and managed through Sustainable Drainage Systems, reducing the risk of surface water flooding.	Design	Reduce
Operation	Water environment	Water Contamination Mitigation	To protect water resources during hydrogen storage, safety steps will be taken to prevent leaks and manage water removal. Corrosion-resistant materials and barriers will help keep hydrogen and contaminated water from reaching nearby water bodies.	Management	Reduce

8. Approach to Scoping

8.1. General Approach

8.1.1. The Design Manual for Roads and Bridges (DMRB) LA 104 standard[41], sets out a general approach for environmental assessments. This approach can be applied not only to road projects but also to other types of development in the absence of specific guidance. This has been applied in the scoping assessment to identify if significant environmental effects are likely to arise for each of the topic areas set out in regulation 14(2) and Schedule 4 of the EIA Regulations. This approach is considered relevant to this Proposed Development due to its general impact assessment method, making it applicable to a wide range of infrastructure projects.

8.1.2. The scoping assessment adopts a similar approach as will be applied in the ES, but where there are currently limitations relating to full understanding of the Site (as further detailed surveys are still to be undertaken) and the details of the Proposed Development (design and technology decisions are still being made) a qualitative approach to the assessment has been adopted.

8.1.3. A conservative approach has been adopted where topics, receptors, and impacts have been scoped in where there is uncertainty and a possibility of a significant effect arising. Each interaction between environmental receptor, impact, and mitigation is either scoped in for more detailed assessment in the ES or scoped out. An explanation justifying why an effect has been scoped in or out is provided for each interaction.

8.1.4. The general approach described in this chapter has been adopted for all topics, except for Major Accidents and Disasters and Cumulative Effects. The typical nature of how these topics are reported doesn't fit with this general approach, as such the approach to scoping these topics differs to the rest of the environmental topic chapters. The approach to scoping these assessments is detailed within their respective chapters (Chapter 21 for Major Accidents and Disasters and Chapter 22 for Cumulative Effects).

8.1.5. This chapter sets out the approach to Scoping the EIA only. The topic specific methodologies for the ES stage are presented in **Appendix C: EIA Methodologies**.

8.2. Receptor Sensitivity

8.2.1. All potentially sensitive receptors that have been identified have been listed in Chapter 5 baseline conditions. Additional receptors may be identified later, once the relevant surveys have been completed e.g. protected species on the Site. Where there is uncertainty, receptors are assumed to be present and have been scoped in for further assessment. Identified receptors have been assigned a sensitivity value as set out by the criteria in **Table 8-1** which has been taken from DMRB LA 104.

Table 8-1 Receptor Sensitivity Criteria

Receptor Sensitivity	Criteria
Very High	Very high importance and rarity, international scale and very limited potential for substitution
High	High importance and rarity, national scale, and limited potential for substitution.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution
Low	Low or medium importance and rarity, local scale
Negligible	Very low importance and rarity, local scale.

8.3. Impact Magnitude

8.3.1. Potential impacts arising from the Proposed Development have been identified and are presented in tables for the construction and operation phases, as set out in **Table 6-1 and Table 6-2.**

8.3.2. These tables describe the impacts in detail so that they can be concisely referenced in the scoping assessment in Chapters 9 to 22 without undue duplication. These impacts identified have been assigned a magnitude rating based on the criteria set out in **Table 8-2** which has been taken from DMRB LA 104. Mitigation which can be readily assumed to be implemented has been taken into account when determining the magnitude of the impact. This includes mitigation measures such as standard best practice construction management which is assumed to be adopted by all reputable contractors. As there is yet to be a preferred option selected, design measures are more difficult to commit to at this stage and have not been included. Where mitigation measures have been assumed to be implemented these are stated. All assumed mitigation measures are detailed in **Table 7-1**.

[41] *Standards For Highways*. (2020.). Www.standardsforhighways.co.uk. https://www.standardsforhighways.co.uk/search/0f6e0b6a-d08e-4673-8691-cab564d4a60a

Table 8-2 Impact Magnitude Criteria

Impact Magnitude		Typical Description
Major	**Adverse**	Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality
Moderate	**Adverse**	Loss of resource but not adversely affecting the integrity; partial loss of / damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality
Minor	**Adverse**	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	**Adverse**	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements
No Change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

8.3.3. The purpose of the scoping stage of EIA is to identify areas where significant environmental effects could arise and will need further analysis. DMRB LA 104 identifies effect significance by combining receptor sensitivity and impact magnitude as set out in **Table 8-3.**

8.3.4. DMRB LA 104 states that effects that have been assessed as moderate, large or very large are material decision making factors, i.e. they are significant, and should therefore be scoped in. Where an effect straddles a category e.g. “slight or moderate”, the higher value will be used to determine if the impact should be scoped in for further assessment unless there is a clear reasoned argument as to why the lower value should be used.

8.3.5. In this scoping assessment, where an effect is deemed to be very large, large, or moderate or large, then the significance has been determined to be ‘Likely to be significant, scoped in’. Where an effect is slight or moderate, the significance has been deemed to be ‘Could be significant, scoped in’. Where an effect is slight or neutral, then it has been deemed to be ‘Unlikely to be significant, scoped out’.

Table 8-3 Scoping Matrix

		Impact Magnitude				
		Major	**Moderate**	**Minor**	**Negligible**	**No Change**
Receptor Sensitivity	**Very High**	Very large	Large or very large	Moderate or large	Slight	Neutral
	High	Large or very large	Moderate or large	Slight or moderate	Slight	Neutral
	Medium	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
	Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral
	Negligible	Slight	Neutral or slight	Neutral or slight	Neutral	Neutral

8.3.6. The following topic chapters (9-22) identify the potential for likely significant effects to arise under each of the topic areas set out in the EIA Regulations. Where the scoping assessment concludes an impact should be scoped into the EIA, the cell is shaded red. Green cells highlight that a significant environmental effect is unlikely to arise and will therefore be scoped out. This means that effects reported as moderate adverse or above at this stage are considered to have the potential to be a likely significant effect. Slight or moderate adverse effects could have a significant effect and are therefore scoped in on a precautionary basis. This approach ensures that an effect which could be significant, or for which there is insufficient information to confidently scope it out at this stage, is scoped into the EIA in line with a precautionary approach.

8.3.7. At the ES stage, when further information is available and mitigation can be relied upon to a greater extent (or additional mitigation applied), then the significance of effects reported is likely to be reduced for several effects.

9. Biodiversity

9.1. Construction

Table 9-1 Potential effects during construction for Biodiversity

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Statutory designated sites for nature conservation	High	• Pollution incidents during construction	Minor	• Embedded pollution control measures	Mersey Estuary Special Area of Protection (SPA) and Mersey Estuary Ramsar site are located down stream and may be hydrologically connected to the Site. Due to the distance from the site (>20 km downstream) any impacts are likely to be minimal. A Habitats Regulation Assessment (HRA) will be undertaken to determine any likely significant effects.	Slight or moderate Adverse	Could be significant, scoped in
Badger	Medium	• Site clearance, excavation, earthworks, and installation of hardstanding areas • Construction noise • Construction vibration • Construction lighting	Major	• Species-specific mitigation plans and method statements. • Obtaining protected species licences where necessary prior to construction • Precautionary Method of Working and pre-works checks where appropriate.	There is potential for badger mortality or injury, as well as disturbance, habitat fragmentation, and loss. Updated badger surveys will be required prior to construction. If active setts are identified within the Site and require closure, a Natural England licence will be obtained, and appropriate mitigation measures implemented before any site clearance begins.	Moderate or large Adverse	Likely to be significant, scoped in
Bats	Medium	• Site clearance, excavation, earthworks, and installation of hardstanding areas • Construction noise • Construction vibration	Major	• Species-specific mitigation plans and method statements. • Obtaining protected species licences where necessary prior to construction. • Precautionary Method of	There is the potential for bat mortality or injury, as well as disturbance, habitat fragmentation, and loss. Surveys are required for bats. If bat roosts or significant assemblages of bats are recorded within the Site, a mitigation plan and a Natural England licence would be required. This will be obtained, with the appropriate mitigation implemented, prior to any site clearance.	Moderate or large Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
		• Construction lighting		Working and pre-works checks where appropriate.			
Otter/ Water vole	Medium	• Site clearance, excavation, earthworks, and installation of hardstanding areas • Pollution incidents during construction • Construction noise • Construction vibration • Construction lighting	Major	• Species-specific mitigation plans and method statements. • Obtaining protected species licences where necessary prior to construction. • Precautionary Method of Working and pre-works checks where appropriate.	Surveys are required for otter and water vole due to the presence of suitable habitat within the Site. If determined to be present, a mitigation plan and a Natural England licence would be required. This will be obtained, with the appropriate mitigation implemented, prior to any site clearance.	Moderate or large Adverse	Likely to be significant, scoped in
Birds (breeding and wintering)	Medium	• Site clearance, excavation, earthworks, and installation of hardstanding areas • Construction noise • Construction vibration • Construction lighting	Major	• Species-specific mitigation plans and method statements. • Precautionary Method of Working and pre-works checks where appropriate.	There is the potential for bird mortality or injury, as well as disturbance, habitat fragmentation, and loss. Surveys are required for breeding and wintering birds due to the presence of suitable habitat within the Site. If impacts are likely, mitigation and method statements will be required.	Moderate or large Adverse	Likely to be significant, scoped in
Reptiles	Medium	• Site clearance, excavation, earthworks, and	Major	• Species-specific mitigation plans and method statements.	There is the potential for reptile mortality or injury, as well as disturbance, habitat fragmentation, and loss. Surveys are required for reptiles due to the presence of suitable habitat within the Site. If impacts are likely, mitigation and method statements will be required.	Moderate or large Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
		installation of hardstanding areas • Construction noise • Construction vibration • Construction lighting		• Precautionary Method of Working and pre-works checks where appropriate.			
Amphibians (including great crested newt)	Medium	• Site clearance, excavation, earthworks, and installation of hardstanding areas • Construction noise • Construction vibration • Construction lighting • Pollution incidents during construction	Major	• Species-specific mitigation plans and method statements. • Obtaining protected species licences where necessary prior to construction. • Precautionary Method of Working and pre-works checks where appropriate.	There is the potential for amphibian mortality or injury, as well as disturbance, habitat fragmentation, and loss. Surveys are required for amphibians due to the presence of suitable habitat within the Site. If impacts are likely, mitigation and method statements will be required.	Moderate or large Adverse	Likely to be significant, scoped in
White clawed crayfish	Medium	• Site clearance, excavation, earthworks, and installation of hardstanding areas • Pollution incidents during construction • Construction noise	Major	• Species-specific mitigation plans and method statements. • Obtaining protected species licences where necessary prior to construction. • Precautionary Method of Working and pre-works	Surveys are required for white clawed crayfish due to the presence of suitable habitat within the Site. If impacts are likely, mitigation and method statements will be required.	Moderate or large Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
		• Construction vibration • Construction lighting		checks where appropriate.			
Aquatic species (such as fish and invertebrates)	Medium	• Site clearance, excavation, earthworks, and installation of hardstanding areas • Pollution incidents during construction • Construction noise • Construction vibration • Construction lighting	Major	• Species-specific mitigation plans and method statements. • Precautionary Method of Working (PMW) and pre-works checks where appropriate.	Surveys are required for aquatic species due to the presence of suitable habitat within the Site. If impacts are likely, mitigation and method statements will be required.	Moderate or large Adverse	Likely to be significant, scoped in
Hedgerows	Medium	Site clearance, excavation, earthworks, and installation of hardstanding areas	Major	• Retention and protection of existing vegetation, where possible • Creation and improvement of habitats (where required)	The Proposed Development may result in the loss, disturbance, and fragmentation of habitats including hedgerows, which could have direct consequences for protected and priority species. To fully understand the extent of these impacts, detailed habitat surveys will be required. Where habitat loss is unavoidable, appropriate replacement or enhancement measures will be implemented to support biodiversity and maintain ecological connectivity.	Moderate or large Adverse	Likely to be significant, scoped in
Priority Habitats (Deciduous Woodland)	Medium	Site clearance, excavation, earthworks, and installation of hardstanding areas	Major	• Retention and protection of existing vegetation, where possible • Creation and improvement of habitats (where required)	The Proposed Development may result in the loss, disturbance, and fragmentation of priority habitats (Deciduous Woodland), which could have direct consequences for protected and priority species. To fully understand the extent of these impacts, detailed habitat surveys will be required. Where habitat loss is unavoidable, appropriate replacement or enhancement measures will be implemented to support biodiversity and maintain ecological connectivity.	Moderate or large Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Priority Habitats (Traditional orchard)	Medium	Site clearance, excavation, earthworks, and installation of hardstanding areas	Major	• Retention and protection of existing vegetation, where possible • Creation and improvement of habitats (where required)	The Proposed Development may result in the loss, disturbance, and fragmentation of priority habitats (Traditional Orchard), which could have direct consequences for protected and priority species. To fully understand the extent of these impacts, detailed habitat surveys will be required. Where habitat loss is unavoidable, appropriate replacement or enhancement measures will be implemented to support biodiversity and maintain ecological connectivity.	Moderate or large Adverse	Likely to be significant, scoped in
Sandbach Flats SSSI	High	Construction Traffic	Minor	• Implementation of a Construction Traffic Management Plan	Construction traffic travelling to and from the Site will increase HGVs and other vehicle flows in the surrounding road network. This will result in temporary increase in traffic emissions. It is not currently known how many daily trips will be generated during construction, the haul routes, or the baseline traffic flows along the affected roads. It is therefore not possible to determine if the increase in traffic flows exceeds the scoping thresholds set out in IAQM guidance. For the purpose of this scoping assessment, it is assumed that construction traffic could exceed these thresholds on roads within 200m of Sandbach Flashes SSSI so this has been scoped into the ES.	Slight or moderate Adverse	Could be significant, scoped in
Sandbach Flashes SSSI	Medium	Construction dust	Negligible	• Implementation of the mitigation measures specified in the IAQM guidance for all construction activities	Ecological sites with national designations are located beyond 50m, the distance over which associated construction dust impacts have the potential to occur as specified in IAQM guidance, therefore, the impact would be negligible at this distance and further assessment of the construction dust impacts on the designated ecological sites has been scoped out for the ES.	Neutral or slight Adverse	Unlikely to be significant, scoped out
Local Wildlife Sites	Medium	Site clearance, excavation, earthworks, and installation of hardstanding areas	Moderate	• Retention and protection of existing vegetation, where possible • Creation and improvement of habitats (where required)	Any losses of Local Wildlife Sites would be mitigated through the inclusion of replacement planting in line with the relevant citation.	Moderate Adverse	Likely to be significant, scoped in

9.2. Operation

Table 9-2 Potential effects during operation for Biodiversity

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Statutory designated sites for nature conservation	High	• Pollution incidents during operation	Minor	• Embedded pollution control measures	Mersey Estuary Special Area of Protection (SPA) and Mersey Estuary Ramsar site are located down stream and may be hydrologically connected to the Site. Due to the distance from the site (>20 km downstream) any impacts are likely to be minimal. A Habitats Regulation Assessment (HRA) will be undertaken to determine any likely significant effects.	Slight or moderate Adverse	Could be significant, scoped in
Bats (roosting, foraging, and commuting)	Medium	• Operational lighting • Change in land use during operation • Operational noise	Major	• Sensitive lighting strategy • Creation and improvement of habitats (where required)	The Proposed Development could result in disturbance to populations through increased levels of lighting and noise during operation. Bats are sensitive to light pollution and therefore, any increase in lighting will need to be sensitively designed to avoid suitable habitats. There is the potential for the killing/injury of protected and priority species, and potential disturbance, fragmentation, and loss of habitats.	Moderate or large Adverse	Likely to be significant, scoped in
Otters/Water voles	Medium	• Operational lighting • Change in land use during operation • Operational noise • Pollution incidents during operation	Major	• Sensitive lighting strategy • Adherence to pollution prevention guidance (Guidance for Pollution Prevention, and CIRIA) • Creation and improvement of habitats (where required)	The Proposed Development could result in disturbance to populations through increased levels of lighting and noise during operation. These species may be sensitive to light pollution and therefore, any increase in lighting will need to be sensitively designed to avoid suitable habitats. There is the potential for the killing/injury of protected and priority species, and potential disturbance, fragmentation, and loss of habitats. These species are sensitive to water pollution and therefore, measures are required to protect the watercourses within and adjacent to the Site and mitigate any impacts from pollution incidents.	Moderate or large Adverse	Likely to be significant, scoped in
White clawed crayfish	Medium	• Operational lighting • Change in land use during operation • Operational noise	Major	• Sensitive lighting strategy • Adherence to pollution prevention guidance (Guidance	The Proposed Development could result in disturbance to populations through increased levels of lighting and noise during operation. These species may be sensitive to light pollution and therefore, any increase in lighting will need to be sensitively designed to avoid suitable habitats. There is the potential for the killing/injury of protected and priority species, and potential disturbance, fragmentation, and loss of habitats.	Moderate or large Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
		• Pollution incidents during operation		for Pollution Prevention, and CIRIA)	These species are sensitive to water pollution and therefore, measures are required to protect the watercourses within and adjacent to the Site and mitigate any impacts from pollution incidents.		
Birds (breeding and wintering)	Medium	• Operational lighting • Change in land use during operation • Operational noise	Major	• Sensitive lighting strategy • Creation and improvement of habitats (where required)	The Proposed Development could result in disturbance to populations through increased levels of lighting and noise during operation. These species may be sensitive to light pollution and therefore, any increase in lighting will need to be sensitively designed to avoid suitable habitats. There is the potential for the killing/injury of protected and priority species, and potential disturbance, fragmentation, and loss of habitats.	Moderate or large Adverse	Likely to be significant, scoped in
Badgers	Medium	• Operational lighting • Change in land use during operation • Operational noise	Major	• Sensitive lighting strategy • Creation and improvement of habitats (where required)	The Proposed Development could result in disturbance to populations through increased levels of lighting and noise during operation. These species may be sensitive to light pollution and therefore, any increase in lighting will need to be sensitively designed to avoid suitable habitats. There is the potential for the killing/injury of protected and priority species, and potential disturbance, fragmentation, and loss of habitats.	Moderate or large Adverse	Likely to be significant, scoped in
Aquatic species (such as fish and invertebrates)	Medium	• Operational lighting • Change in land use during operation • Operational noise • Pollution incidents during operation	Major	• Sensitive lighting strategy • Adherence to pollution prevention guidance (Guidance for Pollution Prevention, and CIRIA)	The Proposed Development could result in disturbance to populations through increased levels of lighting and noise during operation. These species may be sensitive to light pollution and therefore, any increase in lighting will need to be sensitively designed to avoid suitable habitats. There is the potential for the killing/injury of protected and priority species, and potential disturbance, fragmentation, and loss of habitats. These species are sensitive to water pollution and therefore, measures are required to protect the watercourses within and adjacent to the Site and mitigate any impacts from pollution incidents.	Moderate or large Adverse	Likely to be significant, scoped in
Sandbach Flats SSSI	High	Operational traffic	Negligible	N/A	Exact details of the operational traffic flows are not available at the time of writing; however, additional traffic will be limited to the staff travelling to and from the Proposed Development, which is estimated not to exceed the IAQM traffic screening criteria for further assessment. The assessment of operational road traffic emissions is therefore scoped out from the ES at this stage.	Slight Adverse	Unlikely to be significant, scoped out

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Local Wildlife Sites	Medium	Pollution incidents during operation	Minor	Adherence to pollution prevention guidance (Guidance for Pollution Prevention, and CIRIA)	There is potential for pollution incidents during operation, however the adherence to pollution prevention guidance is a standard working practice which will be adhered to. Therefore, the magnitude of the impact is minor, and can be scoped out for further assessment.	Slight Adverse	Unlikely to be significant scoped out
Priority Habitats (Deciduous Woodland)	Medium	Pollution incidents during operation	Minor	Adherence to pollution prevention guidance (Guidance for Pollution Prevention, and CIRIA)	There is potential for pollution incidents during operation, however the adherence to pollution prevention guidance is a standard working practice which will be adhered to. Therefore, the magnitude of the impact is minor, and can be scoped out for further assessment.	Slight Adverse	Unlikely to be significant scoped out
Priority Habitats (Traditional orchard)	Medium	Pollution incidents during operation	Minor	Adherence to pollution prevention guidance (Guidance for Pollution Prevention, and CIRIA)	There is potential for pollution incidents during operation, however the adherence to pollution prevention guidance is a standard working practice which will be adhered to. Therefore, the magnitude of the impact is minor, and can be scoped out for further assessment.	Slight Adverse	Unlikely to be significant scoped out
Hedgerows	Medium	Pollution incidents during operation	Minor	Adherence to pollution prevention guidance (Guidance for Pollution Prevention, and CIRIA)	There is potential for pollution incidents during operation, however the adherence to pollution prevention guidance is a standard working practice which will be adhered to. Therefore, the magnitude of the impact is minor, and can be scoped out for further assessment.	Slight Adverse	Unlikely to be significant scoped out

10. Landscape and Visual Amenity

10.1. Construction

Table 10-1 Potential effects during construction for Landscape and Visual

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Range of visual receptors	High	Change in land use during construction	Moderate	• Retention and protection of existing vegetation, where possible. • Implementation of the CEMP.	Various residential, public right of way users and employee receptors across the Site. Impacts to amenity/view arising from Site clearance and general construction works (construction of gas processing plant, well pads, drilling rigs, LCHPP etc) and construction traffic. Note that not all will be a significant effect. They will be affected to varying degrees depending mainly on proximity to the Proposed Development and openness of their existing view. Mitigation includes avoiding loss of existing screening vegetation and following standard and site-specific CEMP procedures to limit adverse effects.	Moderate or large Adverse	Likely to be significant, scoped in
National Landscape Character	Medium	Change in land use during construction	Negligible	• Retention and protection of existing vegetation, where possible. • Implementation of the CEMP.	The Site is within Shropshire, Cheshire and Staffordshire Plain NCA and comprises most of the county of Cheshire, the northern half of Shropshire and a large part of northwest Staffordshire. Given the scale of this NCA and the comparatively small extent of this Proposed Development within it, significant effects on the NCA are highly unlikely. Therefore, the NCA is scoped out of the assessment.	Neutral or Slight Adverse	Unlikely to be significant, scoped out
Regional Landscape Character	Medium	Change in land use during construction	Moderate	• Retention and protection of existing vegetation, where possible. • Implementation of the CEMP.	The construction activities and Site clearance works will alter the appearance and character of the landscape with changes to landcover and tranquillity evident. The impact depends upon the extent of Site clearance and intrusive works required.	Moderate Adverse	Likely to be significant, scoped in
Local Landscape Character	Medium	Change in land use during construction	Moderate	• Retention and protection of existing vegetation, where possible. • Implementation of the CEMP.	The construction activities and Site clearance works will alter the appearance and character of the landscape with changes to landcover and tranquillity evident. The impact depends upon the extent of Site clearance and intrusive works required.	Moderate Adverse	Likely to be significant, scoped in

10.2. Operation

Table 10-2 Potential effects during operation for Landscape and Visual

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Range of visual receptors	High	Loss of vegetation and presence of new buildings and infrastructure on the Site	Moderate	• Sympathetic design. • Retention and protection of existing vegetation, where possible.	Various residential, public right of way users and employee receptors across the Site. Impacts to amenity/view include from loss of screening vegetation and introduction of new above ground features, as well as potential lighting effects. Note that not all will be a significant effect. They will be affected to varying degrees depending mainly on proximity to the Proposed Development and openness of their existing view. Mitigation is largely embedded in the design, avoiding vegetation loss, siting above ground aspects in balance with the landscape and providing suitable new screening vegetation where appropriate.	Moderate or large Adverse	Likely to be significant, scoped in
National Landscape Character	Medium	Change in land use during operation	Negligible	• Sympathetic design. • Retention and protection of existing vegetation, where possible.	The Site is within Shropshire, Cheshire and Staffordshire Plain NCA and comprises most of the county of Cheshire, the northern half of Shropshire and a large part of northwest Staffordshire. Given the scale of this NCA and the comparatively small extent of this Proposed Development within it, significant effects on the NCA are highly unlikely. Therefore, the NCA is scoped out of the assessment.	Neutral or Slight Adverse	Unlikely to be significant, scoped out
Regional Landscape Character	Medium	Loss of vegetation and presence of new buildings and infrastructure on the Site Change in land use during operation	Moderate	• Sympathetic design. • Retention and protection of existing vegetation, where possible	The impact depends upon the extent of vegetation clearance required, whether there is likely to be any long term lighting effects and the final design of the above ground features. It is unlikely to be significant but needs to be scoped in to confirm this.	Moderate Adverse	Likely to be significant, scoped in
Local Landscape Character	Medium	Loss of vegetation and presence of new buildings and infrastructure on the Site Change in land use during operation	Moderate	• Sympathetic design. • Retention and protection of existing vegetation, where possible	Local Landscape Character is of medium sensitivity, the potential impact on local landscape character will depend on the extent of vegetation clearance, the introduction of lighting, and the final design of above-ground infrastructure. These factors may alter the visual and perceptual qualities of the area. Although the effect is likely to be minor, uncertainties remain. Given the potential for change in land use and visibility, this topic should be scoped into the EIA to confirm whether significant effects could arise.	Moderate Adverse	Likely to be significant, scoped in

11. Historic Environment and Archaeology

11.1. Construction

Table 11-1 Potential effects during construction for Historic Environment

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Listed buildings	High	Change in land use during construction	Moderate	Adoption of mitigation hierarchy	Construction activity may result in a temporary and reversible impact on the setting of the heritage assets and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Scheduled Monuments	High	Change in land use during construction	Moderate	Adoption of mitigation hierarchy	Construction activity may result in a temporary and reversible impact on the setting of the heritage assets and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Conservation Area	High	Change in land use during construction	Moderate	Adoption of mitigation hierarchy	Warmingham Conservation Area borders the eastern edge of the Site and encompasses the village of Warmingham. Construction activity may result in a temporary and reversible impact on the setting of the Conservation Area and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Historic Landscape	High	Changes to amenity	Moderate	Adoption of mitigation hierarchy	During the construction phase, there is the potential for both direct physical impact and indirect impacts to the setting of the historic landscape and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Non-designated heritage assets / unknown archaeological deposits	High	Change in land use during construction	Moderate	Archaeological mitigation works	There is a total of 28 non-designated heritage assets recorded in the 1 km study area. These assets primarily date to the medieval and post-medieval buildings. Any surviving archaeological remains within the Site may be removed by construction groundworks and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in

11.2. Operation

Table 11-2 Potential effects during operation for Historic Environment

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Listed buildings	High	Change in land use during operation	Moderate	Sympathetic design	There may be an alteration of the setting of listed buildings due to the presence of new built form and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Scheduled Monuments	High	Change in land use during operation	Moderate	Sympathetic design	There may be potential change to the setting of the scheduled monuments. Consultation is to be undertaken with Historic England and the County Archaeologist and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Conservation Area	High	Change in land use during operation	Moderate	Sympathetic design	Warmingham Conservation Area borders the eastern edge of the Site and encompasses the village of Warmingham. There is potential for alteration of the setting of conservation areas due to the presence of new built form and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Historic Landscape	High	Changes to amenity	Moderate	Sympathetic design	There is potential for alteration of the setting of the historic landscape due to the presence of new built form and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
Non-designated heritage assets/ unknown archaeological deposits	High	Change in land use during operation	Moderate	Sympathetic design	There is potential for change to the setting of non-designated heritage assets and is therefore scoped in for further assessment.	Moderate or large Adverse	Likely to be significant, scoped in
	High		No change	N/A	Construction of the Proposed Development may remove buried archaeological remains. As the physical remains are removed during construction excavations, the operation of the Proposed Development is not anticipated to have any additional effect on archaeology, therefore has been scoped out.	Neutral Adverse	Unlikely to be significant scoped out

12. Water Environment and Flood Risk

12.1. Construction

Table 12-1 Potential effects during construction for Water Environment and Flood Risk

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
River Wheelock	High	Fluvial Flood Risk	Minor	Implementation of CEMP	Whilst the construction works may not increase flood risk, the Site is partially located within areas of Flood Zones 2 and 3, indicating that there is a medium to high probability of fluvial flooding. As such, a detailed flood risk assessment is required to determine what mitigation measures would be appropriate. Additionally, construction work may introduce new receptors to an area at a medium to high risk of flooding. This can be managed by locating sensitive aspects of the construction works e.g. site offices, materials and equipment laydown areas etc. outside of the high flood risk areas. The CEMP will identify measures to minimise flood risk on the construction site.	Slight or moderate Adverse	Could be significant scoped in
River Wheelock	High	Water Abstraction for Solution mining	No change	Water Contamination and Dewatering Mitigation	Although solution mining requires water abstraction, the proposed activity would be undertaken within the limits of the existing British Salt licence and associated environmental permits. The volume, rate, and location of abstraction would remain consistent with the established baseline and would not introduce any increase or material change compared with current operations. As no additional abstraction, alteration to abstraction points, or changes to operational controls are proposed, there is no anticipated change to the hydrological regime of the River Wheelock. Existing mitigation and regulatory controls would continue to apply. When considering that construction and operational timescales may overlap, it is considered that water demand for the solution mining activities and operation of the LCHPP could be required at the same time. In this case, there is still enough headroom on the abstraction to not increase demand on the River Wheelock. On this basis, the magnitude has no change and is therefore scoped out.	Neutral Adverse	Unlikely to be significant scoped out
River Wheelock	High	Pollution incidents during construction	Minor	• Implementation of CEMP • Adherence to pollution prevention guidance by CIRIA	There are potential pathways for pollutants to enter the river Wheelock through accidental spillage, run off or should the Site be flooded during construction activities. Impacts can be minimised by the implementation of standard working practices and adherence to pollution prevention guidelines which will be set out in the CEMP. A WFD assessment is to be completed prior to starting works.	Slight or moderate Adverse	Could be significant scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Ordinary watercourses	Medium	Pollution incidents during construction	Minor	• Implementation of CEMP • Adherence to pollution prevention by CIRIA	There are potential pathways for pollutants to enter ordinary watercourses such as the nearby brooks and on-site culvert (location to be confirmed) should there be any spills through run off or should the Site be flooded during construction activities. Impacts can be minimised by the implementation of standard working practices and adherence to pollution prevention guidelines which will be set out in the CEMP. It is anticipated there will be a requirement for a pipeline crossing of Hoggins Brook, although the exact location and the risk of spillages to this watercourse is unknown without further design and assessment, therefore as a precautionary measure it has been scoped in.	Slight Adverse	Could be significant scoped in
Standing water bodies	Low	Pollution incidents during construction	Minor	• Implementation of CEMP • Adherence to pollution prevention guidance by CIRIA	There are potential pathways for pollutants to enter nearby ponds should there be any spills in the vicinity or should the Site be flooded during construction activities. Impacts can be minimised by the implementation of standard working practices and adherence to pollution prevention guidelines which will be set out in the CEMP.	Neutral or slight Adverse	Unlikely to be significant scoped out
Ordinary watercourses	Medium	Drainage outfalls	Moderate	• Implementation of CEMP • Adherence to pollution prevention guidance by CIRIA	Sediment disturbance and construction of outfalls can run off into nearby watercourses and reduce water quality. The percentage risk of spillages through drains is unknown, therefore the magnitude is classed as moderate as a conservative measure.	Moderate Adverse	Likely to be significant scoped in
Ordinary watercourses	Medium	Site clearance, excavation, earthworks, and installation of hardstanding areas	Moderate	Best practice methods to minimise impacts - trenchless techniques	There is a requirement to construct an underground pipeline from the west plot caverns to the east plot gas processing facility that will need to cross Hoggins Brook. Depending on final construction plans, this may impact water flows and water quality through sediment disturbance, and changes in flow conveyance, sedimentation or erosion.	Moderate Adverse	Likely to be significant scoped in
Ordinary watercourses	Medium	Landfill leachate release	Moderate	• Implementation of CEMP • Adherence to pollution prevention guidance by CIRIA	The construction of underground pipelines to Hilltop Farm may pierce any potential lining present within the landfill in the centre and east of the Site, particularly within the cell that has accepted mixed wastes. This is a risk to surrounding ground, groundwater and migration to surface water. Impacts can be minimised by the implementation of standard working practices and adherence to pollution prevention guidelines which will be set out in the CEMP. Water quality will be regularly checked and sampled. Emergency plans will be in place to	Moderate Adverse	Likely to be significant scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
					ensure any leaks are quickly contained and repaired in as short a time as practicable.		
River Wheelock	High	Landfill leachate release	Moderate	• Implementation of CEMP • Adherence to pollution prevention guidance by CIRIA	The construction of underground pipelines to Hilltop Farm may pierce any potential lining present within the landfill in the centre and east of the Site, particularly within the cell that has accepted mixed wastes. This is a risk to surrounding ground, groundwater and migration to surface water. Impacts can be minimised by the implementation of standard working practices and adherence to pollution prevention guidelines which will be set out in the CEMP. Water quality will be regularly checked and sampled. Emergency plans will be in place to ensure any leaks are quickly contained and repaired in as short a time as practicable.	Moderate or large Adverse	Likely to be significant scoped in
Surface water flood risk	High	Change in land use during construction	Minor	Proposed civil drainage and levels design	The removal of vegetation and agricultural land from the Site could increase surface water flows and therefore increase flood risk. It is anticipated that surface water runoff generated by the development will be attenuated and managed through of Sustainable Drainage Systems to reduce this risk. A detailed flood risk assessment would be required to confirm this. The magnitude of impact is determined by increases in flood levels, as it is currently unknown to what extent the removal of vegetation will impact this, a conservative approach has been utilised.	Slight or moderate Adverse	Could be significant scoped in
Surface water flood risk	High	Permanent land take during construction	Minor	Proposed civil drainage and levels design	The removal of vegetation and agricultural land from the Site could increase surface water flows and therefore increase flood risk. The proposed drainage design includes surface water drainage systems feeding into attenuation basins to reduce this risk. A detailed flood risk assessment will be required to confirm this. The magnitude of impact is determined by increases in flood levels, as it is currently unknown to what extent the removal of vegetation will impact this, a conservative approach has been utilised	Slight or moderate Adverse	Could be significant, scoped in
Sandbach Flashes SSSI	High	Pollution incidents during construction	Minor	• Implementation of CEMP • Adherence to pollution prevention guidance by CIRIA	There are potential pathways for pollutants to enter Sandbach flashes water bodies in the low likelihood the Site should be flooded during construction activities. Impacts can be minimised by the implementation of standard working practices and adherence to pollution prevention guidelines which will be set out in the CEMP. A WFD assessment is to be completed prior to starting works.	Slight or moderate Adverse	Could be significant, scoped in

12.2.

12.3. Operation

Table 12-2 Potential effects during operation for Water Environment and Flood Risk

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
River Wheelock	High	Pollution incidents during operation	Minor	• Water contamination mitigation • Monitoring and containment strategies	To protect water resources during hydrogen storage, safety steps will be taken to prevent leaks and manage water removal. Corrosion-resistant materials and barriers will help keep hydrogen from reaching nearby water bodies. Pollution events may reduce water quality e.g. pollutant contaminants in water, reduced water clarity, or changes in water chemistry. Water quality will be regularly checked and sampled. Emergency plans will be in place to ensure any leaks are quickly contained and repaired in as short a time as practicable. A WFD assessment is to be completed prior to starting construction works and will include operational impacts within the same assessment.	Moderate or large Adverse	Could be significant, scoped in
Ordinary watercourses	Medium	Pollution incidents during operation	Moderate	Monitoring and containment strategies	Pollution events may reduce water quality e.g. pollutant contaminants in water, reduced water clarity, or changes in water chemistry Water quality will be regularly checked and sampled. Emergency plans will be in place to ensure any leaks are quickly contained and repaired in as short a time as practicable. It is anticipated there will be a requirement for a pipeline crossing of Hoggins Brook, although the exact location and risk of spillages to this watercourse is unknown without further design and assessment, therefore the magnitude is classed as moderate as a conservative measure.	Moderate Adverse	Likely to be significant, scoped in
Ordinary watercourses	Medium	Waste water discharge for the LCHPP	Moderate	Monitoring and containment strategies	Processed water is planned to be treated and discharged to a suitable receptor. Discharge location is to be confirmed i.e. whether this is to a surface water course, via a new or existing outfall, or sewer. If discharged to surface water, via a new or existing outfall, this could lead to a reduction in water quality depending on process and quantity (currently unknown). Potential solid contamination from: spent filtration media, polishing resins and waste oils. If discharged into surface water receptor, water treatment will be needed prior to discharge. If discharged into sewer a trade effluent permit will be required which will contain stipulations regarding discharge.	Moderate adverse	Likely to be significant, scoped in
Standing water bodies	Low	Pollution incidents during operation	Minor	Monitoring and containment strategies	Pollution events may reduce water quality e.g. pollutant contaminants in water, reduced water clarity, or changes in water chemistry Water quality will be regularly checked and sampled. Emergency plans will be in place to ensure any leaks are quickly contained and repaired in as short a time as practicable.	Slight Adverse	Unlikely to be significant, scoped out
River Wheelock	High	Fluvial Flood Risk	Minor	N/A	The Site is located within Flood Zones 2 and 3, indicating that there is a medium to high probability of fluvial flooding. As such, a detailed	Slight or moderate Adverse	Could be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
					flood risk assessment is required to determine what mitigation measures would be appropriate.		
Ordinary watercourses	Medium	Drainage outfalls	Moderate	Monitoring and containment strategies	Operational activity and run off through the outfall lead directly near nearby watercourses. This can lead to reduction in water quality. The percentage risk of spillages through drains is unknown without further assessment, therefore the magnitude is classed as moderate as a conservative measure.	Moderate Adverse	Likely to be significant, scoped in
Sandbach Flashes SSSI	High	Pollution incidents during operation	Minor	Monitoring and containment strategies	Pollution events may reduce water quality e.g. pollutant contaminants in water, reduced water clarity, or changes in water chemistry Water quality will be regularly checked and sampled. Emergency plans will be in place to ensure any leaks are quickly contained and repaired in as short a time as practicable. A WFD assessment is to be completed prior to starting construction works and will include operational impacts within the same assessment.	Moderate or large Adverse	Could be significant, scoped in
Surface water flood risk	High	Change in land use during operation	Minor	Proposed civil drainage and levels design	The operational phase of the Proposed Development will result in a change in land use from agricultural or undeveloped land to industrial energy infrastructure, impacting the landscape through permanent installation of wellpads, gas processing facilities, LCHPP and associated utilities. The changed land use during operation could increase surface water flows, and therefore increase flood risk during operation. It is anticipated that surface water runoff generated by the development will be attenuated and managed through of Sustainable Drainage Systems to reduce this risk. A detailed flood risk assessment will be required to confirm this. The magnitude of impact is determined by increases in flood levels, as it is currently unknown to what extent the removal of vegetation will impact this, a conservative approach has been utilised.	Slight or moderate Adverse	Could be significant, scoped in
River Wheelock	High	Water abstraction related to LCHPP	No change	Water Contamination Mitigation	Primary source of water abstraction for the LCHPP operation is planned to fall within existing British Salt permit, and therefore no increase in resource requirement. As no additional abstraction, alteration to abstraction points, or changes to operational controls are proposed, there is no anticipated change to the hydrological regime of the River Wheelock. Existing mitigation and regulatory controls would continue to apply. When considering that construction and operational timescales may overlap, it is considered that water demand for the solution mining activities and operation of the LCHPP could be required at the same time. In this case, there is still enough headroom on the abstraction to not increase demand on the River Wheelock	Neutral adverse	Unlikely to be significant scoped out

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
					On this basis, the magnitude has no change and is therefore scoped out		

13. Geology and Soils

13.1. Construction

Table 13-1 Potential effects during construction for Geology and Soils

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Agricultural and potential BMV land	Medium	Change in land use during construction	Minor	Construction practices in accordance with Soil Management Plan	Temporary land take will be required to accommodate construction work areas such as haul routes, laydown areas, and Site compounds. This may result in temporary loss of agricultural productivity and access. The main construction activities will be undertaken in phase one of the gas processing plant and overlapping construction of the LCHPP. There will be subsequent phases of construction during phases two and three. However, construction activities will be managed in accordance with a Soil Management Plan to minimise soil degradation and support restoration. Importantly, the land will be returned to agricultural use following construction, and no permanent change in land use is anticipated. Given the temporary nature of the impact and the commitment to land reinstatement, the magnitude of the effect is considered minor.	Slight Adverse	Unlikely to be significant, scoped out
Agricultural and potential BMV land	Medium	Permanent land take during construction	Major	N/A	Permanent land take for the construction of new buildings, structures, and associated hardstanding infrastructure will result in the irreversible loss of agricultural land, including areas potentially classified as BMV. This change will remove the land from productive agricultural use, with no opportunity for reinstatement post-construction. The effect is considered major due to its permanence and the potential sensitivity of the receptor. Further assessment is required to confirm the ALC of Grade 3 land and determine the extent of BMV land affected.	Moderate or large Adverse	Likely to be significant, scoped in
Soil resources / soil function	Medium	Site clearance, excavation, earthworks, and installation of hardstanding areas	Minor	Construction practices in accordance with Soil Management Plan	Construction activities such as Site clearance, excavation, and installation of hardstanding areas and pipelines have the potential to disturb or degrade soil resources through removal, compaction, or sealing. However, with the implementation of a robust Soil Management Plan, these effects are expected to be minimised through careful handling, storage, and reuse of site-won soils. The Soil Management Plan would be prepared in accordance with the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites and the Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings. It would set out guidance on soil handling, storage and reuse procedures in accordance with good practice requirements, to support the protection and conservation of the site soil resources for reuse. As a result, the magnitude of the effect is considered minor, and the impact on soil function is unlikely to be significant.	Slight Adverse	Unlikely to be significant, scoped out

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Existing Site users / Construction workers	High	Construction of underground pipework	Major	Ground investigation in line with BS10175:2011+A2:2017	The construction of underground pipelines to Hilltop Farm may form a preferential pathway through the landfill in the centre and east of the Site, potentially allowing gas migration to the surface. The effect is considered large due to the risk of human health receptors working in buildings at the Site. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed, any construction details and any maintenance measures. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. Upon receipt of these records, the risk may be able to be downgraded.	Large or very large Adverse	Likely to be significant, scoped in
Residents of properties in close proximity to the Site	High	Construction of underground pipework	Moderate	Ground investigation in line with BS10175:2011+A2:2017	The construction of underground pipelines to Hilltop Farm may form a preferential pathway through the landfill in the centre and east of the Site, potentially allowing gas migration to off-site residential properties. The effect is considered moderate due to the risk to human health receptors of those residing in neighbouring properties. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed, any construction details and any maintenance measures. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. In absence of these records, ground investigation is likely to be required. However, upon receipt of these records, the risk may be able to be downgraded.	Moderate or large Adverse	Likely to be significant, scoped in
Existing buildings and enclosed spaces	High	Construction of underground pipework	Major	Ground investigation in line with BS10175:2011+A2:2017	The construction of underground pipelines to Hilltop Farm may form a preferential pathway through the landfill in the centre and east of the Site, potentially allowing gas migration to the surface. This may cause gas to accumulate in buildings that can cause explosion. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed, any construction details and any maintenance measures. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. In absence of these records, ground investigation is likely to be required. In absence of these records, ground investigation and ground gas monitoring is likely to be	Large or very large Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
					required. However, upon receipt of these records, the risk may be able to be downgraded.		
Groundwater Bodies	Medium	Construction of underground pipework	Moderate	Ground investigation in line with BS10175:2011+A2:2017	Polluted surface water runoff and direct migration of mobile pollutants to groundwater from construction vehicles, plant and high-risk activities that may contaminate groundwater. The construction of underground pipelines to Hilltop Farm may pierce any potential lining present within the landfill in the centre and east of the Site, particularly if it is confirmed there is a cell that has accepted mixed wastes. This is a risk to surrounding ground, groundwater and migration to surface water. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed, any construction details and any maintenance measures. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. In absence of these records, ground investigation is likely to be required. However, upon receipt of these records, the risk may be able to be downgraded.	Moderate Adverse	Likely to be significant, scoped in
Watercourses	Medium	Construction of underground pipework	Moderate	Ground investigation in line with BS10175:2011+A2:2017	The construction of underground pipelines to Hilltop Farm may pierce any potential lining present within the landfill in the centre and east of the Site, particularly if it is confirmed there is a cell that has accepted mixed wastes. This is a risk to surrounding ground, groundwater and migration to surface water. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed, any construction details and any maintenance measures. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. In absence of these records, ground investigation is likely to be required. However, upon receipt of these records, the risk may be able to be downgraded.	Moderate Adverse	Likely to be significant, scoped in
Existing Site users / Construction workers	High	Drilling within deep geology	Major	• Ground investigation in line with BS10175:2011+A2:2017	There is a risk of gas release from deep geological strata that is drilled through as part of the development and formation of preferential pathways to the surface via the construction of underground pipework. Trapped gas can be found in pockets within deep geology and drilling through such deposits can result in gas at surface. However, ground investigation, further geological assessments and well / cavern design will determine appropriate mitigation to manage	Large or very large Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
				• Well / cavern design	this risk to a suitable level, which will be taken into consideration at the ES stage.		
Residents of properties in close proximity to the Site	High	Drilling within deep geology	Moderate	• Ground investigation in line with BS10175:2011+A2:2017 • Well / cavern design	There is a risk of gas release from deep geological strata that is drilled through as part of the development and formation of preferential pathways to the surface via the construction of underground pipework. Trapped gas can be found in pockets within deep geology and drilling through such deposits can result in gas at surface. However, ground investigation, further geological assessments and well / cavern design will determine appropriate mitigation to manage this risk to a suitable level, which will be taken into consideration at the ES stage.	Large or very large Adverse	Likely to be significant, scoped in
Existing buildings and enclosed spaces	High	Drilling within deep geology	Major	• Ground investigation in line with BS10175:2011+A2:2017 • Well / cavern design	There is a risk of gas release from deep geological strata that is drilled through as part of the development and formation of preferential pathways to the surface via the construction of underground pipework. Trapped gas can be found in pockets within deep geology and drilling through such deposits can result in gas at surface. However, ground investigation, further geological assessments and well / cavern design will determine appropriate mitigation to manage this risk to a suitable level, which will be taken into consideration at the ES stage.	Large or very large Adverse	Likely to be significant, scoped in
Groundwater Bodies	Medium	Drilling of the subsurface	Moderate	• Ground investigation in line with BS10175:2011+A2:2017 • Well / cavern design • Hydro-geological Impact Assessment (HIA)	Drilling may form vertical flow pathways for pollution into the groundwater body and may form a barrier to groundwater flow, reducing flow to groundwater dependent surface water bodies. Activities associated with drilling may cause losses of drilling fluids and formation waters in the borehole and cavern construction to surface or groundwater bodies. However, good well / cavern design should mitigate this risk. The Environment Agency has requested that a hydrogeological impact assessment (HIA) is carried out.	Moderate Adverse	Likely to be significant, scoped in
Groundwater Terrestrial Ecosystems	Medium	Drilling of the subsurface	Moderate	• Ground investigation in line with BS10175:2011+A2:2017 • Well / cavern design	Drilling may form vertical flow pathways for pollution into the groundwater body and may form a barrier to groundwater flow, reducing flow to groundwater dependent surface water bodies. Activities associated with drilling may cause losses of drilling fluids and formation waters in the borehole and cavern construction to Groundwater Terrestrial Ecosystems. However, good well / cavern design should mitigate this risk. The Environment Agency has	Moderate Adverse	Likely to be significant, scoped in

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
				• Hydro-geological Impact Assessment (HIA)	requested that a hydrogeological impact assessment (HIA) is carried out.		
Watercourses	Medium	Mobilisation of contaminants	Moderate	Ground investigation in line with BS10175:2011+A2:2017	Potential contamination of soils and watercourses in the vicinity of the historical tanks on Site, this will need to be looked at in more detail and is therefore scoped in.	Moderate Adverse	Likely to be significant, scoped in
Existing Site users	Medium	Mobilisation of contaminants	Moderate	Ground investigation in line with BS10175:2011+A2:2017	Potential contamination of soils and groundwater in the vicinity of the historical tanks on Site, that may cause vapour intrusion and build up in enclosed spaces. There is also a potential for dermal contact and inhalation from contaminated soils. This will need to be looked at in more detail and therefore scoped in.	Moderate Adverse	Likely to be significant, scoped in
Groundwater Bodies	Medium	Mobilisation of contaminants	Moderate	Ground investigation in line with BS10175:2011+A2:2017	Potential contamination of soils and groundwater in the vicinity of the historical tanks on Site; this will need to be looked at in more detail and therefore scoped in.	Moderate Adverse	Likely to be significant, scoped in

13.2. Operation

Table 13-2 Potential effects during operation for Geology and Soils

Baseline		Scoping assessment					
Receptor		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Soil resources / soil function	Medium	Change in land use during operation	Major	N/A	The presence of new buildings, structures, and associated hardstanding infrastructure will result in the permanent sealing of soil resources, leading to the irreversible loss of soil function. As the land will no longer be available for restoration or reuse, the effect is considered major and long-term, with likely significant implications for soil sustainability.	Moderate or large Adverse	Likely to be significant, scoped in
Existing Site users	High	Landfill gas release	Major	Ground investigation in line with BS10175:2011+ A2:2017	During the operational phase, existing Site users are considered a highly sensitive receptor as they spend significant time indoors, in buildings within the Order Limits. The primary impact is the potential release of landfill gases that may build up in enclosed spaces. This is a risk to human health of those working in enclosed buildings at the Site and is therefore scoped in for further assessment. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed and any construction details. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. In absence of these records, ground investigation and ground gas monitoring is likely to be required. Upon receipt of these records, the risk may be able to be downgraded.	Large or very large Adverse	Likely to be significant, scoped in
Residents of properties in close proximity to the Site	High	Landfill gas release	Moderate	Ground investigation in line with BS10175:2011+ A2:2017	There is a potential that landfill gas can migrate off-site through soil or preferential pathways such as service ducts and build up in enclosed spaces within residential properties, particularly where groundwater level changes or due to meteorological changes (such as atmospheric pressure) over time. The impact during operation is the release and movement of these gases beyond the Order Limits. This is a risk to human health of those residing in neighbouring properties and therefore scoped in for further assessment. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed and any construction details. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. In absence of these records, ground investigation and ground gas monitoring is likely to be required. Upon receipt of these records, the risk may be able to be downgraded.	Moderate or large Adverse	Likely to be significant, scoped in

Baseline		Scoping assessment					
Receptor		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Existing buildings and enclosed spaces	High	Landfill gas release	Major	Ground investigation in line with BS10175:2011+ A2:2017	Buildings and enclosed spaces within the Site are highly sensitive receptors as landfill gases can build up enclosed spaces and buildings. The potential impact during operation is the accumulation of hazardous gases, which can reach explosive concentrations. This presents a severe safety risk to both property and life, as explosions could cause structural damage and operational disruption. This is therefore scoped in for further assessment. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed and any construction details. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. In absence of these records, ground investigation and ground gas monitoring is likely to be required. Upon receipt of these records, the risk may be able to be downgraded.	Large or very large Adverse	Likely to be significant, scoped in
Groundwater Bodies	Medium	Flow pathways	Moderate	• Ground investigation in line with BS10175:2011 + A2:2017 • Well / cavern design	Below ground structures have the potential to cause a vertical flow pathway for pollutants during operation. There is also potential that any below ground structures could cause a barrier to groundwater flow potentially impacting groundwater receptors and hydrologically connected surface water features and water resources.	Moderate Adverse	Likely to be significant, scoped in
Watercourses	Medium	Landfill leachate release	Moderate	Ground investigation in line with BS10175:2011+ A2:2017	During the operational phase, the primary impact is the release of landfill leachate from contaminated land. This leachate can migrate through soil and enter watercourses. There is a risk to surrounding watercourses and therefore scoped in for further assessment. Records have been requested from the Environment Agency to indicate the landfill boundaries, details on waste disposed and any construction details. Engagement is ongoing with the Environment Agency to confirm this landfill corresponds with permit reference EPR/GP3334XL, has not accepted any mixed waste and relates to the brinefield only. This information will inform necessary mitigation measures (if required) to limit the impact of contamination on the design, the Site and Site users. Upon receipt of these records, the risk may be able to be downgraded.	Moderate Adverse	Likely to be significant, scoped in
Groundwater Bodies	Medium	Mobilisation of contaminants	Minor	N/A	Any residual contamination risk from historical tanks on Site and risks from potential leaks and spills is expected to be fully addressed through pre-construction ground investigations and remediation measures. These actions will ensure that groundwater quality is protected during operation.	Moderate Adverse	Unlikely to be significant, scoped out

Baseline		Scoping assessment					
Receptor		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Watercourses	Medium	Mobilisation of contaminants	Minor	N/A	Any residual contamination risk from historical tanks on Site and risks from potential leaks and spills is expected to be fully addressed through pre-construction ground investigations and remediation measures. These actions will ensure that watercourses are protected during operation.	Moderate Adverse	Unlikely to be significant, scoped out
Existing Site users	Medium	Mobilisation of contaminants	Minor	N/A	Any residual contamination risk from historical tanks on Site and risks from potential leaks and spills is expected to be fully addressed through pre-construction ground investigations and remediation measures. These actions will ensure that existing Site users are protected during operation.	Moderate Adverse	Unlikely to be significant, scoped out
Future Site users	Medium	Mobilisation of contaminants	Minor	N/A	Any residual contamination risk from historical tanks on Site and risks from potential leaks and spills is expected to be fully addressed through pre-construction ground investigations and remediation measures. These actions will ensure that future Site users are protected during operation.	Moderate Adverse	Unlikely to be significant, scoped out

14. Noise and Vibration

14.1. Construction

Table 14-1 Potential effects during construction for Noise and Vibration

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Residents of properties in close proximity to the Site	High	Construction noise	Moderate	Implementation of BPM as set out in BS 5228:2009+A1: 2014 Part 1	Construction activities have the potential to temporarily impact upon the amenity of nearby receptors. At this stage of the Proposed Development, detailed information on construction program and methodologies are not known, however impacts arising from construction activities are predicted to be long-term due to the duration of the leaching process, therefore measures to minimise potential for adverse impact should be taken. Cumulative effects from construction noise from other committed and planned developments within the local area have the potential to adversely impact nearby receptors. Significant effects are expected to be avoided through implementation of Best Practicable Means.	Moderate or large Adverse	Likely to be significant, scoped in
Residents of properties in close proximity to the Site	High	Construction vibration	Moderate	Implementation of BPM as set out in BS 5228:2009+A1: 2014 Part 2	Construction activities have the potential to temporarily impact upon the amenity of nearby receptors. Impacts arising from vibration generating construction activities such as drilling activities is expected to occur for a few months per cavern, therefore measures to minimise potential for adverse impact should be taken. Significant effects are expected to be avoided through implementation of Best Practicable Means.	Moderate or large Adverse	Likely to be significant, scoped in
Residents of properties in close proximity to the Site	High	Construction Traffic	Minor	Implementation of Construction Traffic Management Plan	Receptors have the potential to be adversely impacted by increased road traffic noise associated with the construction phase of the Proposed Development. Cumulative effects from increased road traffic noise due to all committed and planned developments in the local area have the potential to adversely impact receptors in proximity to the Proposed Development. There might be the possibility that construction traffic overlaps with operational as the prolonged construction phase associated with ongoing cavern development, successive infrastructure packages, and staged commissioning across the Site is likely to extend beyond the first operational year of the Proposed Development. However, due to the limited operational trips, this additional traffic is deemed to have negligible impact on top of construction traffic. Significant impacts are predicted to be avoided through the implementation of a Construction Traffic Management Plan.	Slight or moderate Adverse	Could be significant, scoped in

14.2. Operation

Table 14-2 Potential effects during operation for Noise and Vibration

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Residents of properties in close proximity to the Site	High	Operational noise	Moderate	Implementation of Best Available Techniques (BAT) Implementation of a Noise Management Plan	Operational activities, including operation of compressor stations, electrolysers, electrolyser cooling systems and hydrogen and oxygen vents associated with the Hydrogen Storage Facility and LCHPP, pose the potential to impact nearby residential receptors. Mitigation may include use of acoustic sheds/enclosures and/or noise barriers for the noise generating plant associated with the compressor station and the LCHPP. Significant effects are expected to be avoided through development of a Noise Management Plan and implementation of Best Available Techniques.	Moderate or large Adverse	Likely to be significant, scoped in
Residents of properties in close proximity to the Site	High	Operational vibration	Negligible	Implementation of Best Available Techniques (BAT)	Operational activities are not anticipated to give rise to vibration effects as compressor stations and the LCHPP are understood to produce minimal levels of vibration. No mitigation is required as no significant impacts are predicted due to operational vibration.	Slight Adverse	Unlikely to be significant, scoped out
Residents of properties in close proximity to the Site	High	Operational Traffic	Minor	N/A	Receptors have the potential to be adversely impacted by increased road traffic noise associated with the operation of the Proposed Development. Vehicle movements are however predicted to be limited to the number of staff on Site, approximately 15 persons per day, meaning vehicle movements on the local road network are highly unlikely to reach the thresholds for an increase in road traffic noise during the operational phase of the Proposed Development. No mitigation is required as no significant impacts are predicted due to operational traffic.	Slight Adverse	Unlikely to be significant, scoped out
Residents of properties in close proximity to the Site	High	Operational maintenance noise	Minor	N/A	Given the implementation of routine scheduling, to avoid maintenance flaring during sensitive periods such as nights, evenings and weekends, no significant effects are predicted from this process. Operational flaring maintenance is not classed as typical operation of the Proposed Development, and therefore is not predicted to meet temporal threshold for significant impacts (of 10 days or more in 15 consecutive days, or a total number of days exceeding 40 in any 6 consecutive months).	Slight Adverse	Unlikely to be significant, scoped out

15. Air Quality

15.1. Construction

Table 15-1 Potential effects during construction for Air Quality

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Sandbach Flashes SSSI	Medium	Construction dust	Negligible	Implementation of the mitigation measures specified in the IAQM guidance for all construction activities	Ecological sites with national designations are located beyond 50m, the distance over which associated construction dust impacts have the potential to occur as specified in IAQM guidance, therefore, the impact would be negligible at this distance and further assessment of the construction dust impacts on the designated ecological sites has been scoped out for the ES.	Neutral or slight Adverse	Unlikely to be significant, scoped out
Sandbach Flashes SSSI	High	Construction traffic	Minor	Implementation of a Construction Traffic Management Plan	Construction traffic travelling to and from the Site will increase HGVs and other vehicle flows in the surrounding road network. This will result in temporary increase in traffic emissions. It is not currently known how many daily trips will be generated during construction, the haul routes, or the baseline traffic flows along the affected roads. It is therefore not possible to determine if the increase in traffic flows exceeds the scoping thresholds set out in IAQM guidance. Furthermore, there might be the possibility that construction traffic overlaps with operational traffic as the prolonged construction phase associated with ongoing cavern development, successive infrastructure packages, and staged commissioning across the Site is likely to extend beyond the first operational year of the Proposed Development For the purpose of this scoping assessment, it is assumed that construction traffic could exceed these thresholds on roads within 200m of Sandbach Flashes SSSI so this has been scoped into the ES.	Slight or moderate Adverse	Could be significant, scoped in
Sandbach Flashes SSSI	High	Construction plant emissions	Negligible	Implementation of the CEMP	Exact details of the numbers and type of plant are not available at the time of writing, however limits on Non-Road Mobile Machinery (NRMM) emissions are set in regulations, which contractors would be required to meet. Appropriate mitigation measures will be in place to minimise the emissions from the debrining centrifugal pump and drilling rigs as detailed in the CEMP. Due to the relatively small size of the drilling equipment, short-term nature of activities (~3 months drilling per cavern), distance from the caverns to nearest sensitive receptors and prolonged construction period (9 caverns over 35 years), it is unlikely that there would be a material effect on local air quality. The impact of temporary construction plant emissions has therefore been scoped out and no further assessment is proposed in the ES.	Slight Adverse	Unlikely to be significant, scoped out

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
High sensitivity human health receptors including residential properties, educational and medical facilities in close proximity of the Site (within 250 m)	High	Construction dust	Minor	Implementation of the mitigation measures specified in the IAQM guidance for all construction activities	Construction dust can be generated by a range of construction activities and can be exacerbated by weather conditions, particularly dry and windy periods. The risk of significant effects from dust during the construction phase and recommendations for mitigation will be considered fully in the EIA, in accordance with the methodology provided in the IAQM guidance, as there are residential properties within the distance where dust may be deposited. The IAQM guidance sets out the recommended mitigation measures according to the level of dust risk expected. With the application of appropriate mitigation measures, significant adverse effects should not arise. A dust assessment in accordance with the IAQM methodology will be undertaken and included the ES. Appropriate mitigation measures will be in place to minimise the dust emissions from construction activities as detailed in the CEMP.	Slight or moderate Adverse	Could be significant, scoped in
High sensitivity human health receptors including residential properties, educational and medical facilities in proximity of the construction traffic routes (within 200 m)	High	Construction Traffic	Minor	Implementation of a Construction Traffic Management Plan	Construction traffic travelling to and from the Site will increase HGV and other vehicle flows in the surrounding road network. This will result in an increase in traffic emissions. It is not currently known how many daily trips will be generated during construction, the haul routes, or the baseline traffic flows along the affected roads. It is therefore not possible to determine if the increase in traffic flows exceeds the scoping thresholds set out in the IAQM guidance. Furthermore, there might be the possibility that construction traffic overlaps with operational as the prolonged construction phase associated with ongoing cavern development, successive infrastructure packages, and staged commissioning across the Site is likely to extend beyond the first operational year of the Proposed Development. For the purpose of this scoping assessment, it is assumed that construction traffic could exceed these thresholds and this has been scoped into the EIA on a precautionary basis.	Slight or moderate Adverse	Could be significant, scoped in
High sensitivity human health receptors including residential properties, educational and medical facilities in proximity of the site (within 1 km)	High	Construction plant emissions	Negligible	Implementation of CEMP	IAQM guidance states that experience of assessing the exhaust emissions from on-site plant (NRMM) are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. Exact details of the numbers and type of plant are not available at the time of writing, however limits on NRMM emissions are set in regulations, which contractors would be required to meet. Appropriate mitigation measures will also be in place to minimise the emissions from the debrining centrifugal pump and drilling rigs as detailed in the CEMP. Due to the relatively small size of the drilling equipment, short-term nature of activities (~3 months per cavern), distance from the caverns to nearest sensitive receptors and prolonged construction period (9 caverns over 35 years), it is unlikely that there would be a material effect on local air quality. The impact of temporary construction plant emissions has therefore been scoped out and no further assessment is proposed in the ES.	Slight Adverse	Unlikely to be significant, scoped out

15.2. Operation

Table 15-2 Potential effects during operation for Air Quality

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Sandbach Flashes SSSI	High	Operational traffic	Negligible	N/A	Exact details of the operational traffic flows are not available at the time of writing. However, additional daily traffic is likely to be limited to a maximum of 3 heavy duty vehicles (HDV) movements and 15 car movements associated with staff travelling to and from the Proposed Development, which does not exceed the IAQM traffic screening criteria for further assessment which requires a change in vehicle flows of 500 or 100 annual average daily traffic (AADT) for light duty vehicles (LDV) and HDV respectively). The assessment of operational road traffic emissions is therefore scoped out from the ES at this stage.	Slight Adverse	Unlikely to be significant, scoped out
Sandbach Flashes SSSI	High	Vented hydrogen and oxygen emissions	Minor	Embedded pollution control measures	The operation of the LCHPP will lead to vented emissions from hydrogen and oxygen as part of the electrolysis process. Neither of these gases cause adverse impacts to sensitive habitats. As hydrogen is an indirect greenhouse gas, emissions will be minimised through the source operational regime and the application of BAT.	N/A	Not significant, scoped out
Sandbach Flashes SSSI	High	Emission of combustion products from the flare, standby diesel generator (SDG) and firewater pumps	Minor	Embedded pollution control measures	Pollutant emissions resulting from the high temperature during flaring will be limited to maintenance and emergency only and will be further minimised through design including an appropriate stack height and location. The flare pilot light will run continuously using a very small volume of hydrogen gas to ensure combustion of the flared gas occurs if required. The stack emissions from combustion of associated with the SDG and firewater pumps (although limited throughout the year) have the potential to affect receptors considered sensitive in terms of human health. A qualitative assessment of the stack emissions from these sources during the operational phase will be undertaken as part of the EIA. Further assessment can be conducted for the permit application, if necessary, when details on the plant design are available.	Slight or moderate Adverse	Could be significant, scoped in
High sensitivity human health receptors including residential properties, educational and medical facilities in proximity of the site (within 1 km)	High	Operational traffic	Negligible	N/A	Exact details of the operational traffic flows are not available at the time of writing; however, however, daily traffic is likely to be limited to a maximum of 3 heavy duty vehicles (HDV) movements and 15 car movements associated with staff travelling to and from the Proposed Development, which does not exceed the IAQM traffic screening criteria for further assessment. The assessment of operational road traffic emissions is therefore scoped out from the ES at this stage.	Slight Adverse	Unlikely to be significant, scoped out

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
High sensitivity human health receptors including residential properties, educational and medical facilities in proximity of the site (within 1 km)	High	Vented hydrogen and oxygen emissions	Minor	Embedded pollution control measures	The operation of the LCHPP will lead to vented emissions of hydrogen and oxygen as part of the electrolysis process. Neither of these gases are regulated local air quality pollutants and at ambient levels would not cause adverse impacts to human health receptors. As hydrogen is an indirect greenhouse gas, emissions will be minimised through the source operational regime and the application of BAT.	N/A	Not significant, scoped out
High sensitivity human health receptors including residential properties, educational and medical facilities in proximity of the site (within 1 km)	High	Odour emissions discharged by the hydrogen gas regeneration system and from the release of hydrogen sulphide (H2S) from the cavern	Negligible	Odour Management Plan	Odour emissions might arise from the operation of the Proposed Development. Any potentially odorous materials would be appropriately contained and managed using established techniques to control fugitive emissions to air, supported by an effective leak detection and repair programme. These measures would be implemented through an odour management plan to ensure any impact on surrounding communities will be minimised. On this basis, the Proposed Development is not considered likely to result in off-Site odour nuisance and an assessment of odour has therefore bee scoped out of the ES at this stage.	Slight Adverse	Unlikely to be significant, scoped out
High sensitivity human health receptors including residential properties, educational and medical facilities in proximity of the site (within 1 km)	High	Emission of combustion products from the flare, standby diesel generator (SDG) and firewater pumps	Minor	Embedded pollution control measures	Pollutant emissions resulting from the high temperature during flaring will be limited to maintenance and emergency operations only and will be further minimised through design including an appropriate stack height and location. The flare pilot light will run continuously using a very small volume of hydrogen gas to ensure combustion of the flared gas occurs if required. The stack emissions from combustion of associated with the SDG and firewater pumps (although limited throughout the year) have the potential to affect receptors considered sensitive in terms of human health. A qualitative assessment of the stack emissions from these sources during the operational phase will be undertaken as part of the EIA. Further assessment can be conducted for the permit application, if necessary, when details on the plant design are available.	Slight or moderate Adverse	Could be significant, scoped in

16. Waste and Materials

16.1. Construction

Table 16-1 Potential effects during construction for Waste and Materials

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Landfill capacity	Medium	Permanent use of landfill void from construction waste	Minor	• Adherence to waste hierarchy • Site Waste Management Plan • Implementation of CEMP	Currently, the type and quantities of waste that will be generated by construction of the Proposed Development are unknown. The anticipated significance of effect is slight adverse as the waste generation is not expected to be high compared to the landfill capacity baseline. However, a precautionary approach has been taken to assessing the potential impact on landfill capacity against the criteria and will therefore be scoped into the ES to ensure a full assessment of the impacts from the Proposed Development on landfill receptor can be carried out when the waste generation data is obtained at a later design stage.	Slight Adverse	Likely to be significant, scoped in
Raw materials	Medium	Permanent use of materials during construction	Moderate	• Implementation of CEMP • Adherence to waste hierarchy	Currently, the type and quantities of raw materials that will be required to construct the Proposed Development is unknown. Therefore, a precautionary approach has been taken to assessing the potential impact on raw materials market against the criteria and will therefore be scoped into the ES to ensure a full assessment of the impacts from the Proposed Development on raw materials markets can be carried out when the material use data is obtained at later design stage.	Moderate Adverse	Likely to be significant, scoped in
Mineral Safeguarding Area (MSA)	Negligible	Sterilisation of MSA	No change	Use of extracted salt from the brine in British Salt Production	The Site is on an allocated mineral safeguard area for salt. However, the construction of the Proposed Development will not result in sterilisation of an unexploited mineral resource as this salt is already being extracted for solution mining by British Salt in the baseline. Therefore, the impact on MSA is unlikely to be significant and will be scoped out of the ES for construction.	Neutral Adverse	Unlikely to be significant, scoped out

16.2. Operation

Table 16-2 Potential effects during operation for Waste and Materials

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Landfill capacity	Low	Operational permanent use of landfill void from waste generation	Negligible	Adherence to waste hierarchy	The amount of waste likely to be generated during the operation phase is unknown at this stage. However, the operational waste volumes that could be generated are anticipated to be negligible (compared to the baseline) and would likely consist of waste generated by staff, visitors and any maintenance work. It is anticipated that solid wastes, including but not limited to, spent filtration media, polishing resins and cartridges and waste oils are likely to be produced from the operation of the LCHPP in unknown quantities at this stage. The management of this waste would prioritise non-landfill methods such as recycling, recovery or processed via Energy from Waste facilities with energy recovery and therefore minimal waste would go to landfill. Hence, will be unlikely to be significant so this will be scoped out of the ES.	Neutral or slight Adverse	Unlikely to be significant, scoped out
Raw materials	Low	Operational permanent use of materials	Negligible	Implementation of CEMP	Currently, the amounts of materials to be used during the operation phase is unknown. However, low volume, long-term, permanent use of materials that could be used in operation are the same as those in construction, although they would be due to planned and un-planned maintenance activities and in much smaller quantities. These quantities are expected to be negligible (compared to the baseline). Hence, will be unlikely to be significant so this will be scoped out of the ES.	Neutral or slight Adverse	Unlikely to be significant, scoped out
MSA	Negligible	Sterilisation of MSA	No change	N/A	The Site is on an allocated mineral safeguard area for salt. There will be no sterilisation of the MSA as it will already have been extracted for utilisation prior to operation. Therefore, the impact on MSA is unlikely to be significant and will be scoped out of the ES for operation.	Neutral Adverse	Unlikely to be significant, scoped out

17. Climate Vulnerability

17.1. Construction

Table 17-1 Potential effects during construction for Climate Vulnerability

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Water resources	Medium	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Moderate	Climate mitigation for water resources	Although solution mining requires water abstraction, the proposed activity would be undertaken within the limits of the existing British Salt licence and associated environmental permits. The volume, rate, and location of abstraction would remain consistent with the established baseline and would not introduce any increase or material change compared with current operations. When considering that construction and operational timescales may overlap, it is considered that water demand for the solution mining activities and operation of the LCHPP could be required at the same time. In this case, there is still enough headroom on the abstraction to not increase demand on the River Wheelock. The Environment Agency integrates the consideration of climate change impacts and future water availability projections into its water abstraction licensing decisions and therefore climate related water resource impacts are scoped out under this assessment. Furthermore, the region's climate is not vulnerable to extreme droughts and mitigation will be embedded into the design, the most significant which is that the British Salt Production facility at Middlewich will treat water after it has been used for solution mining at the so that it can be sent back and reused in the solution mining process. This will reduce the Proposed Development's demand for abstracting water from the River Wheelock where flows may reduce in the future due to climate change.	Moderate Adverse	Unlikely to be significant scoped out
Proposed Development: Construction processes and activities	Low	Extreme weather observed in the current climate	Minor	Extreme weather mitigation	Extreme weather events (heatwaves, drought, storms, flooding, and high groundwater) could affect construction by reducing productivity, limiting water availability, eroding spoil piles, restricting site access, impacting excavation, disrupting supply chains, increasing water demand for dust suppression, and posing health risks to workers. Construction flood risk (affecting the viability of the site for construction), including consideration of extreme weather, is addressed in the Water Resources and Flood Risk Chapter and is therefore scoped out of the climate vulnerability assessment. Other climate vulnerability impacts on construction activities and processes are also scoped out as they will be mitigated through standard best practice measures. The Proposed Development's CEMP will include requirements to	Neutral or slight Adverse	Unlikely to be significant scoped out

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
					monitor weather forecasts and implement measures such as stop-work protocols or change management plans prior to adverse conditions. The CEMP will also outline flood control measures and contingency actions for site flooding. Risk management procedures, including toolbox talks, will address potential weather-related health and safety hazards for workers.		
Environmental Receptors	Low	Extreme weather observed in the current climate	Minor	Adoption of mitigation hierarchy	Climate change could affect, intensify or ameliorate, the potential impacts set out by the other disciplines. This impact is scoped out of a standalone climate vulnerability. It will be covered by an ICCI (In-combination Climate Change Impacts) assessment which will be completed in the ES within each topic as required.	Neutral or slight Adverse	Unlikely to be significant scoped out

17.2. Operation

Table 17-2 Climate effects during operation for climate vulnerability

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Structures - above and below ground	Low	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Minor	Climate mitigation for structures	Increasingly severe soil moisture deficits and altered groundwater levels could affect the stability of soils affecting structures. Climate related impacts on structures will be mitigated by design, adhering to best practice GI will ensure the stability of structures, and scour damage to assets will be avoided by the installation of drainage which is already part of the design. Therefore, scoped out due to the low sensitivity and minor magnitude.	Neutral or slight Adverse	Unlikely to be significant, scoped out
Materials	Medium	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Minor	Climate mitigation for materials	General impacts on exposed infrastructure from extreme heat could decrease asset lives and/or maintenance cycles. Warmer winters may reduce cold weather operational issues, for example freeze thaw damage to underground assets. Generally, it is considered that the effects of extreme weather are unlikely to impact operation of the LCHPP and the design could consider including canopies to give some weather protection to the electrolysers. Extreme weather could affect supply chains disrupting the supply of materials required for the operation of the Proposed Development. Effects will be mitigated by design, for example by use of materials that have specifications that are resilient to projected future climate conditions. Therefore, scoped out due to the medium sensitivity and minor magnitude.	Slight Adverse	Unlikely to be significant, scoped out
Power and tele-communications equipment	Medium	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Minor	Climate mitigation for power and tele-communications equipment	Extreme hot temperatures may increase thermal loadings on electrical and control equipment reducing their lifespan. More regular and intense storms in the future could increase the regularity of lightning strikes on infrastructure which could damage electrical equipment, including lighting. More regular loss of power to the Site following storms with high winds could cause operational hazards. An increase in the severity and or regularity of extreme weather could impact the reliability of essential infrastructure, e.g. control and communication equipment. However, climate related impacts will be mitigated by design, for example any assets considered critical in detailed design will have backup power and/or manual operation controls and therefore scoped out due to the medium sensitivity and minor magnitude.	Slight Adverse	Unlikely to be significant, scoped out
Drainage infrastructure	Low	Increasingly severe and frequent extreme weather in the future	Moderate	Climate mitigation for drainage infrastructure	Climate change could increase erosion and so increase sedimentation within surface water drainage infrastructure on the Site, e.g. along roads and around built structures – potentially reducing its capacity to cope with flood events. NB climate change impacts on flood risk are covered by the impacts listed in the water environment chapter, for example heavier rain and wetter winters could increase the risk of pluvial or surface flooding around the site. Future changes to groundwater levels would not affect the buried assets on the site.	Slight Adverse	Unlikely to be significant, scoped out

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Environmental Receptors	Low	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Minor	N/A	Climate change could affect, intensify or ameliorate, the potential impacts set out by the other disciplines. This impact is scoped out of a standalone climate vulnerability. It will be covered by an ICCI (In-combination Climate Change Impacts) assessment which will be completed in the ES within each topic as required.	Neutral or slight Adverse	Unlikely to be significant, scoped out
All receptors (environmental and human)	High	Increasingly severe and frequent extreme weather in the future	Negligible	Climate mitigation for major accidents and disasters	After consideration of mitigation there are no likely impact pathways for climate or extreme weather, e.g. lightning, flooding or wind damage to cause a major accident or disaster or hinder the effective management of a major accident or disaster that was otherwise unrelated to climate thereby increasing its severity.	Slight Adverse	Unlikely to be significant, scoped out
Water resources	Medium	Slow onset changes to the future climate (warmer wetter winters and hotter drier summers)	Minor	Climate mitigation for water resources	Once operational, the Proposed Development will require water for the operation of the LCHPP. The regions climate is not vulnerable to extreme droughts and water saving mitigation will be embedded into the design to ensure impacts do not significantly affect operational activities. For example, the British Salt production facility will treat water after it has been used for solution mining at the brinefield so that it can be reused. This will reduce the Proposed Development's demand for abstracting water from the River Wheelock where flows may reduce in the future due to climate change. Climate risks to water supply and demand are already being actively managed by others at a regional / water company scale through the Water Resource Management Planning process. British Salt has an existing abstraction licence on the Site (as per the Water Resources Act 1991, and Water Resources [Abstraction and Impoundment Regulations 2006]) and it is, at this stage, considered that there is sufficient headroom on that licence to supply the requirements of the Proposed Development, subject to a possible use amendment (see **Table 21-2**). When considering that construction and operational timescales may overlap, it is considered that water demand for the solution mining activities and operation of the LCHPP could be required at the same time. In this case, there is still enough headroom on the abstraction to not increase demand on the River Wheelock. The Environment Agency considers climate change in the water abstraction licensing process by assessing long-term water availability, and therefore this impact is scoped out as it has been considered separately.	Slight Adverse	Unlikely to be significant, scoped out

18. Effects on Climate

18.1. Construction

Table 18-1 Potential effects during construction for Effects on Climate

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Atmosphere	High	Greenhouse gas emissions	Minor	Carbon reduction and management	Greenhouse gas emissions affect the atmosphere leading to climate change globally. The construction of the Proposed Development will result in greenhouse gas emissions. These will come from the combustion of fossil fuels used to power construction plant and machinery, and construction vehicles travelling to and from the Site. There will also be embedded carbon emissions generated in the manufacture of the construction materials.	Slight or moderate Adverse	Could be significant, scoped in

18.2. Operation

Table 18-2 Potential effects during operation for Effects on Climate

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Atmosphere	High	Greenhouse gas emissions	Minor	Carbon reduction and management	Greenhouse gas emissions affect the atmosphere leading to climate change globally. The operation of the Proposed Development will result in greenhouse gas emissions. These will come from the use of grid electricity, the combustion of fossil fuels used to power operational plant and machinery, and vehicles travelling to and from the Site. Additionally, a small amount of hydrogen will be released from the Proposed Development during normal operation. Hydrogen is considered an indirect GHG because it does not cause a warming effect on its own, but rather by prolonging the life of atmospheric methane, which is a potent GHG, and by increasing the production of ozone. This release of hydrogen, and its impact will be included within the operation phase assessment. Hydrogen stored at the Site will have the potential to replace fossil fuels in the generation of energy. The use of the Hydrogen gas could lead to a decrease in overall emissions if it replaces fossil fuel. This potential beneficial impact will be explored during the ES assessment.	Slight or moderate Adverse	Could be significant, scoped in

19. Socioeconomics

Key issues and potential likely impacts

19.1.1. It is anticipated that the Proposed Development will result in a range of potentially significant socio-economic impacts during both the construction and operational phases. These impacts may occur as a direct result of the Proposed Development or indirectly, for example through supply chain and employee expenditure within the local economy.

19.1.2. There will also be consideration of the impact on the local community and labour force through both the construction and operational phase.

19.2. Construction

19.2.1. The socio-economic assessment will consider the following potential impacts during the construction phase:

- Temporary employment generated through construction of the Proposed Development. This will include direct employment associated with the Site, as well as indirect and induced employment (multiplier effects) from supply chain expenditure and the expenditure in the local economy of workers employed during the construction phase;
- Short-term increase in local and regional economic output (gross value added, GVA) in line with the temporary employment impact. This will again take account of the direct, indirect, and induced economic output impact during the construction phase;
- Wider socio-economic impacts. This will include those impacts which although difficult to quantify are important in understanding the overall socio-economic effect of the Proposed Development. For example, consideration will be given to wider impacts such as: community identity, perception and overall impact on local reputation as communities may associate the construction of the nearby Site with noise, pollution and disruption affecting the perception of the new development; and
- Social value. This will include those impacts related to the positive value to society generated through the construction phase that goes beyond business as usual. These will consider social, economic and environmental benefits; and
- Loss of income for agricultural business due to loss of agricultural land.

19.3. Operation

19.3.1. The socio-economic assessment will consider the following potential impacts during the operational phase:

- Permanent loss of income for agricultural business due to loss of agricultural land;
- Creation of direct, indirect, and induced long-term employment opportunities from the proposed uses on the Site;
- Creation of additional spend, supporting wider off-site employment within the Cheshire East economy;
- Long-term increase in economic output (GVA) resulting from the direct, indirect, and induced impacts of the Proposed Development during the operational phase;
- Increase in business rate revenue generated due to the provision of new employment floorspace on the Site;
- Creation of training and apprenticeship opportunities for the local community during the operational phase;
- Effect on local labour market, specifically in terms of employment opportunities generated by the Proposed Development for residents of Cheshire East;
- Wider socio-economic impacts. Consideration will be given to wider positive impacts of the Proposed Development such as community identity, perception and overall impact on local reputation; and
- Social value. This will include those impacts related to the positive value to society generated through the operational phase that goes beyond business as usual. These will consider social, economic and environmental benefits.

Table 19-1 Potential effects during construction for Socioeconomics

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Local Authority and LSOA Population	Medium	Changes in employment and income	Moderate	N/A	At the ES stage, analysis will be undertaken to understand the impact of the development on local employment and wider economic impacts such as local spend.	Moderate Beneficial	Likely to be significant, scoped in

Table 19-2 Potential effects during operation for Socioeconomics

Receptor		Scoping assessment					
		Impact		Mitigation	Potential effect		Scope in / out
Name	Sensitivity	Name	Magnitude	Name	Description	Significance	
Local Authority and LSOA Population	Medium	Changes in employment and income	Moderate	N/A	At the ES stage, analysis will be undertaken to understand the impact of the development on local employment and wider economic impacts such as local spend.	Moderate Beneficial	Likely to be significant, scoped in

20. Human Health

20.1. Construction

Table 20-1 Potential effects during construction for Human Health

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
Changes in access to community, recreational and educational facilities	Moderate	Wider population: Surrounding population and community	Medium	• Implementation of Construction Traffic Management Plan • Implementation of CEMP	From the perspective of human health, traffic flow changes determine the way different receptors are affected by traffic derived pollutants, traffic noise and severance and effects may be adverse or beneficial, depending on the nature of the changes. The Human Health Study Area includes rural settlements with limited public transport and a high proportion of older residents. Changes in traffic flow may affect exposure to pollutants, noise, and severance, with potential adverse effects to access to and need for healthcare and community services. Construction may reduce access or increase travel times, particularly for families and children. The mitigation is not relied upon at this scoping stage, to reflect a precautionary approach.	Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	High			Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - materially disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Moderate or large Adverse	Likely to be significant, scoped in
Changes in access to green space and open space	Moderate	Wider population: Surrounding population and community	Medium	• Implementation of Construction Traffic Management Plan • Implementation of CEMP	Construction activities will require temporary closure or diversion of several Public Rights of Way, which pass through or adjacent to the Site. These routes provide informal access to valued green spaces including Burnt Covert Woods, Warmingham Wood, and Larch Wood. These areas are used for walking, nature observation, and quiet recreation by both the wider population and the Warmingham sub-population. Disruption will reduce access to natural environments and diminish opportunities for outdoor leisure and wellbeing during the construction phase. The mitigation is not relied upon at this scoping stage, to reflect a precautionary approach.	Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - materially disadvantaged	Medium			Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Geographic sub-population: Warmingham residents	High			Moderate or large Adverse	Likely to be significant, scoped in
Changes in access to healthcare facilities	Moderate	Wider population: Surrounding population and community	Medium	• Implementation of Construction Traffic Management Plan • Implementation of CEMP	During the construction phase, increased HGV movements associated with construction activities may contribute to congestion and reduced journey reliability on School Lane and Warmingham Road. These routes are key connectors to healthcare services located outside Warmingham, such as Leighton Hospital and GP practices in Middlewich and Crewe. For residents without access to private transport, particularly elderly individuals, those with mobility impairments, or low-income households, delays or reduced reliability in public or community transport could hinder timely access to medical appointments, prescriptions, or emergency care. This may exacerbate health inequalities and contribute to stress or deterioration in health outcomes, especially if compounded by other transport-related disruptions. The mitigation is not relied upon at this scoping stage, to reflect a precautionary approach.	Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	High			Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - materially disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Moderate or large Adverse	Likely to be significant, scoped in
		Geographic sub-population: Construction workers	Medium	• Construction practices in accordance with standard process and adhering to national and international safety standards	Construction activities bring risk of injury and death to construction workers, which must be managed through safe working practices and construction worker training. Construction activities may influence the ability to access healthcare facilities, should they be required.	Moderate Adverse	Likely to be significant, scoped in
Construction traffic	Moderate	Wider population: Surrounding population and community	Medium	• Implementation of Construction Traffic Management Plan • Implementation of CEMP • Development and implementation of	The Proposed Development may result in a range of temporary and permanent changes to aspects of the existing transport network. This could include some changes to road junctions, to accommodate construction and operational traffic. Impacts on PROW are expected, involving temporary and permanent diversions. Construction-related HGV movements and haul routes will significantly increase traffic volumes along Warmingham	Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Moderate Adverse	Likely to be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Sensitive sub-population - materially disadvantaged	High	a Community Engagement Plan and Strategy • Pro-active community liaison through a Community Liaison / Relations Agency	Road and School Lane, which are used daily by drivers, pedestrians, and cyclists. These routes provide access to residential properties, the primary school, and local businesses. Increased vehicle movements may reduce road quality, cause congestion, and disrupt local traffic patterns, particularly during peak hours. The presence of large vehicles may also reduce visibility and manoeuvrability for non-motorised users, affecting the safety and comfort of travel through the village. The mitigation is not relied upon in this scoping assessment, to reflect a precautionary approach. The introduction of construction traffic to the network increases risks of modal conflict, and diversion routes and traffic management can elevate driver uncertainty, contributing to increase safety risks. Increased HGV traffic and altered access routes during construction may pose safety risks to pedestrians, cyclists, and school children using School Lane and Warmingham Road. Reduced visibility, narrow carriageways, and unfamiliar vehicle movements may heighten the risk of accidents or near misses, particularly during peak hours. This could lead to increased anxiety and avoidance of walking or cycling, with indirect health consequences from reduced physical activity. The mitigation is not relied upon in the scoping assessment, on a precautionary basis.	Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium			Moderate Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Moderate or large Adverse	Likely to be significant, scoped in
Changes in air quality, affecting people	Minor	Wider population: Surrounding population and community	Low	• Implementation of CEMP • Implementation of the mitigation mitigation measures specified in the IAQM guidance for all construction activities • Pollution control measures for human health	During the construction phase, activities such as drilling, earthworks, and vehicle movements associated with maintenance and logistics may generate dust and emissions, including particulate matter and nitrogen oxides. These pollutants can disperse into the surrounding area, affecting air quality near sensitive receptors such as residential properties along School Lane and Warmingham Road, Warmingham C of E Primary School, and hospitality businesses including The Bear's Paw. Although the area is not within an Air Quality Management Area, cumulative exposure may lead to respiratory irritation, particularly for children, elderly residents, and those with pre-existing health conditions. The impacts are expected to be temporary and reversible with appropriate mitigation (e.g. dust suppression, low-emission vehicles), but may still contribute to short-term reductions in local air quality and perceived wellbeing. There is well-documented research demonstrating causality between air pollution, increased noise levels and pollutants and direct physical health effects. UK legislation controlling these aspects of development is set such that developers	Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Medium			Slight Adverse	Unlikely to be significant, scoped out

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium		must meet specific standards that are directly connected to thresholds for impacts on human health (set by the UK government, on the basis of the wider population). It is assumed that these legislative requirements will be met by the Proposed Development design and controls and will be assessed and reported within the individual topic chapters if necessary. On that basis, this aspect of impacts from changes to air quality, noise and pollutants is scoped out of the human health assessment, for all but the high sensitivity receptors. However, the contribution of any changes to these aspects will be considered in the context of changes in amenity (on an in-combination basis), within the human health assessment (as set out above).	Slight Adverse	Unlikely to be significant, scoped out
		Geographic sub-population: Warmingham residents	High			Slight or moderate Adverse	Could be significant, scoped in
Changes in noise and vibration, affecting people	Minor	Wider population: Surrounding population and community	Medium	• Implementation of CEMP • Implementation of best practice measures (BPM) as set out in BS 5228:2009+A1:2014 Part 1 and 2 • Pollution control measures for human health	Construction activities including drilling, vehicle movements, and use of heavy machinery will introduce new sources of noise and vibration into a predominantly rural setting. The area surrounding the site is characterised by quiet residential lanes, informal recreation spaces, and low ambient noise levels. Sensitive receptors such as residents on School Lane and Cornmill Close, guests at nearby accommodation (e.g. Island Cottage, Cheshire Annex), and students at Warmingham Primary School may experience disturbance, particularly during peak construction periods. The change in acoustic environment may affect wellbeing, concentration, and sleep quality. There is well-documented research demonstrating causality between air pollution, increased noise levels and pollutants and direct physical health effects. UK legislation controlling these aspects of development is set such that developers must meet specific standards that are directly connected to thresholds for impacts on human health (set by the UK government, on the basis of the wider population). It is assumed that these legislative requirements will be met by the Proposed Development design and controls and will be assessed and reported within the individual topic chapters if necessary. On that basis, this aspect of impacts from changes to air quality, noise and pollutants is scoped out of the human health assessment, for all but the high sensitivity receptors. However, the contribution of any changes to these aspects will be considered in the context of changes in amenity (on an in-combination basis), within the human health assessment (as set out above).	Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Geographic sub-population: Warmingham residents	High			Slight or moderate Adverse	Could be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
Changes in risks of pollution of soils and water, affecting people	Minor	Wider population: Surrounding population and community	Low	• Implementation of CEMP • Pollution control measures for human health	Construction activities may result in accidental spills, fuel leaks, or runoff from compounds and stockpiles, which could enter nearby watercourses such as the River Wheelock or affect agricultural land. This poses a risk to water quality and soil integrity, with potential knock-on effects for human health through contamination of private water supplies, disruption to farming operations, and exposure to pollutants. Vulnerable groups such as children and elderly residents may be more susceptible to health impacts from degraded environmental conditions. There is well-documented research demonstrating causality between air pollution, increased noise levels and pollutants and direct physical health effects. UK legislation controlling these aspects of development is set such that developers must meet specific standards that are directly connected to thresholds for impacts on human health (set by the UK government, on the basis of the wider population). It is assumed that these legislative requirements will be met by the Proposed Development design and controls and will be assessed and reported within the individual topic chapters if necessary. On that basis, this aspect of impacts from changes to air quality, noise and pollutants is scoped out of the human health assessment. However, the contribution of any changes to these aspects will be considered in the context of changes in amenity (on an in-combination basis), within the human health assessment (as set out above).	Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Low			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Low			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	Low			Neutral or slight Adverse	Unlikely to be significant, scoped out
Changes to amenity	Moderate	Wider population: Surrounding population and community	Medium	• Landscape measures for construction works • Implementation of best practice measures (BPM) as set out in BS 5228:2009+A1:2014 Part 1 and 2 • Implementation of the mitigation	For the purposes of the human health assessment, amenity is an in-combination effect with adverse effects arising from impacts of increased noise, decreased air quality, visual intrusion and general disturbance (e.g. from changes in activity levels/ traffic). Most commonly, this combination of impacts is associated with construction compound and work site locations but can also be linked to specific construction activities. The Proposed Development is set within a rural landscape that is actively used by the local community for walking, recreation, and informal exercise. The presence of woodland and open green spaces contributes to the area's visual amenity and supports mental wellbeing, particularly for	Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - materially disadvantaged	Medium			Moderate Adverse	Likely to be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium	measures specified in the IAQM guidance for all construction activities. • Implementation of Construction Traffic Management Plan	residents who rely on access to nature for relaxation and physical activity. Construction compounds and substantial engineering works (e.g. the construction and operation of the facility) may affect amenity, particularly for sensitive sub-populations such as older adults and families. The tranquil rural character of the Warmingham area will be altered by construction noise, dust, lighting, and visual intrusion. These changes will affect the sensory experience of the landscape, particularly for users of PRoWs and nearby green spaces. The cumulative effect, defined as landscape amenity, includes intra-project effects from noise, visual change, and air quality degradation. This may reduce mental wellbeing, increase stress, and discourage outdoor activity, especially among those who rely on the area for quiet recreation or therapeutic use.	Moderate Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Moderate or large Adverse	Likely to be significant, scoped in
Changes in employment and income	Moderate	Wider population: Surrounding population and community	Low	• Construction phase planning • Implementation of CEMP • Pro-active community liaison through a Community Liaison / Relations Agency • Development and implementation of a Community Engagement Plan and Strategy	The Proposed Development will generate construction job roles, increasing employment opportunities. Impacts on land take and access of existing employment opportunities; and implications for businesses operating on the tourism and leisure sector may be adverse. The construction phase may generate short-term employment opportunities for contractors, suppliers, and support services. Local businesses such as The Bear's Paw, and accommodation providers may benefit from increased demand. Based on the potential magnitude of impact, this impact type is scoped in for receptors who have a sensitivity of medium or greater. When viewed through a human health assessment lens, the changes in employment an income are connected to effects on mental health and well-being, derived from factors such as income security, job satisfaction and self worth; and the ability of sub-populations to have the fiscal means to make healthier lifestyle choices (e.g. improved access to healthcare and sporting/leisure pursuits).	Slight Beneficial	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Low			Slight Beneficial	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Medium			Moderate Beneficial	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	Low			Slight Beneficial	Unlikely to be significant, scoped out
		Geographic sub-population: existing Site users	Very high			Very large Beneficial	Likely to be significant, scoped in
		Geographic sub-population: Construction workers	High	N/A	As a major construction project, the Proposed Development would create employment opportunities for local construction workers. The impacts would be beneficial.	Slight or moderate Beneficial	Could be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Geographic sub-population: Warmingham residents	Medium	Construction phase planning	Warmingham is the closest settlement to the Site. The Proposed Development has the potential to exert a range of impacts on the community that could change employment and income. Construction job opportunities could bring benefits; the presence of the construction activities to the west and the movement of construction vehicles could have adverse effects on some existing businesses, particularly those that rely on the rural setting and availability of access to tranquil countryside. The scoping assessment does not rely on mitigation, to reflect a precautionary approach.	Moderate Beneficial	Likely to be significant, scoped in
Change in land use during construction	Major	Geographic sub-population: existing Site users	Very high	Adoption of mitigation hierarchy	The Proposed Development will require permanent and temporary land take within the Site. This has the potential to lead to the loss of, substantial change to or threat to commercial viability of an existing use. Effects would differ depending on the extent of the impact, but could have the effect of displacement, or closure of existing uses. When viewed through a human health assessment lens, the potential loss of a business can be a cause of stress and anxiety, with adverse mental health effects. Actual loss of a business could also be connected to effects on mental health and well-being, derived from factors such as income security, job satisfaction and self worth; and the ability of sub-populations to have the fiscal means to make healthier lifestyle choices (e.g. improved access to healthcare and sporting/leisure pursuits).	Very large Adverse	Likely to be significant, scoped in
Permanent land take during construction	Major	Geographic sub-population: agricultural landholdings:	High	N/A	Permanent land take during construction will result in the irreversible loss of agricultural land, including areas potentially classified as BMV. This change will remove the land from productive agricultural use, with no opportunity for reinstatement post-construction. The effect is considered major due to its permanence and the potential sensitivity of the receptor. When viewed through a human health assessment lens, the potential loss of a business (due to permanent loss of agricultural land) can be a cause of stress and anxiety, with adverse mental health effects. Actual loss of a business could also be connected to effects on mental health and well-being, derived from factors such as income security, job satisfaction and self worth; and the ability of sub-populations to have the fiscal means to make healthier lifestyle choices (e.g. improved access to healthcare and sporting/leisure pursuits).	Large or very large Adverse	Likely to be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
Uncertainty and anxiety	Moderate	Geographic sub-population: agricultural landholdings:	High	• Pro-active community liaison through a Community Liaison / Relations Agency • Implementation of CEMP • Development and implementation of a Community Engagement Plan and Strategy	Major construction projects typically generate public interest and speculation about what will be happening, who and how people will be affected, what the new development will change, and uncertainty can often generate community anxiety, which affects mental health. The mitigation is not relied upon at this scoping stage, to reflect a precautionary approach; however, early engagement has commenced for the Proposed Development.	Moderate or large Adverse	Likely to be significant, scoped in
		Wider population: Surrounding population and community	Medium			Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	High			Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - materially disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in
		Geographic sub-population: existing Site users	Very high			Large or very large Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Moderate or large Adverse	Likely to be significant, scoped in
		Geographic sub-population: Construction workers	Low	N/A	Major construction projects present an opportunity to this receptor group. Impacts would be beneficial.	Neutral	Unlikely to be significant, scoped out

20.2. Operation

Table 20-2 Potential effects during operation for Human Health

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
Changes in access to community, recreational and educational facilities	Minor	Wider population: Surrounding population and community	Low	Delivery of PRoW connectivity	Several PRoW cross the Site, serving the role of connecting residential properties directly into Warmingham village, including routes to Warmingham Primary School, Village Hall, and St Leonard's Church. It is currently unclear whether these PRoWs will remain open once the hydrogen facility becomes operational. If access is restricted or rerouted, this may reduce movement and accessibility for nearby residents, and vulnerable sub-populations, particularly those without alternative transport options. Long-term disruption could affect participation in education, community events, and social interaction, with indirect impacts on mental wellbeing and social cohesion. Based on the potential magnitude of impact, this impact type is scoped out for receptors who have a sensitivity of medium or low. The wider population, which reflects residents across the whole of the Human Health study area, has a low sensitivity to this type of change and is therefore scoped out.	Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	High			Slight or moderate Adverse	Could be significant, scoped in
		Sensitive sub-population - materially disadvantaged	High			Slight or moderate Adverse	Could be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	High			Slight or moderate Adverse	Could be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Slight or moderate Adverse	Could be significant, scoped in
Changes in access to green space and open space	Minor	Wider population: Surrounding population and community	Medium	Delivery of PRoW connectivity	PRoW that cross the Site and link residential areas to nearby green spaces such as Burnt Covert Woods, Warmingham Wood, and Larch Wood may be affected by the operational footprint of the hydrogen facility. It is not yet confirmed whether these routes will remain open or be permanently diverted. If access is restricted, this could reduce opportunities for walking, nature observation, and quiet recreation. Long-term loss of access to green space may negatively affect physical activity, mental wellbeing, and quality of life, especially for those who rely on the landscape for routine or therapeutic use. Based on the potential magnitude of impact, this impact type is scoped in for receptors who have a sensitivity of high or above, as these groups have a lower tolerance for change and / or may be more reliant upon these routes (relative to the wider population of the Human Health study area as a whole) due to where they live.	Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	High			Slight or moderate Adverse	Could be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Slight or moderate Adverse	Could be significant, scoped in
Changes in access to	Negligible	Wider population: Surrounding population and community	Medium	N/A	The operational phase will require skilled workers for Hydrogen Storage Facility monitoring, LCHPP, maintenance, and gas processing. This may create long-term employment opportunities	Neutral or slight Adverse	Unlikely to be significant, scoped out

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
healthcare facilities		Sensitive sub-population - age (families with children; and elderly persons)	High		and support local economic resilience. Stable income can improve access to healthcare, reduce financial stress, and support overall wellbeing.	Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	High			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	High			Slight Adverse	Unlikely to be significant, scoped out
		Geographic sub-population: Warmingham residents	Medium			Neutral or slight Adverse	Unlikely to be significant, scoped out
Changes in air quality, affecting people	Negligible	Wider population: Surrounding population and community	Low	Operation in accordance with appropriate health and safety management systems, audits and checks	Operation of the Hydrogen Storage Facility and LCHPP will involve regular maintenance activities, vehicle movements, and operation of the gas processing plant, which includes compressors and flaring equipment. Without suitable controls, these could contribute to localised emissions of NOx and particulates, potentially affecting air quality. Sensitive receptors include residents along School Lane and Warmingham Road, and users of Warmingham C of E Primary School. Although the area is not within an AQMA, cumulative exposure may affect respiratory health and wellbeing. The impact magnitude category assumes effective control measures, in line with legislative standards and permitting requirements and is expected to be negligible. At this level, when combined with the receptor sensitivities, the resultant effects are sufficiently low to enable this impact type to be scoped out.	Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Medium			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Geographic sub-population: Warmingham residents	Medium			Neutral or slight Adverse	Unlikely to be significant, scoped out
Changes in noise and vibration, affecting people	Minor	Wider population: Surrounding population and community	Medium	Operation in accordance with appropriate health and safety management systems, audits and checks	Operational noise sources include compressors, flare stack, and vehicle movements. The gas processing plant and LCHPP will operate continuously, residual noise may theoretically affect nearby receptors such as Warmingham residents, school pupils, and users of PRoWs. Vibration impacts are expected to be minimal but may arise during maintenance or emergency operations. The impact magnitude category assumes effective control measures, in line with legislative standards and permitting requirements and is expected to be minor. At this level, when combined with the receptor sensitivities, the resultant effects are sufficiently low to enable this impact type to be scoped out.	Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Medium			Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium			Slight Adverse	Unlikely to be significant, scoped out

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Geographic sub-population: Warmingham residents	Medium			Slight Adverse	Unlikely to be significant, scoped out
Changes in risks of pollution of soils and water, affecting people	Minor	Wider population: Surrounding population and community	Low	Operation in accordance with appropriate health and safety management systems, audits and checks	The Site is underlain by aquifers and includes authorised landfill sites. Operational risks include accidental leaks of hydrogen, brine, or chemicals used in cavern maintenance. These could contaminate soils or groundwater, affecting drinking water sources or ecological receptors. Mitigation (e.g. bunding, monitoring) will be in place, together with controls reflecting that a residual risk remains, particularly during cavern transfer or debrining operations. The impact magnitude category assumes effective control measures, in line with legislative standards and permitting requirements and is expected to be minor. At this level, when combined with the receptor sensitivities, the resultant effects are sufficiently low to enable this impact type to be scoped out.	Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Low			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Low			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	Low			Neutral or slight Adverse	Unlikely to be significant, scoped out
		Geographic sub-population: Warmingham residents	Low			Neutral or slight Adverse	Unlikely to be significant, scoped out
Changes to amenity	Moderate	Wider population: Surrounding population and community	Medium	Sympathetic design	The gas processing plant includes structures up to 50m high (flare stack), and vent stacks are required up to 20m high for the LCHPP, altering the visual character of the area. This may reduce the amenity value of nearby green spaces such as Burnt Covert Woods, Warmingham Wood, and PRoWs. Users of these areas may experience reduced tranquillity and visual intrusion, affecting recreation and mental wellbeing.	Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - materially disadvantaged	Medium			Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium			Moderate Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Moderate Adverse	Likely to be significant, scoped in
Operational traffic	Moderate	Wider population: Surrounding population and community	Low	Operational Traffic Management Plan	The operational phase of the Hydrogen Storage Facility will involve regular vehicle movements for maintenance, monitoring, and supply logistics. These activities may increase traffic volumes on School Lane and Warmingham Road, leading to congestion, wear on road surfaces, and reduced journey reliability. Over time, this could degrade the quality of the transport network, making it	Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Medium			Moderate Adverse	Likely to be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Sensitive sub-population - materially disadvantaged	Low		less attractive for walking and cycling. The presence of large or frequent vehicles may discourage active travel due to perceived inconvenience or discomfort, contributing to reduced physical activity levels. This may indirectly affect cardiovascular health and increase travel-related stress, particularly for residents, school users, and those reliant on non-car modes of transport. The operational phase has the potential to increase large or HGV traffic use of local roads such as School Lane and Warmingham Road, which are also used by pedestrians, cyclists, and vulnerable groups including children attending Warmingham C of E Primary School and visitors to the village hall. The increased traffic may elevate the risk of road traffic accidents, particularly at junctions, crossings, and areas with limited visibility or infrastructure for non-motorised users. This could lead to direct physical harm and contribute to anxiety or avoidance of active travel modes, with indirect impacts on mental wellbeing and community confidence in road safety. Based on the potential magnitude of impact, this impact type is scoped in for receptors who have a sensitivity of medium or above, as these groups have a lower tolerance for change and / or may be more reliant upon these routes (relative to the wider population of the Human Health study area as a whole) due to where they live.	Slight Adverse	Unlikely to be significant, scoped out
		Sensitive sub-population - mentally and/or physically disadvantaged	Medium			Moderate Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	Medium			Moderate Adverse	Likely to be significant, scoped in
Changes in employment and income	Moderate	Wider population: Surrounding population and community	Low	N/A	The operational phase will require skilled workers for hydrogen storage monitoring, LCHPP, maintenance, and gas processing. This may create long-term employment opportunities and support local economic resilience. Stable income can improve access to healthcare, reduce financial stress, and support overall wellbeing. Based on the potential magnitude of impact, this impact type is scoped in for receptors who have a sensitivity of medium or above, as these groups have a higher likelihood to experience beneficial change (relative to the wider population of the Human Health study area as a whole).	Slight Beneficial	Unlikely to be significant, scoped out
		Sensitive sub-population - age (families with children; and elderly persons)	Low			Slight Beneficial	Unlikely to be significant, scoped out
		Sensitive sub-population - materially disadvantaged	Medium			Moderate Beneficial	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	Low			Slight Beneficial	Unlikely to be significant, scoped out
		Geographic sub-population: Warmingham residents	Medium			Moderate Beneficial	Likely to be significant, scoped in
Uncertainty and anxiety	Moderate	Geographic sub-population: agricultural landholdings:	High	Communication and engagement	The nature of hydrogen storage and hydrogen production and proximity to residential areas may cause anxiety among local residents regarding safety, noise, and environmental risks.	Moderate or large Adverse	Likely to be significant, scoped in

Impact		Receptor		Scoping Assessment			
Name	**Magnitude**	**Name**	**Sensitivity**	**Mitigation**	**Description**	**Significance**	**Scope In / Out**
		Wider population: Surrounding population and community	Medium		Despite mitigation and engagement, perceived risks may persist, affecting mental wellbeing. This is particularly relevant for sensitive sub-populations such as elderly residents and families with children, who may be resident within farmsteads.	Moderate Adverse	Likely to be significant, scoped in
		Sensitive sub-population - age (families with children; and elderly persons)	High			Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - materially disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in
		Sensitive sub-population - mentally and/or physically disadvantaged	High			Moderate or large Adverse	Likely to be significant, scoped in
		Geographic sub-population: Warmingham residents	High			Moderate or large Adverse	Likely to be significant, scoped in
Change in land use during operation	Moderate	Geographic sub-population: existing Site users	High	Adoption of mitigation hierarchy	The Proposed Development will make permanent changes to land use within parts of the Site, which will endure through operation. Based on the precautionary approach and reflecting the construction phase impacts, the operational impacts of permanent land use change are potentially connected to the loss of businesses and agricultural activities that would affect existing Site users. When viewed through a human health assessment lens, the loss or need to relocate and re-establish a business (due to permanent loss of agricultural land or other land take) can be a cause of stress and anxiety, with adverse mental health effects. Actual loss of a business could also be connected to effects on mental health and well-being, derived from factors such as income security, job satisfaction and self worth; and the ability of sub-populations to have the fiscal means to make healthier lifestyle choices (e.g. improved access to healthcare and sporting/leisure pursuits).	Moderate or large Adverse	Likely to be significant, scoped in

21. Major Accidents and Disasters

21.1. Context

21.1.1. The EIA Regulations introduced the requirement for the consideration of major accidents and disasters into the EIA process. Schedule 4(8) of the EIA Regulations provides that the ES includes:

21.1.2. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.

21.1.3. There are a number of other regulatory regimes / consenting processes that relate to the protection of human health and / or the environment that are relevant to the prevention, control and mitigation of, and / or the assessment of, major accidents / hazards (including those resulting from disasters). Key examples of these are referred to herein, as appropriate.

21.1.4. The key source of guidance for the assessment of MA&D is the Institute of Environmental Management and Assessment (IEMA)[42] Major Accidents and Disasters in EIA: A Primer[43] (referred to herein as the 'IEMA Primer'). The IEMA Primer offers an assessment methodology based on known current practice within the UK to date and provides definitions of key terminology. It has been structured around a typical assessment approach and offers a proportionate method for considering MA&D through screening, scoping and impact assessment.

21.2. Scope

21.2.1. The consideration of MA&D includes the construction and operational phases of the Proposed Development, whilst noting that construction and operation will ultimately take place in parallel.

21.2.2. As noted previously in Chapter 2, limited information is available for the decommissioning phase of the Proposed Development; however, decommissioning impacts are likely to be similar to those for construction / operation and will be scoped concurrently. At the end of operational life, a decommissioning plan will be implemented.

21.2.3. To avoid unnecessary repetition and duplication, the assessment of MA&D signposts to other sections of the Scoping Report and / or to other documentation / regulatory regimes, as applicable. Consequently, the potential for MA&D associated with the following environmental topics are excluded from this assessment as they are considered elsewhere in this Scoping Report:

- the vulnerability of the Proposed Development to climate change (e.g. severe weather events), with the exception of flood risk, is considered in Climate Vulnerability (Chapter 17) where it was concluded that potential effects were unlikely to be significant and could be scoped out;
- flood risk is addressed in the Water Environment and Flood Risk (Chapter 12), and a standalone Flood Risk Assessment (FRA) will be undertaken for the EIA;
- risks associated with geohazards (for example ground instability, unexploded ordinance, landfill gas permeability) are addressed in Geology and Soils (Chapter 13); and
- risks associated with traffic and transport will be considered as part of a standalone Transport Assessment (TA), to be submitted with the DCO application.

21.3. Identification of Hazards and Risks

21.3.1. Hazards can be man-made or natural. Two sources of guidance in relation to the identification and assessment of risks on a national and local basis, in particular those arising as a result of accidents and disasters are:

- the National Risk Register (NRR) of Civil Emergencies 2025[44]. The NRR is the external version of the National Security Risk Assessment, which is the government's assessment of the most serious risks facing the UK. It provides the government's updated assessment of the likelihood and potential impact of a broad range of risks that may directly affect the UK and its interests; and
- Community Risk Registers (CRRs). The Civil Contingencies Act (2004)[45] requires the production and publication of CRRs, which provide an overview of significant risks based on local conditions, infrastructure and geography that are most relevant for a local area. For Cheshire, the relevant CRR is the Cheshire Resilience Forum CRR[46].

[42] Note IEMA has recently (July 2025) been rebranded as ISEP (Institute of Sustainability and Environmental Professionals).
[43] Major Accidents and Disasters in EIA: A Primer, IEMA, September 2020. Available via: https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer

[44] https://www.gov.uk/government/publications/national-risk-register-2025
[45] https://www.legislation.gov.uk/ukpga/2004/36/contents
[46] Cheshire Resilience Forum Community Risk Register, September 2025.

21.3.2. The CRR identifies the top risks to the County of Cheshire as:

- Pandemic;
- Flooding;
- Severe weather;
- Loss of critical national infrastructure;
- Animal diseases;
- Environmental Incidents;
- Industrial Incidents;
- Transport Incidents;
- Malicious attacks; and
- Cyber Risk.

21.3.3. The most directly relevant of these for the Proposed Development, and to the scope of the MA&D assessment, are environmental and industrial incidents. As a result of the flammability of hydrogen gas, and in the event of a large scale hydrogen gas leak encountering a source of ignition, this could potentially result in fire and / or explosion scenarios.

21.3.4. A further source of hazards is provided in the IEMA Primer[47], as seen in **Table 21-1**.

21.3.5. In relation to hazards and associated risks specific to the Proposed Development, hazard identification (HAZID) and environmental impact identification (ENVIID) workshops have been undertaken during the Pre-FEED phase for the Hydrogen Storage Facility. To ensure that workshop participants had a common understanding of the objectives, scope, requirements and the methodology to be followed, a HAZID / ENVIID Terms of Reference (ToR) document was produced. Appendix A of the HAZID / ENVIID ToR provides comprehensive lists of guidewords to be used as prompts in the HAZID and ENVID workshops. The guidewords are considered to represent the relevant hazards / risks identified in the NNR, CRR and the IEMA Primer.

21.3.6. Following on the from the HAZID / ENVIID, a concept risk assessment (CRA) (including consequence modelling using licenced software validated for hydrogen) has been undertaken for the Hydrogen Storage Facility, and the findings of this have already been fed back into the design process. Further studies and risk assessments will be undertaken as the Proposed Development continues (these will include consideration of the LCHPP), and as the design continues to evolve through the FEED[48] and into the detailed design phase.

Table 21-1 IEMA Primer: source of hazards

Man-Made Hazards	Natural Hazards
Structural / building collapse; Human error / management failure; Design error; Sabotage / arson; Aircraft / rail / road / sea or river vessel disaster; Collision / overloading / hull failure; Terrorism / cyber-attack; Industrial / technological accident; Explosion (chemical, nuclear or other); Pollution (oil, chemical or other); Fire; Conflict; Displaced population; Crowd violence and disorder.	Earthquake; Flooding; Dam collapse; Volcanic eruption; Avalanche; Extreme temperature (heat wave, cold snap); Fire; Ground subsidence; Landslide; Tropical storm; Storm surge; Animal / insect infestation; Sandstorm; High winds/storm; Wildfire; Tsunami/tidal wave; Drought; Biological hazard – epidemic, pandemic.

21.4. Scoping the EIA

21.4.1. In relation to the requirement to consider MA&D the IEMA Primer states that:

21.4.2. ‘‘In general, major accidents and/or disasters should be considered as part of an assessment where the development has the potential to cause the loss of life, permanent injury and / or temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.’’

21.4.3. Developments are considered in terms of both:

- their vulnerability to MA&D;
- their potential to cause, or exacerbate a MA&D.

21.4.4. The IEMA Primer offers a proportionate assessment methodology with a focus on low likelihood / high consequence events. Low impact events, such as minor spills,

[47] Major Accidents and Disasters in EIA: A Primer, IEMA, September 2020. Available via: https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer

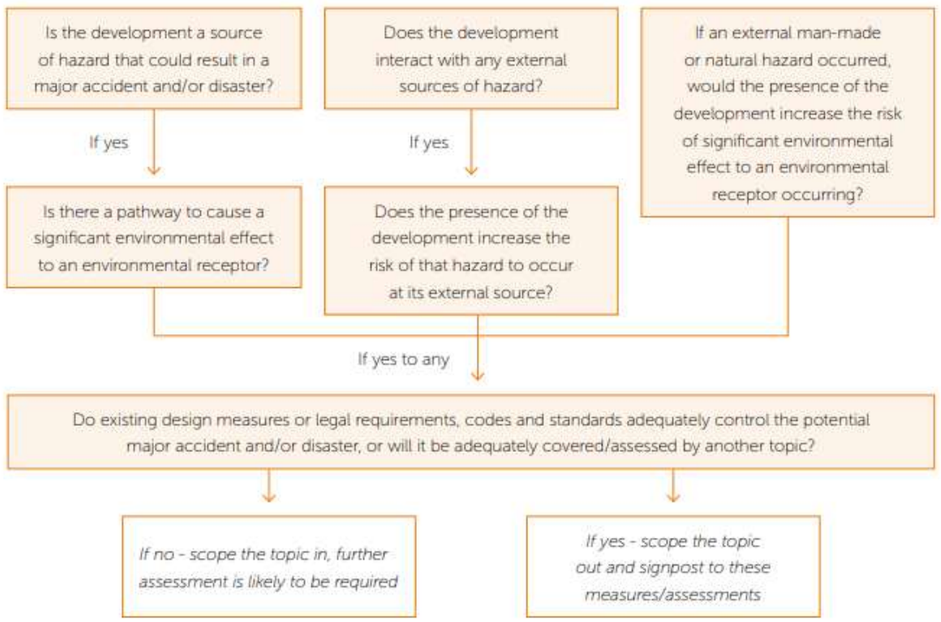
[48] Front-End Engineering Design stage comprising a comprehensive design package, scope, technical specs etc for tendering.

are not major accidents and are not to be considered. The IEMA Primer also recognises that:

- the update to the 2017 EIA Regulations should not result in duplication of effort and/or assessment, reinforcing the need for proportionality;
- the UK already has a structured framework of risk management legislation in place and as such a signposting approach, making efficient use of existing risk assessments, can be applied; and
- primary and tertiary mitigation of a development's vulnerability to MA&D for infrastructure and other built environment developments is covered by a wide range of safety and non-safety related legislation, and that in most circumstances, this mitigation is usually sufficient to manage the vulnerabilities to MA&D without the need for secondary mitigation.

21.4.5. The IEMA Primer provides a useful screening tool / process flow diagram for scoping MA&D in or out of an EIA as illustrated in **Insert 21-1** below.

Insert 21-1 IEMA Primer Screening Tool



21.4.6. Of particular relevance to the Proposed Development is the final stage in the IEMA Primer screening process (as shown in **Insert 21-1**). This is because the nature and location / setting of the Proposed Development, coupled with the anticipated overarching regulatory requirements, codes and standards and assessments will mean that the design, construction, operation and management of the facility will be such that the answer to the last stage of the IEMA Primer Screening Tool (**Insert 21-1**) is '*yes – scope the topic out and signpost to these measures / assessments*'.

21.4.7. As noted previously, risks associated with climate vulnerability, flooding, geohazards and transport accidents are adequately covered / assessed elsewhere in this Scoping Report.

21.4.8. Typically, construction related health, safety and environmental requirements are considered within the relevant construction risk assessments and by existing legislation, and therefore, can be scoped out of further assessment in the EIA process. This is consistent with the Scoping Opinion for a similar development (Aldbrough Hydrogen Storage Project), which stated: *'…the Inspectorate are in agreement that it is typical for construction related health and safety requirements to be considered within the relevant construction risk assessments and by existing legislation, and therefore these can be scoped out of the ES.'*

21.4.9. The HAZID / ENVIID workshops, and subsequent CRA have identified that the main risks associated with the operational phase of the Hydrogen Storage Facility are from a large scale accidental release of hydrogen (caused by man-made / natural hazards). This could potentially result in thermal radiation from pool / jet fires, flash fires and overpressure from explosions. The findings of the HAZID / ENVIID workshops, and the CRA will be reviewed to determine if further workshops, amendments or revisions are required as a result of the proposed LCHPP. It is expected that the main risk from the LCHPP will also be due to a large scale accidental release of hydrogen, but the other potential risks, such as the potential for asphyxiation from a release of nitrogen (purge gas) in a confined space, should be identified, reviewed and considered.

21.4.10. Operation of the Proposed Development will be governed by comprehensive health, safety and environmental related regulatory requirements, one of the key regulatory regimes being the Control of Major Accident Regulations 2015 (COMAH Regulations). The COMAH Regulations apply to sites that store hazardous substances in quantities above threshold levels. COMAH establishments are regulated by the 'Competent Authority' (CA), which in England comprises the Health and Safety Executive (HSE) and Environment Agency.

21.4.11. The aim of the COMAH Regulations is to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious harm to people and / or the environment. Due to the quantity of hydrogen that could be stored, the Proposed Development will be an upper tier COMAH establishment and will require a Hazardous Substances Consent (HSC). Therefore, the Proposed Development will:

- be highly regulated;
- employ safe systems of working;
- require rigorous safety and environmental risk assessments; and
- have to demonstrate that any risks are reduced to a level considered to be 'As Low As Reasonably Practicable' (ALARP).

21.4.12. Further information is provided in **Table 21-2**.

21.4.13. As suggested in the IEMA Primer, signposting to evidence for the measures, regulations, consents, requirements, standards, codes, practices, studies / assessments and features that will apply to the Proposed Development can be provided to justify scoping out further assessment of MA&D. A summary of the key aspects is provided in **Table 19-2**, the Basis of Design (BoD) provides more detailed information.

Table 21-2 Key control measures, requirements, standards, designs and features

Aspect	Summary Description
Regulatory Regimes / Acts	
Construction (Design and Management) Regulations 2015 (CDM Regulations)	The Proposed Development will be subject to the CDM Regulations, the purpose of these regulations is to improve health and safety by making sure work is planned properly and risks are managed from start to finish. The CDM Regulations place specific duties on clients, designers, and contractors so that health and safety is considered throughout the life of a construction development from its inception to its subsequent final demolition and removal. Under the CDM Regulations, designers are required to avoid foreseeable risks so far as reasonably practicable by eliminating hazards from the construction of a structure, reducing risks from any remaining hazard, and giving collective safety measures priority over individual measures.
The Health and Safety at Work Act and the Management of Health and Safety at Work Regulations	The Health and Safety at Work Act 1974 is the main legislation in Great Britain that provides the legal framework for workplace health, safety, and welfare. The overriding principle of the Health and Safety at Work Act is that foreseeable risks to persons in workplaces will be reduced so far as is reasonably practicable and that adequate evidence will be produced to demonstrate that this has been done. This applies to both construction and operation. The Management of Health and Safety at Work Regulations 1999 supplement the Health and Safety at Work Act by providing specific, actionable duties, primarily requiring employers to conduct formal risk assessments and to implement preventative measures.
Planning (Hazardous Substances) Regulations	The Planning (Hazardous Substances) Regulations 2015 implement land-use planning requirements under the Seveso III Directive (2012/18/EU). HSC is required for the presence of certain hazardous substances at, or above, controlled quantities specified. A HSC will be required for the Proposed Development. HSCs are granted by the Hazardous Substance Authority, which is typically the Local Planning Authority.
COMAH Regulations 2015	As an upper tier COMAH site, the Proposed Development will be required to submit a pre-construction COMAH safety report in advance of construction and a COMAH safety report in advance of operation. A COMAH safety report details how a site prevents major accidents and limits their consequences by outlining the policy, management systems, hazard identification, risk assessments, and technical safety measures in place. It describes potential accidents and their impacts, demonstrates risks are reduced to ALARP and informs emergency planning for workers, the public, and the environment. See also below for more information relating to the contents of a COMAH Safety Report.
Pipeline Safety Regulations	The Pipeline Safety Regulations 1996 apply to onshore and offshore pipelines and contains two tiers of duties. The first tier applies to all pipelines irrespective of the fluid being conveyed, whereas the second tier (Regulations 18 -27) only applies to pipelines which are classified as Major Accident Hazard Pipelines (MAHP). MAHPs are those that convey a dangerous fluid. Hydrogen gas is classified as a dangerous fluid; therefore; the hydrogen pipeline will be considered a MAHP. Regulation 23 states a Major Accident Prevention Document (MAPD) will be prepared by the operator of a MAHP to demonstrate that: • all reasonably foreseeable hazards relating to the pipeline, which involve a dangerous fluid and have a potential to cause a major accident, resulting in death or serious injury, have been identified; • the risks arising from those hazards have been evaluated; • the safety management system is adequate; • the pipeline operator has established adequate arrangements for audit and for the making of reports thereof. Regulation 20 requires the operator to inform the HSE prior to construction and operation of a MAHP.
Pressure Systems Safety Regulations (PSSR) 2000	The aim of PSSR is to prevent serious injury from the hazard of stored energy, as a result of the failure of a pressure system or one of its component parts. PSSR impose duties on designers, importers, suppliers, installers and users or owners to ensure that pressure systems do not give rise to danger.
The Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR)	DSEAR require employers to control the risks to safety from fire, explosions, and substances corrosive to metals. This applies both to people in the workplace and who may be put at risk by work activities. DSEAR will apply to the Proposed Development.
The Offshore Installations and Wells	Application of the DCR to land based wells provides a framework for ensuring the safe condition of wells, throughout their lifecycle, including an examination scheme. The regulations require the duty holder to ensure the integrity of a well, from design to abandonment.

Aspect	Summary Description
(Design and Construction, etc.) Regulations **1996 (DCR)**	
The Boreholes Safety and Operations Regulations 1995	The Boreholes Safety and Operations Regulations apply to activities or operations in connection with the extraction of minerals by a borehole, including the construction of caverns in salt formations by solution mining. The regulations include requirements for drilling operations, well maintenance, and other general operations. The regulations require operators to notify the HSE at least 21 days in advance of drilling activities.
Environmental Permitting (England and Wales) Regulations 2016 (EPR)	The EPR establish the environmental permitting and compliance regime that applies to England and Wales. The EPR require operators of certain facilities and activities to obtain permits and provides for ongoing supervision by the relevant regulators. An environmental permit typically sets out the standards and requirements to avoid the risk of unacceptable levels of pollution under both typical and abnormal operation. It ensures that potential effects on the environment have been minimised as far as reasonably practicable. See the Consents and Permitting Strategy row below for further information.
General Standards, Practices and Management Controls	
General construction practices	The construction of the Proposed Development will be undertaken in accordance with standard good practices and with adherence to legislation and general risk management procedures for construction work, including the production of a comprehensive CEMP.
Inherent safety design	Inherent safety design principles will be used to ensure compliance with the COMAH requirements, to apply the ALARP principle and to comply with the CDM Regulations. The approach will be applied to the design, construction, intervention, installation, operation and decommissioning of the Proposed Development.
Best Available Techniques (BAT)	The Hydrogen Storage Facility design will take account of BAT, i.e., those available techniques which are the best for preventing or minimising emissions and impacts on the environment. “Techniques” include both the technology used and the way the installation is designed, built, maintained, operated and decommissioned. There are no existing UK or European Union BAT reference documents (BREFs) or BAT Conclusion (BATC) documents which specifically cover the production of hydrogen from water by electrolysis. The UK regulators have produced guidance on emerging techniques for hydrogen production by the electrolysis of water[49]. This guidance was informed by a review produced following consultation with industry and other stakeholders[50]. Although it is not a regulatory requirement, the guidance identifies best practice to address important environmental issues and the regulator expects operators to follow it or propose an alternative approach to provide the same or greater level of protection for the environment. In addition, the BREF for Common Wastewater and Waste Gas Treatment / Management Systems in the Chemical Sector can be referred to for BAT for the wastewater treatment plant[51].
Cybersecurity	Best practice, following the International Electrotechnical Commission (IEC) 62443 – Risk Management Standard for Industrial Automation and Control Systems, Network and Information System Regulations (2018), and applicable corporate standards, will be applied to the design of the Information Technology and Operational Technology systems to address potential cyber risks/threats. Consideration will also be given to the HSE Guidance Note OG-86 – Cyber Security for Industrial Automation and Control System. Facilities will have the ability to enable backup and recovery of the systems in the event of compromise to any system.
Security	The design of the Proposed Development includes for security fencing around the process areas, including the Gas Processing Facility and the Hydrogen Production Facility. Security fencing for NSIPs must adhere to rigorous standards designed to protect critical assets from sabotage, terrorism and theft. Fencing must be chosen on a site-specific risk assessment. As of 2026, the primary authority for these standards is the National Protective Security Agency (NPSA). The NPSA has produced guidance[52] for those responsible for developing, designing and delivering a new perimeter solution.

[49] Environment Agency. Guidance on Hydrogen Production by Electrolysis of Water: Emerging Techniques, March 2024.
[50] Environment Agency. Review of Emerging Techniques for Hydrogen Production from Electrolysis of Water, March 2024.
[51] BAT Conclusions for the Common Wastewater and Waste Gas Treatment / Management Systems in the Chemical Sector (Implementing decision - 2016/902 - EN - EUR-Lex)
[52] Security Fences and Gates, last updated 14 August 2025: . https://urldefense.com/v3/__https://www.npsa.gov.uk/building-protection/building-infrastructure/security-fences-and-gates*:*:text=NPSA*20no*20longer*20tests*20fences,threat*20posed*20to*20your*20site__;I34lJSUlJSUlJQ!!OepYZ6Q!_flGc9sUCsJTWJKJWmUjX4309r_oZlNWk2l9OaqmzbY5dLCMefRBD06Fwi64PR6Uu3tL8Zfc6g8py4bUVJWZKyBafPlR$.

Aspect	Summary Description
Environnemental Management Plan / Environnemental Management System (EMS)	An Environmental Management Plan (EMP) will be prepared for the operation of the Proposed Development. The Proposed Development will minimise and manage impacts to the environment in accordance with the EMP. It is assumed that the operation of the Proposed Development will be undertaken in accordance with an accredited EMS, or an EMS established in accordance with ISO 14001:2015
Studies and Reports	
Basis of Design (BoD)	A comprehensive BoD report has been prepared for the Hydrogen Storage Facility. The BoD develops the requirements, constraints and assumptions, plus any unknowns, and provides sufficient information for this to be used throughout the development of the Proposed Development. The BoD develops the overarching design requirements further, providing more specific requirements and is considered the primary reference for the minimum design requirements for the Proposed Development. Part of scope of the BoD is to identify the applicable standards, acts and regulations that apply to the Proposed Development. The precedence and order of standards is given as: • UK law; • HSE; • site safety requirements (as applicable); • project specifications; • Uniper specifications; • industrial and international standards, including those already identified in project Standards (e.g. National Association of Corrosion Engineers (NACE) standards, American Society of Mechanical Engineers (ASME standards), etc.); and • good engineering practice. A further, more detailed, list of relevant Codes and Standards is provided Appendix A of the BoD. The list will be updated as the Proposed Development develops. The BoD will be reviewed to determine if amendments or revisions are required as a result of the proposed LCHPP.
HAZID / ENVIID and CRA	As noted previously, HAZID / ENVIID workshops have been undertaken, a CRA has been produced – all of these have fed back into the design process. These will be reviewed to determine if further workshops amendments or revisions are required as a result of the proposed LCHPP.
Process Safety Strategy (PSS) / Passive and Active Fire Protection Philosophy	The PSS and the Passive and Active Fire Protection Philosophy are being developed as part of the Pre-FEED. These documents describe the process safety and design assurance strategy for the Proposed Development, including the strategy for compliance with the COMAH Regulations and HSC, as well as the mitigation strategies for potential fire and explosion type events.
Environmental Design Philosophy	An Environmental Design Philosophy has been developed during Pre-FEED for the Hydrogen Storage Facility to define the environmental requirements which the Proposed Development must meet, as established through the relevant environmental standards, regulations, and legislation applicable to the Proposed Development. This will be reviewed to determine if amendments or revisions are required as a result of the proposed LCHPP.
Consents and Permitting Strategy	A Consents and Permitting Strategy has been developed during Pre-FEED for the Hydrogen Storage Facility to outline the key consenting and permitting activities that may be required to construct and operate the Proposed Development. An initial review of the most likely EPR permitting requirements has been undertaken for the Hydrogen Storage Facility following Scheduled Activities. Pre-application consultation with the Environment Agency has been undertaken. The list below summarises the anticipated requirement for consents based on the current design phase and pre-application advice from the Environment Agency. • Schedule 1 - Installations and mobile plant (activities such as combustion, chemicals production and waste management) – not likely to be required; • Schedule 20 - Mining Waste Operations – not likely to be required for mining operations or for management of waste; • Schedule 21 - Water Discharge Activities - not likely to be required; • Schedule 22 - Groundwater Activities - maybe required, but this depends on the outcome of the site-specific hydrogeological risk assessment and conceptual model;

Aspect	Summary Description
	• Schedule 23 - Radioactive Substances – to be reassessed upon confirmation of well drilling process; • Schedule 25 - Flood Risk Activities – not likely to be required; and • Schedule 25A/25B - Medium Combustion Plant/Specified Generators – not likely to be required, to be reassessed during detail design. The Consents and Permitting Strategy will be reviewed and updated to incorporate the LCHPP. As production of hydrogen is a Part A (1) 4.2 (a)(i) inorganic chemicals activity within Schedule 1 Part 2 of the EPR, the Hydrogen Production Facility will require an Installations Permit. There will be a water discharge from the waste water treatment plant for the LCHPP. Once the design of the waste water treatment plant has progressed, and the discharge can be characterised, the options for disposal can be identified and fully understood. Pre-application consultation with the Environment Agency should then be held to ensure any permit requirements are known. British Salt has an existing nearby abstraction licence (as per the Water Resources Act 1991, and Water Resources (Abstraction and Impoundment) Regulations 2006)) and this is proposed to be used as a source of water for the Proposed Development. However, the conditions of the existing licence will need to be reviewed to determine whether the existing abstraction licence can be used for the Proposed Development or whether a variation, or new abstraction licence, will be required. The Proposed Development will continue to be reviewed to determine and / or confirm the applicability of permit requirements as the design develops.
Construction and Simultaneous Operations (SIMOPs)	SIMOPs is the term for when two or more potentially conflicting operations could happen at the same time in the same, or adjacent locations. A key component of managing SIMOPs is conducting a risk assessment to identify and mitigate potential hazards before operations begin. A SIMOPs assessment will be undertaken at a later phase in the Proposed Development.
Hazard and Operability Study (HAZOP)	A HAZOP is a systematic and structured method for identifying potential hazards and operational problems in a planned (or existing) process. The aim of the study is to identify potential issues and recommend solutions to ensure the prevention of accidents, equipment damage and inefficient operation. A HAZOP will be undertaken towards the end of FEED.
COMAH Safety Reports	Key components of a COMAH Safety Report include: Site Description & Policy: • General Information: operator name, address, site details, and volumes of hazardous materials stored; • A formal statement of how the operator will prevent major accidents. Management Systems: • Implementation Plan: how the safety policy will be put into practice; • Organisational Structure: how safety responsibilities are managed; • Internal Systems: links to the site's overall management systems. Hazard Identification & Risk Assessment Hazard Register: • A list of identified major accident hazards. (Note, Hazard identification includes taking account of the potential for ‘domino’ effect as a result of other COMAH establishments in the vicinity.) Accident Scenarios: • Descriptions of possible major accidents, their likelihood, and consequences (e.g., fatalities, injuries, environmental damage); • ALARP justification: evidence and methodologies showing that risks are reduced to a level considered ALARP. Technical & Procedural Measures: • Prevention measures: safe plant design, safe operating procedures, and process control to prevent accidents; • Mitigation measures: systems like fire-fighting equipment, relief systems, and filters to limit the impact of an accident if it occurs; • Plant & equipment: information on safety features built into the plant during its design and construction; • Safety-related control systems: details on how these systems are designed for safety and reliability. Emergency Planning: • Site Emergency Plan: The plan for managing emergencies on-site; • Off-Site Planning: Information used by local authorities to create plans for emergencies affecting the wider community. COMAH Safety reports are used by the:

Aspect	Summary Description
	• Site operator - to demonstrate compliance with COMAH regulations and ensure safe operations; • Competent Authority to assess whether the operator has met their legal obligations and provided sufficient evidence of risk control; Local Authorities - for informing the creation of off-site emergency plans
Other assessments	In addition to those already mentioned in this Table, the PSS notes the following design and safety studies are planned for the future: • Layer of Protection Analysis (LOPA); • Fire and Explosion Analysis (FERA); • Occupied Building Risk Assessment (OBRA); • Escape, Evacuation and Rescue Assessment (EERA); Risk Registers; and Mechanical Integrity Programme.
Flood Risk Assessment (FRA)	Consideration of MA&D relating to flooding will be assessed in a standalone FRA.
Transport Assessment (TA)	Consideration of MA&D relating to traffic and transport will be assessed in a standalone TA.

21.4.14. It is not considered that a standalone MA&D assessment is likely to be required for any phase of the Proposed Development; this conclusion is based on a combination of the following:

- the guidance in the IEMA Primer;
- the location and type of the Proposed Development;
- design processes and the associated measures, regulations, consents, requirements, standards, codes, practices, studies / assessments that will apply / be undertaken;
- the coverage and related assessments provided elsewhere within the other EIA technical sections; and
- adequate assessment outside of the EIA, either in standalone documents to support the DCO application and / or to support other regulatory regimes.

21.4.15. However, in recognition of the properties of hydrogen gas, and as some of the assessments referred to above may not have been undertaken by the next stage in the EIA process, it is proposed that the potential risks resulting from a large scale release of hydrogen gas be considered further.

21.5. Summary of Elements Scoped In or Out

21.5.1. The output of the scoping exercise is summarised in **Table 21-3**. Justification for scoping out the assessment of MA&D scenarios has been provided through signposting to other sections of this report, to other reports / assessments and through the provision of evidence sources.

Table 21-3 Summary of elements scoped in or out.

Aspect	Scoped in / Out	Justification
Construction		
All Aspects	Scoped out	Either: • Existing design measures or legal requirements, codes and standards will adequately control potential MA&D, and / or • It will be covered by another environmental topic (e.g. FRA / TA).
Operation		
Large Scale Accidental Release of Hydrogen Gas	Scoped in	Will be addressed as part of other regulatory regimes (particularly COMAH); however, scoped in on a precautionary basis.
All Other Aspects	Scoped out	Either: • Existing design measures or legal requirements, codes and standards will adequately control potential MA&D, and / or • It will be covered by another environmental topic (e.g. FRA / TA).

22. Cumulative Effects

22.1. Context

22.1.1. Schedule 4 of the EIA Regulations requires an ES to identify and assess the likely significant cumulative effects of a development, either cumulatively with other developments (inter-project effects) or the in-combination environmental effects on receptors or resources from the project in isolation (intra-project effects).

22.1.2. The Proposed Development will be subject to an application for a DCO under the PA2008. The proposed approach to the assessment of cumulative effects has therefore been developed with reference to the relevant parts of PINS guidance on Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment (2025)[53]; and the Design Manual for Roads and Bridges (DMRB) LA 104[54] , which are considered to provide best practice guidance.

22.1.3. As the Proposed Development is still at an early stage of design definition, no baseline description specific to the Cumulative Effects Assessment (CEA) is included and no CEA has been undertaken as part of this Scoping Report.

22.2. Existing Environment and Baseline Conditions

22.2.1. At this scoping stage, no specific baseline conditions have been established, nor has an assessment of the associated cumulative effects been undertaken. This scoping report outlines the proposed approach, recognising that a comprehensive CEA can only be undertaken once the environmental topic assessments are completed as part of the ES. The baseline conditions described in other topic chapters will become relevant once a refined short-list of Reasonably Foreseeable Future Projects (RFFPs) are identified at the next stage in the EIA process. A full assessment of cumulative effects will be presented in the ES.

22.2.2. **Appendix C, Chapter 20** outlines the assessment methodology for the CEA, which will evaluate the Proposed development against the future baseline environment. Two future baselines will be established for comparison: the opening year future baseline and the operational year future baseline, which will be five years after the opening year.

22.2.3. To support the assessment of cumulative effects of the Proposed Development with other projects, a longlist and shortlist of RFFPs will be complied at the next stage of the EIA process. The categories that each RFFP will be assigned and assessed under are included in **Appendix C, Table 20-1.** It should be noted that the CEA proposes to include the drilling and solution mining activities for the four east plot caverns (14/5678W) in the assessment.

22.3. Potential Environmental Effects

22.3.1. In the ES, the CEA will explore the ways in which the predicted effects of the Proposed Development on receptors/ resources may alter when they are considered in their totality (i.e. across all topic assessments), as well as in the context of RFFPs, that could potentially interact with the Proposed Development. DMRB LA 104 provides a definition of cumulative effects that reflects these two potential sources of cumulative impact for consideration within CEA. For the purposes of this Scoping Report, they are referred to as intra-project assessment and inter-project assessment, summarised here:

- Intra-project assessment– cumulative impacts arising from the Proposed Development itself, including across topics
- Inter-project assessment – cumulative impacts arising between the Proposed Development and other developments expected to come forward within similar timeframes. This is completed with reference to the RFFPs.

22.3.2. Within both categories, cumulative effects arising from the impacts may be additive or synergistic, depending on the nature of the impact interaction:

- Additive effects - Where similar impacts from different sources accumulate (e.g. two developments generating noise, resulting in a higher overall noise level); or
- Synergistic - Where different types of impacts interact to produce a greater overall effect, for example, dust and visual intrusion jointly affecting the amenity of a public space.

22.3.3. **Insert 22-1** provides a cross-tabulation of the topics where impact interactions with the potential to lead to cumulative effects can most typically be identified. At this Scoping stage, all of the typical interactions remain scoped in.

22.3.4. Impact interactions between topics and Climate Vulnerability and effects on Climate (GHG emissions) have been scoped out. This is because the effects of GHG emissions are cumulative, with their concentration in the atmosphere, rather than actual emissions levels, being what determines the warming effect – on this basis, shortlisted RFFPs will not affect the likelihood of climate hazards or their consequences on the Proposed Development in ways that will not have already been considered within the climate vulnerability assessment of the ES.

[53] Planning Inspectorate (March 2025). Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment. Available online at: Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment - GOV.UK

[54] Design Manual for Roads and Bridges (2020) LA 104 Environmental assessment and monitoring. Available online at: LA 104 - Environmental assessment and monitoring

Topic	Water Env.	Biodiversity	Landscape & Visual	Geology & Soils	Material Assets & Waste	Historic Env.	Traffic & Transport	Air Quality	Noise & Vibration	Population & Human Health
Water Environment	—	✓	✓	✓	✓	✓	✓	✓	—	✓
Biodiversity	✓	—	✓	✓	✓	—	✓	✓	✓	✓
Landscape & Visual	✓	✓	—	✓	✓	✓	✓	✓	✓	✓
Geology & Soils	✓	✓	✓	—	✓	✓	—	✓	—	✓
Material Assets & Waste	✓	✓	✓	✓	—	—	✓	✓	—	✓
Historic Environment	✓	—	✓	✓	—	—	✓	✓	✓	✓
Traffic & Transport	✓	✓	✓	—	✓	✓	—	✓	✓	✓
Air Quality	✓	✓	✓	✓	✓	✓	✓	—	✓	✓
Noise & Vibration	—	✓	✓	—	—	✓	✓	✓	—	✓
Population & Human Health	✓	✓	✓	✓	✓	✓	✓	✓	✓	—

Insert 22-1 Typical impact interactions that may lead to potential cumulative effects

23. Proposed Scope of the EIA and Consultation

23.1. Proposed Scope of the EIA

23.1.1. The proposed scope and structure of the ES is as follows:

- ES Volume 1: Non-Technical Summary;
- ES Volume 2: Main Report comprising:
    - Chapter 1: Introduction
    - Chapter 2: The Proposed Development
    - Chapter 3: Consideration of Alternatives
    - Chapter 4: Policy and Legislation
    - Chapter 5: Scope of the EIA and overall methodology;
    - Chapter 6: Biodiversity
    - Chapter 7: Landscape and Visual Amenity
    - Chapter 8: Historic Environment and Archaeology
    - Chapter 9: Water Environment and Flood Risk;
    - Chapter 10: Geology and Soils;
    - Chapter 11: Noise and Vibration;
    - Chapter 12: Air Quality;
    - Chapter 13: Waste and Materials;
    - Chapter 14: Effects on Climate;
    - Chapter 15: Socioeconomics
    - Chapter 16: Human Health;
    - Chapter 17: Cumulative Effects; and
    - Chapter 18: Mitigation Schedule.
- ES Volume 3: Figures; and
- ES Volume 4: Appendices (e.g. CEMP, CTMP, FRA, WFD etc).

23.1.2. In addition to the ES, it is proposed that further environmental information will be submitted as part of the DCO application including but not limited to the following documents:

- Transport Assessment;
- Arboricultural Impact Assessment, including Tree Protection Plans; and
- BNG Assessment.

23.1.3. This will ensure that the ES will focus on only those impacts where there is a possibility of significant effects arising, in accordance with the EIA Regulations.

23.2. Consultation

23.2.1. Before an application for a DCO is submitted to PINS, consultation with key stakeholders (local authorities, statutory bodies, the local community and interest groups) will be undertaken.

23.2.2. The first phase involves submitting this Scoping Report to obtain feedback from consultees on the Proposed Development and the scope of the ES. This feedback, which will be provided through a Scoping Opinion coordinated by PINS, will inform the ongoing EIA process for the Proposed Development.

23.2.3. Subject to changes in statutory requirements or updated guidance, the second phase will comprise a public consultation in 2026. This will present to key stakeholders and the local community how the feedback received during the scoping period has been taken into account in developing the proposal.

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