Ferrybridge Carbon Capture and Storage

EIA Scoping Request

April 2024

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1 Introduction

1.1 Request for EIA Scoping Opinion

1.1.1 enfinium Limited ('the Applicant') operate Ferrybridge 1&2, which is the largest combined Energy from Waste facility currently operating in the UK. enfinium are planning to install post combustion Carbon Capture Technology and Storage (CCS) ('the Proposed Development') to serve both EfW facilities (EfWs), and intend to submit an application for a development consent order (DCO) to the Secretary of State, to approve this.

1.1.2 Installing CCS at Ferrybridge 1&2 is estimated to save over 1.3 million tonnes a year of CO_2, roughly half of which is biogenic CO_2, resulting in a net removal of CO_2 from the atmosphere.

1.1.3 Savills has been commissioned to prepare this Environmental Impact Assessment (EIA) Scoping Report to inform the scope and content of an EIA for the proposed development. The Application Site Boundary ('Site Boundary') for the Proposed Development is shown in Figures 1.1 and 1.2.

1.1.4 enfinium intends to submit an Environmental Statement (ES), making the proposed development EIA development under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations').

1.1.5 This EIA Scoping Report constitutes a request under Regulation 10 that the Secretary of State, adopts a Scoping Opinion. This EIA Scoping Report is structured as follows:

- Section 2 describes the Site, the surrounding context, and identifies sensitive receptors;
- Section 3 provides information about the development proposed;
- Section 4 outlines the approach that will be undertaken in preparing the EIA and proposed structure of the ES;
- Section 5 identifies the effects considered to be insignificant and, therefore, 'scoped out' of the EIA;
- Sections 6 to 16 provide a review of the relevant baseline, outline the potential environmental effects and the proposed scope of the assessment, under individual topic headings;
- Section 17 sets out the assessment of other environmental effects;
- Section 18 sets out the proposed approach to the consideration of cumulative effects in the ES; and

1.1.6 The foregoing Sections should be read in conjunction with the supporting Figures.

1.1.7 On receipt of this report, the Secretary of State will consult with statutory bodies before adopting their formal EIA Scoping Opinion. The Scoping Opinion will confirm the key environmental considerations to be assessed in the Environmental Statement.

1.2 Consultation to date

1.2.1 Prior to submitting this scoping opinion request, enfinium and its environmental advisors made initial contact with the host local authority, Wakefield Metropolitan District Council ('the Council' / WMDC') to introduce the project to WMDC.

1.2.2 The Applicant further met with WMDC in November 2023 to discuss the consenting approach for the project, this resulted in a letter of support being provided by WMDC to support the submission of a request for a direction under Section 35 of the Planning Act 2008 for the project to be considered a Project of National Significance (PNS). The Applicant intends on having regular contact with WMDC on design and other technical assessment matters as the project progresses.

1.2.3 The Applicant has also held preliminary discussions with the Environment Agency (EA), which regulates both Ferrybridge 1&2 under separate Environmental Permits (EP) and will in due course intend to meet

and brief key regulators, including Natural England (NE) and the Health and Safety Executive. Stakeholder engagement is planned ahead of the statutory consultation exercise, which is likely to take place towards the end of 2024.

1.3 Planning Act 2008 Section 35

1.3.1 In January 2024, the Applicant made a request for a Direction by the Secretary of State under Section 35 'Directions in relation to projects of National Significance' of the Planning Act 2008 for the Proposed Development to be treated as development for which a DCO is required.

1.3.2 A decision by the Secretary of State was received on 20th February 2024, and varied on 16th April 2024, confirming that the project is to be considered as a PNS for which a DCO is required and, for the purposes of this EIA Scoping Report, assessed in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

2 The Site

2.1 Introduction

2.1.1 This section provides an overview of the existing environmental features, constraints and opportunities within the Site Boundary as well as the wider setting of the application site. Mapping of environmental constraints is provided in Figures 2.1 and 2.2 and further detail of the baseline environmental conditions is provided within each EIA topic in Sections 6 to 16.

2.2 The Application Site Boundary

2.2.1 The Application Site ('the Site') that hosts Ferrybridge 1&2 EfWs is located near Knottingley in West Yorkshire in the administrative area of the WMDC. The site is located to the west of the River Aire and the east of the A1(M) at the following coordinates 53°43′14″N, 001°17′17″W (approximate centre of the site). The Site Boundary for the Proposed Development is shown in Figures 1.1 and 1.2.

2.2.2 Within the Site Boundary, the two EfWs border the A1(M) and run parallel to each other in a southwest-northeast configuration. They are located approximately 235m apart and are separated by a railway, rail head facility and landscaping. It is anticipated that the post combustion CCS facilities would be constructed between Ferrybridge 1&2 EfWs and overall the area within the Site Boundary is approximately 41ha. Further information on the Proposed Development is provided in Section 3.

2.2.3 The site has existing connections to the strategic highway network with M62 junction 33 (Ferrybridge Interchange) to the south via the B6136 and the A162, these roads also provide a direct connection to the A1(M) going north.

2.2.4 The land use which abuts the Site is industrial, and comprises both general industrial and storage or distribution uses. Surrounding occupiers include Blue Phoenix UK to the North, Siniat Ltd to the North East and IPTS to the East. MultiTech Engineering, Castleford & Fryston Skip Services and TGM Industrial Ferrybridge Workshop lie to the South East of the Site

2.2.5 Ferrybridge Golf Club and surrounding agricultural land lie to the North West. The nearest area of residential properties is Ferrybridge, over 0.5km to the south, beyond the B6136 and Brotherton and Byram to the east, beyond the River Aire. Holmfield Farm, Holmfields Plant Centre, Oakland Hill Park Home Estate Limited and iCodes are located to the West, beyond the A1(M).

2.3 Key environmental constraints

2.3.1 A summary of the key environmental constraints reported in Sections 6 to 16 and mapped in Figures 2.1 and 2.2 are as follows:

- The Site is located on non-agricultural previously developed land;
- Fairburn and Newton Ings Site of Special Scientific Interest and Local Nature Reserve is 1.5km to the north;
- Well Wood Local Nature Reserve is 1.6km to the northeast
- Parts of the Site lie within flood zones 2 and 3;
- Ferrybridge Henge, a Scheduled Monument lies approximately 500m to the south of the Site;
- Possible archaeological potential on the Site;
- Potential soil contamination is anticipated at the Site due to the former industrial nature of the Site, although the majority of this was redeveloped for Ferrybridge 1&2;
- Nearest housing is 300m to the west of the existing plant at the Oakland Hill Park Home Estate; and

2.4 Relevant planning applications

2.4.1 There have been a number of historical planning applications associated with the Site or in the immediate area.

2.4.2 The first, submitted in 2006, regarded the construction and operation of a plasterboard manufacturing and distribution centre at former Ferrybridge B Power Station, Stranglands Lane, Knottingley, West Yorkshire, WF11 8SQ (planning reference: 06/00078/FUL). This planning application was granted consent in 2006 and the scheme is in operation.

2.4.3 The second, submitted in 2010, regarded the construction of a single storey extension to a gypsum storage building at the same address (planning reference: 10/00303/FUL). This planning application was granted consent in 2010 and constructed.

2.4.4 The third, submitted in 2009, regarded an application under Section 36 of the Electricity Act 1989 for the construction and operation of a 108MW multi-fuel generating station (Ferrybridge 1) on land adjacent to Ferrybridge C Power Station, Stranglands Land, Knottingley, Pontefract WF11 8SQ (local planning authority reference: 09/02103/OHL). This application was given deemed consent in 2011 and the Ferrybridge 1 scheme has been in operation since 2015.

2.4.5 The fourth, submitted in 2014, regarded an application for a DCO under Section 37 of the Planning Act 2008 for the construction and operation of Ferrybridge Multifuel 2, a 90MW multi-fuel power station on land adjacent to Ferrybridge C Power Station, Stranglands Land, Knottingley, Pontefract WF11 8SQ. This DCO was granted in 2015 and the Ferrybridge 2 scheme has been in operation since 2019.

2.4.6 The fifth, submitted in 2018, regarded the construction and operation of an Incinerator Bottom Ash (IBA) recycling facility including the erection of a processing building, formation of an attenuation lagoon, storage areas and associated development at Land North of Kirkhaw Lane, Knottingley, WF11 8RD (planning reference: 18/00347/FUL). This application was granted consent in 2018 and the scheme is in operation by Blue Phoenix.

2.4.7 The sixth, submitted in 2018, regarded the demolition of Ferrybridge ‘C’ Power Station infrastructure at Ferrybridge C Power Station, Stranglands Land, Knottingley WF11 8SQ (planning reference: 18/01761/DEM). This application was granted consent in 2018 and demolition works have been completed.

2.4.8 The seventh, submitted in 2020, regarded the erection of an acoustic fence adjacent to the Site railway unloading conveyor on Siniat Limited land, Kirkhaw Lane, Knottingley, WF11 8UL (application reference: 20/01707/FUL). This application was granted in 2020 and constructed.

2.4.9 The eighth, submitted in 2021, regarded the installation of approximately 97 battery units with a capacity of 150MW on land within the decommissioned Ferrybridge Power Station site at Land at Ferrybridge Power Station, Kirkhaw Lane, Knottingley, WF11 8RB (planning reference: 21/02758/CPL). Other ancillary infrastructure was also required to be installed, including one transformer and an inverter unit for each battery bank, a 2.4m high palisade security fence and Closed Circuit Television security cameras. The battery units were to be connected via underground cabling to the National Grid substation directly north of the Site. This application was granted consent in 2021 and is expected to be fully operational by late 2024.

2.4.10 The Site Boundary is located adjacent to SSE land which has historically been the site for the Ferrybridge C power station, which has now been fully decommissioned and demolished. SSE had planned the creation of Ferrybridge D Power Station, a 2,200MW gas fired power project, however, this was not progressed. In its place, Mountpark proposed a new employment development on the Former Coal Yard at Ferrybridge Power Station (planning reference: 23/00100/HYB). A planning application was submitted to WMDC in November 2023 and approved in March 2024. The scheme is planned to be operational by Q3 2024 and may lead to the change of access to the site.

2.4.11 These applications are noted as the environmental information presented within the applications remain useful for the purposes of this EIA Scoping Report in order to inform the baseline presented.

3 The Proposed Development

3.1 Proposed Development overview

3.1.1 The Applicant is proposing to provide post combustion CCS facilities to serve the Ferrybridge 1 and Ferrybridge 2 Energy from Waste facilities (EfWs).

3.1.2 The purpose of the development is to capture carbon dioxide (CO_2) from the flue gas stream of the EfWs, separate this from the other flue gases, and compress the CO_2 either for initial storage as liquefied carbon before onward rail transport or compression to pressurised gas for onward transport by pipeline to geological storage. This will provide secure long-term storage of the CO_2.

3.1.3 The Site Boundary for the Proposed Development is for construction and operation of carbon capture, storage and compression equipment within the Site.

3.1.4 Flexibility over the route of export for the captured carbon is to be retained and connections to East Coast Cluster or Viking Cluster remain viable. If a pipeline is to be used, it is not yet clear which of the Government's carbon capture, usage and storage 'Clusters' would be connected to and thus at this time there is no notional route of where the pipeline could go, beyond the Site Boundary. As such, it will not be possible to assess pipeline proposals outside of the Site Boundary within the Environmental Statement (including cumulative assessment). If export by rail is to be utilised, the Proposed Development includes the powers to upgrade the existing railhead on Site to facilitate this, and these works will be assessed in the ES.

3.1.5 The ES will consider the indirect impacts associated with the additional train journeys (focussing on noise) that would be created by the Proposed Development (and would otherwise not exist) until it reaches the public railway network.

3.1.6 To provide additional context in light of the importance of the transport and storage network to the success of the Proposed Development, the GHG chapter will present emissions from these journeys, emissions for onwards journeying to Teesside as the rail receptor point (as the Applicant has a MoU with Navigator Terminals located in Teesside), and, in light of recent practice on other CCS schemes, the emissions associated with the transport and storage provision from Navigator to a CO_2 storage site (currently assumed to be utilising Norway's Northern Lights)[1].

3.1.7 The project's key elements are as follows. The associated processes are explained further below. The areas for the new equipment and structures within the Site Boundary are shown indicatively in Figure 3.1. These broad locations may change as the EIA develops and the assessments would take this into account but the Applicant confirms that any such changes would not change the proposed scope of the ES as set out in this Scoping Report.

3.1.8 Carbon Capture and Storage (CCS) technology for up to two CCS plant lines per facility, made up of the following plant and equipment:

- Absorber column(s) and associated release points for exhaust gas
- Stripper column(s)
- Flue gas cooling/heat exchanger(s)
- Solvent cooling/heat exchanger(s)
- Flue gas re-heater(s), if required

[1] https://norlights.com/how-to-store-co2-with-northern-lights/

- Carbon Processing and Conditioning Plant(s) for the conditioning, compression, dehydration, liquefication and refrigeration of the captured carbon, driven by electricity, and onward transport as a liquid by rail; or
- Carbon Processing and Conditioning Plant(s) for the conditioning, compression and dehydration of the captured carbon, driven by electricity, and onward transport as a pressurised gas by pipeline.

3.1.9 To help facilitate the CC process, other development associated with CCS equipment is required, including:

- Control and ancillary equipment
- Infrastructure to deal with the captured CO_2 on-site, such as CO_2 and other storage tanks and CO_2 connections within the Site
- Flue gas connections to each EfWs
- Above-ground installation within the Site Boundary (providing a connection point for the export pipeline if this option is chosen)
- Railhead with tank car loading facility, if rail transport is taken forward
- Drainage requirements
- Utility connections within the Site
- Internal and external EfW modifications to F1 and F2 as required to facilitate the new pipework
- Access, parking and welfare facilities
- Biodiversity and landscape replacement and mitigation.

3.1.10 In appearance, the maximum extent of CCS development will comprise two vertical columns (cylindrical tank-like structures) adjacent to the EfW at both Ferrybridge 1&2 buildings for the capture process, ground-level pipe and ductwork to tie in to the existing EfWs, and ancillary plant at ground level for the CO_2 conditioning and AGI.

3.1.11 Overall, the CCS system is expected to capture around 95% of the CO_2 produced by each EfW, which is approximately 1.3 $MtCO_2$/annum for combined Ferrybridge 1&2. Based on the typical composition of waste treated in the EfW, the CO_2 is around 50% 'biogenic' and 50% 'fossil' in origin. This refers to the source of the carbon in the waste that was combusted.

3.1.12 Fossil CO_2 comes from materials such as plastics made with oil that was formed underground over geological timescales. Releasing this carbon to atmosphere through combusting the waste causes global heating; but capturing the CO_2 and returning it to geological storage via carbon sequestration avoids that effect.

3.1.13 Biogenic CO_2 on the other hand was drawn down from the atmosphere recently by the growth of plants (food, wood, natural textiles and similar). When waste containing this is combusted, the CO_2 would be returned to the atmosphere over a short time cycle, with no net increase. But if the CO_2 is captured and sequestered, as proposed, then this is a net removal, reducing the atmospheric concentration. Combined, the capture and sequestration of both the fossil and biogenic CO_2 is expected to have a net climate-positive impact.

3.2 Typical CCS process and equipment

Overview

3.2.1 In the current operation of the EfWs, exhaust gas from the waste combustion passes through a flue gas treatment (FGT) system for air pollution control and is then discharged through the 100m (Ferrybridge 1) and 119m (Ferrybridge 2) exhaust stacks. Flue gas emissions are regulated and monitored by the Environment Agency (EA) under the respective EfW Environmental Permit.

3.2.2 A detailed description of the carbon capture process is described below, based on the current design. The design will evolve during further engineering design refinement but the main elements will be as described below. The following bullet points are provided to act as a condensed, simplified guide:

- Flue gas will be diverted to the CCS plant from each treated flue gas line and the streams from each facility will then be combined into one or two ducts per EfW (i.e. one or two at Ferrybridge 1 and one or two at Ferrybridge 2).
- Flue gas is then cooled to reduce the flue gas temperature.
- The cooled flue gas will then enter the absorber column(s) where it will be contacted with a solvent which absorbs at least 95% of CO_2 and is then separated from the flue gas.
- The remaining flue gas will then be released from exhaust stacks. The stack height for the CCS elements will be confirmed using dispersion modelling and detailed design but is unlikely to exceed the existing stack height of 100 – 119m[2].
- The CO_2 rich solvent will be passed through a heat exchanger and directed to the top of the vertical stripper column to separate the CO_2 and CO_2 lean solvent. Solvent is then recirculated and re-used in the system.
- The CO_2 gas stream from the stripper column will then pass to the conditioning, compression and export systems, either for liquefaction and storage in spheres as liquefied CO_2 until it is taken offsite by rail or for compression and export by pipeline as pressurised gas. The on-site liquefaction and storage elements for CCS are expected to be shared between Ferrybridge 1&2 in all scenarios.
- It is currently envisaged that the electrical demand of the CCS plant will be met by the existing EfWs.
- To assist the process, there will be ad-hoc deliveries of chemicals to the Site, and removal of spent solvent and effluent.

Carbon capture from flue gas

3.2.3 With the proposed addition of CCS, a new exhaust pipework T junction after the existing flue gas treatment (FGT) stage will allow treated exhaust gas to be diverted from the existing stacks via one or two ducts per EfW into the CCS system. The existing stack and its connection to the EfWs will be retained, so that this can still be used during periods when the CCS system is undergoing maintenance. The flue gas will continue to pass through the existing FGT systems before entering the CCS system, so the existing air pollution control is maintained and the requirements of current environmental permits are continued to be satisfied.

3.2.4 In the CCS system, flue gas will be pre-conditioned via a flow damper and cooling stage and will then enter a vertical absorber column, which is packed with media to create a very high surface area. As flue gas passes up through the column, it will come into contact with liquid solvent sprayed into the top of the column that will flow down the column under gravity, absorbing CO_2 from the flue gas. The CO_2-rich solvent stream will be collected from the base of the column, and the CO_2 lean flue gas will be exhausted from the top. Cooling the flue gas before introducing the solvent is required because the solvent absorbs CO_2 at relatively low temperatures, and releases it at higher temperature. The cooling demand will be met by a standalone cooling water plant, which will be part of the supporting plant for the CCS. This is likely to use hybrid water-air coolers.

3.2.5 The remaining flue gas, with at least 95% of CO_2 removed, will be released from an exhaust stack. At this stage, it is anticipated that this will be located at the top of the absorber column. However, this will be

[2] This assumption on stack height has been used to guide the environmental topic sections within this EIA Scoping Report. In particular, this information has been used to set a Zone of Theoretical Visibility for the Landscape and Visual Impact Assessment. Should dispersion modelling and detailed design determine a stack height above those reported, assessments will be updated in the ES accordingly.

subject to a pre-FEED (front-end engineering design) options study during EIA development to also consider the relative merit of returning the exhaust to the existing EfW facility stack for release. The flue gas may require re-heating to maintain its buoyancy and dispersion characteristics. Optimisation studies will be undertaken to waste as little heat as possible and to maximise efficiency.

3.2.6 The CO_2-rich solvent stream will be sent to a vertical stripper column, located near to the absorber column. It will be heated through a steam reboiler system to a temperature where it releases the carbon dioxide again and leaves the solvent, now CO_2-lean, for re-use again in the absorber column after cooling. The CO_2 stream from the stripper column will then pass to the conditioning, compression and export systems for onward transport by pipeline or liquefaction and storage in spheres for transport off-site via rail.

3.2.7 A steam and electricity supply options study will be carried out as part of the pre-FEED to inform the ES, which will identify the preferred means of supplying steam and auxiliary power to the carbon capture plant. It is currently envisaged that steam produced by the existing EfWs facility will be used in the stripper to heat the solvent and release the CO_2, and to re-heat the exhaust gas if needed. It is envisaged that a new back-pressure steam turbine will be installed to optimise the combined thermal and electrical generation efficiency of the EfW with the new steam offtake to the CCS system. Similarly, the electrical demand of the CCS system (for fans, pumps and similar) is expected to be met from the existing EfWs' electricity generation.

3.2.8 The solvent is re-used in the process, being recirculated through the absorber and stripper columns multiple times to move CO_2 between them, as described above. However, it is eventually spent and requires top-up. There will therefore be occasional tanker deliveries of solvent to the Site, a fresh solvent storage tank, a spent solvent tank and occasional tanker exports of spent solvent for disposal at a suitably licensed installation. The quantities and vehicle numbers will be set out in the ES, but are anticipated to be minor and transported with LGVs.

CO_2 compression and liquefaction

3.2.9 The separated CO_2 gas stream will be cooled, conditioned (dehydration and deoxygenation) and compressed ready for export by pipeline. Alternatively, the cooling, compression and dehydration, will liquefy the CO_2 for refrigeration and storage in spheres before transport via rail. The cooling and liquefaction system will involve pumps, heat exchangers and pipework from the capture process to the above-ground installation.

Liquid CO_2 Storage Spheres

3.2.10 If required, storage spheres will be approximately 25m in diameter and it is anticipated at this time that there will be a need for up to 3.

Above Ground Installation

3.2.11 An Above Ground Installation (AGI) will be included within the design to facilitate the transportation of CO_2 as a pressurised gas. The AGI acts as a connection point to any future pipeline taking CO_2 offsite and so the AGI will be at low level for accessibility. It is anticipated that the AGI will be located in the southeast of the Site near to the Ferrybridge 2 attenuation pond.

3.2.12 The AGI on-site is to facilitate future CO_2 pipeline opportunities whereby the Site may eventually connect to a CO_2 pipeline as part of a Cluster of CCS projects. It is not yet clear which of the Government's carbon capture, usage and storage 'Clusters' would be connected to and thus at this time there is no notional route of where the pipeline could go beyond the Site Boundary. As such, it will not be possible to assess pipeline proposals outside of the Site Boundary within the Environmental Statement (including cumulative assessment). The pipeline will in due course need its own consent and its potential effects will be assessed at the time.

Railhead and transportation of CO_2 off-site

3.2.13 For the railhead to be used a CO_2 Rail Loading Station is required. The loading station is likely to have multiple loading bays and rail wagons would move to complete loading. It is anticipated that the movement will be driven by an electric driven pulley system.

3.2.14 The trains will use the East Coast Main Line which has adequate capacity to support additional movements. This will be discussed with Network Rail as the project proceeds. The CO_2 is expected to be transported to Teesside, where it will be stored and loaded onto ships to storage sites. For the purposes of GHG assessment only, an assumption has been made that this will be to Norway's Northern Lights site, in order to make an assumption that is reasonable.

Railhead for inward transport of waste

3.2.15 In addition to the movement of CO_2 via rail, it remains possible that waste could be unloaded from a single point using the existing gantry on site. It is likely that modifications are to be made to allow the gantry to fly over the CO_2 Loading Station bays and movements may be restricted, therefore, trains would need to move to fully unload all containers onto on-site HGV.

3.2.16 Should rail inward transport of waste not prove viable by rail, operations using HGV will continue.

Cooling system

3.2.17 Cooling systems will be required for the flue gas, solvent (post-stripper) and CO_2 stream. The design of the cooling system is subject to pre-FEED study but may comprise a mixture of air cooling (finned heat exchangers and fans) and/or hybrid water-air cooling, via one or multiple cooling loops. A hybrid water and air cooling system can offer efficiency advantages and potentially re-use flue gas condensate. It would comprise a series of cooling towers with internal fans, which draw air in through louvres at the base, through a water mist system and then through a heat exchanger. This would be broadly similar in appearance to the existing air-cooled condenser system of the EfW, but at a smaller scale.

Water Inputs

3.2.18 A small continuous flow of water will be required for the CO_2 capture process. A larger continuous flow of water may also be required for the cooling if hybrid cooling towers are adopted, although some of this may be able to be supplied from flue gas condensate. If dry cooling is adopted, no additional water would be required. The water supply would be via the existing water connection to the Site which is via on-site borehole abstraction, with public (towns) water supply used as a back-up.

Process Effluent (Wastewater) and Surface Water Runoff

3.2.19 When the flue gas is cooled for the CCS, a proportion of the water vapour that is present in it will condense, creating a new process wastewater stream. It may be possible to re-use a proportion of this in a hybrid water-air cooling system. Ultimately, process effluent will be treated and discharged in accordance with the Environmental Permit. Further details will be set out in the ES following the pre-FEED study to determine the most suitable means of treatment, re-use and disposal route.

Visible Exhaust Plume

3.2.20 The expected minimum flue gas emission temperature from the absorber is 38°C, which may lead to a visible exhaust plume due to residual water vapour condensation under some weather conditions. This will be assessed further in the pre-FEED study and EIA to determine whether exhaust re-heating to aid buoyancy, which would reduce the potential for visible plume formation, is necessary.

3.3 Construction and operation

Demolition

3.3.1 It may prove necessary to demolish existing warehouses and workshops to the south of the Site, within the Site Boundary subject to further design refinement, discussion and agreement. This detail will be confirmed in the Environmental Statement and assessed appropriately within the EIA. For the purposes of this EIA Scoping Report, it has been assumed that the warehouses to the south of the Site will be demolished.

Construction programme

3.3.2 The Proposed Development would be built over a two to three year period. Subject to planning consent and final investment decision, construction could commence from mid-2026, allowing for operation by 2030.

Construction Access and Parking

3.3.3 A provisional construction laydown area has been identified. Temporary site access to is likely to be via the current access off the B6136 and Fryston Lane to the south of the Site. At present, the feasibility of rail use for any construction elements is under consideration.

3.3.4 It is to be noted that the Site access may be altered following amendments proposed through Mountpark's new employment development on the Former Coal Yard at Ferrybridge Power Station. A planning application was submitted to WMDC in November 2023 and approved in March 2024[3]. The scheme is planned to be operational by Q3 2024 and may lead to the change of the Site access.

3.3.5 In addition to the construction laydown areas, it is anticipated that the existing staff and contractor car parks will be used for construction parking.

Operational Access and Parking

3.3.6 The permanent road access will remain as existing, via the current Site access off the B6136 and Fryston Lane to the south of the Site. Site access may be altered following amendments proposed through Mountpark's new employment development mentioned above. It is anticipated that the existing staff and contractor car parks will be used for all operational requirements.

3.3.7 No additional car parking capacity is anticipated to be required for operation of the CCS plant together with the existing EfWs, but any changes to the existing internal access roads and parking will be confirmed in the ES. A loading/unloading area for solvent and other process inputs to the CCS will be provided within the Site Boundary.

Operating hours and staff

3.3.8 The Proposed Development would be designed to operate continuously, as with the existing EfWs, with periods of downtime for planned maintenance. In common with the existing EfWs, it would be staffed in a shift pattern with employees holding a variety of skillsets operating the control room, undertaking maintenance and providing site security and administration. The degree of additional employment opportunities will be set out in the ES.

3.3.9 At intervals a larger temporary contractor workforce would be required during planned maintenance and overhaul of various equipment. Intervals are to be determined by the maintenance and shutdown regime.

[3] https://planning.wakefield.gov.uk/online-applications/applicationDetails.do?keyVal=ROQ7YOQQ0BX00&activeTab=summary

Surface water runoff

3.3.10 It is anticipated that the existing site clean surface water drainage infrastructure will be used to manage any additional runoff from new impermeable areas, although there may be some modification required to divert flows and/or provide additional or alternative attenuation systems. The capacity of this and any required alterations to provide appropriate runoff attenuation will be confirmed through a Conceptual Drainage Strategy to be provided with the application, informed by the Flood Risk Assessment in the EIA.

3.4 Mitigation as part of the proposal

Safety protocols

3.4.1 enfinium plan to arrange discussions with HSE for them to understand any emerging technologies or specific risks of the enfinium project which could have an HSE regulatory impact. It is be noted that the existing Site is not a COMAH site and Hazardous Substances Consent (HSC) is not required. It is assumed that the Proposed Scheme will not be a COMAH site.

3.4.2 The CCS plant will form part of the EfW operation as regulated by the EA under the Environmental Permit. This includes control of emissions to land, water and air, and accident management plans. Enfinium is engaging with the EA to discuss the CCS plant and a probable new permit application for its operation.

3.4.3 The project does not create any new or novel HSE risks without precedence in industry.

Transport

3.4.4 There is good access to the strategic road network and the viability for construction materials to be transported via rail is also being considered.

3.4.5 Suitable safety measures will be in place to ensure safe transportation of CO_2 via pipeline or rail and HGV transportation of chemicals, spent solvent and effluent where required, in accordance with standard practice.

Landscaping and habitat creation

3.4.6 A revised landscaping design for the Site will be developed, to include areas of planting and habitat creation within the Site, including screening of views where applicable. Off-site mitigation may be required, but will be confirmed through the environmental assessment.

3.4.7 enfinium intends to provide biodiversity net gain as part of the Proposed Development, likely to be principally via off-site habitat creation areas, although on-site opportunities will be identified.

Control of construction activities

3.4.8 The assessment of effects prior to the adoption of additional mitigation measures will assume that construction will proceed in accordance with industry standard best practice techniques and that all legislative requirements will be met. Standard measures can be secured through DCO requirements and these will be considered an inherent component of the Proposed Development in the ES, rather than additional mitigation. Management plans are expected to include: site waste management; construction and environmental management and construction traffic management.

Procedure for dealing with contaminated material

3.4.9 The history of industry and demolition on the Site poses an environmental risk with the potential for contamination from a number of sources on Site, as well as the area surrounding the Site, which is heavily industrialised with numerous potentially contaminative sources.

3.4.10 The precise soil conditions and chemistry is undefined at this stage; however, it is noted prevention of contamination was a specific requirement of the Environmental Permit for the operation of the Ferrybridge 1&2 EfWs. They were designed such that it will not create any new areas of ground contamination as a result of construction or operation. In addition, both EfWs had contingency procedures in place in the case of encountering suspected or actual ground contamination. These were incorporated into the respective Construction Environmental Management Plan and operator's Environmental Management System.

3.4.11 Both Ferrybridge 1&2 involved very substantial excavation and site preparation, including remediation where required and under each Environmental Permit, there is a Site Condition Report detailing the ground conditions prior to operation of each facility. The EPs require the control of potentially contaminating substances and the protection of ground and surface water. In addition to this, ground excavation for the CCS infrastructure is relatively limited, so it is considered unlikely that a material risk of the mobilisation of contamination is likely to arise.

3.4.12 As the precise soil conditions are variable, however, and as a matter of prudent good practice, contamination will be considered as an environmental risk across the Site during construction. Data from site investigations including geotechnical assessment, land quality and controlled waters risk assessment will inform the ES, with the necessary mitigation measures to be regulated via DCO requirements.

3.4.13 In the event that contaminated material is identified during site preparation, the contractor would follow standard procedures to:

- Notify the Environment Agency of the discovery;
- Secure the area / take action to prevent the release of contamination;
- Appoint a specialist to carry out the necessary investigation and assessments to identify the nature of the contamination, the level of risk to human health or the environment and (if necessary) appropriate remediation or disposal options;
- Remediate or dispose of the material in accordance with applicable legislation after obtaining the necessary consents and / or licenses; and
- Record waste transfer / disposal certificates.

3.4.14 During construction, appropriate measures will be implemented via a Construction Environmental Management Plan (an outline of which will be submitted with the DCO application), in accordance with all relevant legislation, to prevent accidental spillages of contaminants.

3.5 Decommissioning

3.5.1 There is no limit to the operational lifespan of the CCS facilities and therefore decommissioning is not being considered within this application.

3.5.2 enfinium does not intend to seek a time-limited consent. The proposed CCS development will have an initial design lifetime consistent with that of the existing EfW. Further operation of the combined facility beyond this timescale will be dependent on prevailing market conditions, although it is noted that the addition of CCS is expected to be a key element in the long-term viability of EfWs under the UK's balanced pathway to net zero greenhouse gas emissions.

3.5.3 The CCS assets, if in continuing use beyond the initial design lifetime, would be refurbished and upgraded as required, and would follow any necessary approvals process in place at that time.

3.5.4 The facility will be developed from equipment manufactured offsite and assembled on-site, so would be capable of being decommissioned and deconstructed non-intrusively in future in a reverse of that process.

4 Approach to Assessment

4.1 The proposed EIA

4.1.1 EIA is a process through which the likely significant environmental effects of a development proposal can be identified and, where possible, adverse effects avoided or mitigated. This process is reported in an ES, which will be prepared to be submitted with the DCO application.

4.1.2 This Section of the EIA Scoping Report sets an overarching assessment methodology and identifies the proposed structure for each Chapter of the ES.

4.1.3 The ES will consider various environmental parameters as required by Schedule 4 of the EIA Regulations and environmental effects of the Proposed Development will be considered during both the construction and operational phases.

4.1.4 All personnel undertaking the assessments are suitably qualified, competent experts in the field of EIA.

4.2 Assessment methodology

Guidance

4.2.1 The EIA process will be undertaken with regard to the requirements of the EIA Regulations and good practice guidance. The overarching EIA methodology is set out below. Further details of the topic-specific methodologies based on professional practice guidance for those topics are provided in the following Sections 6 to 16.

4.2.2 The impact assessment methodology will draw on legislation, policy and guidance including, where relevant:

- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations');
- Planning Inspectorate (2020, 2018 and 2019) Advice Notes Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping; Nine: Rochdale Envelope; and Seventeen: Cumulative Effects Assessment[4];
- Highways England et al. (2020) Design Manual for Roads and Bridges, LA 104 Environmental assessment and monitoring, revision 1[5];
- Institute of Environmental Management and Assessment (IEMA) (2004) Guidelines for Environmental Impact Assessment;
- IEMA (2015) Environmental Impact Assessment Guide to Shaping Quality Development[6];
- IEMA (2016) Guide to Delivering Quality Development[7];

Assessment structure

4.2.3 The assessment for each environmental impact pathway will form a separate topic ES Chapter. For each topic ES Chapter, the following components will be set out:

- identification of the study area for the topic specific assessments;
- description of the legislation, policy and guidance for that topic assessment;

[4] https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/, accessed 20/07/23

[5] https://www.standardsforhighways.co.uk/tses/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true, accessed 20/07/23

[6] https://www.iema.net/document-download/7018, accessed 20/07/23

[7] https://www.iema.net/download-document/7014, accessed 20/07/23

- summary of consultation activity undertaken, including comments received in the Scoping Opinion;
- description of the approach to assessment, including details of the methodologies used;
- description of the baseline environmental conditions; and
- presentation of the impact assessment undertaken, which includes:
    - identification of the maximum design scenario for each impact assessment;
    - a description of the measures adopted as part of the design of the Proposed Development, including mitigation and design measures which seek to prevent, reduce or compensate for environmental effects or enhance beneficial effects;
    - an assessment of the likely impacts and effects associated with the Proposed Development;
    - identification of any further mitigation measures required in respect of likely significant effects (in addition to those measures adopted as part of the project design); and
    - identification of residual effects and any future monitoring required.

4.2.4 Cumulative (i.e. with other developments) and intra-project effects will be dealt with in a separate ES Chapter.

Study area and temporal scope

4.2.5 Each assessment topic will define its study area geographically and indicate the timescales over which the environmental effects will be considered. The temporal scope will consider the construction phase, and following its completion, the operational phase.

Environmental baseline conditions

4.2.6 The existing and likely future environmental conditions in the absence of the Proposed Development are known as ‘baseline conditions’ and ‘future baseline conditions. Each topic ES Chapter will include a description of the current baseline environmental conditions, which will be drawn from surveys and desk-based assessments.

4.2.7 A summary of existing knowledge of the baseline is provided in each topic section of this EIA Scoping Report. The need for and proposed scope of any further baseline surveys or desk-based research is identified in the topic sections.

4.2.8 Consideration will also be given to the conditions that are likely to exist in the absence of the Proposed Development at the time that the development is likely to be implemented, i.e. from around Q2 2026 onwards, including planned or consented developments in the area (the future baseline). Consideration will be given to any likely changes between the time of surveys or desk-based assessments and the future baseline at the time of construction and operation of the Proposed Development.

4.2.9 The characterisation of future baseline conditions in the ES will take into account the likely effects of climate change, as far as these are known at the time of undertaking the EIA. This will be based on information available from the Met Office Hadley Centre’s UK Climate Projections project (UKCP18), which provides information on plausible changes in climate for the UK and on published documents such as the UK Climate Change Risk Assessment published by the Climate Change Committee.

4.2.10 Where development is projected to be constructed or operated after construction or operation of the Proposed Development (as relevant), such development will be considered within the assessment of cumulative effects, discussed further in Section 4.6 and Section 18.

Determining significance of effects

4.2.11 A standard approach based on the guidance cited above will be used for describing impacts and forming a judgement as to the significance of effects, as follows. However, this approach may be modified or different

definitions of terms used for particular topic ES Chapter where required by professional guidance for that topic. This will be explained in each topic chapter

4.2.12 Each ES Chapter will identify those receptors relevant to the topic and they will be assessed to determine their sensitivity. The receptors will be attributed a sensitivity level ranging from high to low as set out in Table 4.1 below.

Table 4.1 Sensitivity of a generic environmental receptor to change

Sensitivity	Receptor type
High	Receptors of high importance with a high susceptibility to change and limited potential for substitution or replacement determined through individual topic assessment.
Medium	Receptors with some sensitivity to change and medium importance. These often have relevance at a regional scale with some opportunity for substitution or replacement.
Low	Receptors with low importance and sensitivity to change, often of relevance at a local scale.
Negligible	The receptor has very low importance / is not sensitive to change.

4.2.13 The magnitude of impact affecting each receptor will then be considered in accordance with Table 4-2. This can be positive or negative as well as temporary or permanent. The nature of each will be analysed based on quantitative and qualitative techniques and a magnitude assigned ranging from no/negligible change to major change, as set out below.

Table 4.2 Criteria for the magnitude of environmental impact

Magnitude	Description of criteria
Negligible	Very minor changes that are not noteworthy or material.
Minor	Some measurable changes that are noteworthy and material. Minor benefit or minor loss/detrimental change to the receptors characteristics, features or elements.
Moderate	Adverse loss of resource or damage to characteristics, features or elements but limited impact on integrity; or Benefit or addition to characteristics, features and elements that improve the receptor.
Major	Effects will be of a consistently high magnitude and frequency and cause severe damage to key characteristics, features and elements or even total loss; or Major improvement to characteristics, features and elements of receptor.

4.2.14 Having identified the sensitivity of the receptor and the magnitude of the impact, the standard matrix set out in Table 4.3 will be used to indicate the predicted level of effect, ranging from neutral to substantial. For the purposes of the ES, unless specifically defined otherwise in an ES Chapter, effects of moderate and higher are considered to be likely significant effects.

Table 4.3 Framework for identifying environmental effects

Receptor sensitivity	Magnitude of impact			
	Negligible	Minor	Moderate	Major
Negligible	Neutral	Neutral	Minor/neutral	Minor
Low	Neutral	Minor	Moderate	Moderate/Major
Medium	Neutral	Moderate	Moderate/Major	Major
High	Neutral	Moderate/Major	Major	Substantial

4.2.15 Where a range is presented within Table 4-3, professional judgement will be used to define the significance of effect.

4.2.16 The likely effects of the Proposed Development will be described as:

- Adverse / beneficial;
- Direct / indirect;
- Temporary (i.e. those impacts that will only occur during construction) / Permanent (permanent effects that will be present during the operation of the Proposed Scheme;
- Reversible / irreversible.

Assessment of environmental effects

4.2.17 Having identified receptors that are likely be affected (taking into account inherent mitigation), the assessments will outline the potential impacts that could arise in the absence of any additional mitigation. Where adverse effects are identified, the ES will set out the mitigation measures considered necessary to minimise the potential effect so far as reasonably practicable. Residual effects will be evaluated, taking account of embedded and additional mitigation, and their significance will be reported based upon the magnitude of impact against the sensitivity of the receptor.

4.2.18 An iterative approach will be taken to mitigation and enhancement in the EIA process. This involves a feedback loop during the design and impact assessment process. A specific impact and the significance of the resulting effect will be initially assessed (taking account of embedded mitigation) and, if this is predicted to be a significant adverse effect, changes will be made (where practicable) to relevant parameters or design of the Proposed Development in order to avoid, reduce or compensate the impact. The assessment will then be repeated and the process continues until the EIA practitioner is satisfied that:

- the effect has been reduced to a level that is not likely to be significant; or
- having regard to other constraints, no further changes can reasonably be made to design or operational parameters in order to reduce the magnitude of impact (and hence significance of effect). In such cases, an overall effect that is still significant would be reported as the residual effect in the ES.

4.2.19 Where there are beneficial effects, these will also be iterated with a view to enhancement where possible. The same will be applied to adverse effects where practicable.

4.2.20 A register of enhancement, mitigation and monitoring commitments will be provided in the ES.

Assumptions and limitations

4.2.21 Each topic ES Chapter will identify any limitations identified in the available baseline data and whether there were any difficulties encountered in compiling the information required to predict environmental effects.

Uncertainty in assessments will be discussed, and a conservative (reasonable maximum case) approach will be taken to reporting effects where there is uncertainty. The approach to defining design parameters for the Proposed Development is discussed further below.

4.3 Other assessments

Water Framework Directive

4.3.1 Consideration of WFD will be undertaken with reference to the guidance which includes:

- PINS Advice Note Eighteen
- Water Framework Directive risk assessment ; and
- Water Framework Directive assessment: estuarine and coastal waters .

4.3.2 The WFD assessment process for the Proposed Development will be staged, commencing with WFD Screening. The Applicant will engage with the EA on the development of the WFD assessment .

Habitats Regulations Assessment (HRA)

4.3.3 Due to their physical distance from the Site no potential impact pathways to any European / International nature conservation designations have been identified as part of this EIA Scoping Report in Section 10, Ecology, and the Site does not lie within any Impact Risk Zones (IRZ) for any European conservation designations. Therefore it is considered that a Report on the Implications for European Sites should not be required in respect of this development.

4.3.4 This position will be kept under review to consider the outputs from air dispersion modelling, receiving views from Natural England and reviewing the outcomes of the intra-related effects assessment.

4.4 Design parameters

4.4.1 To manage uncertainty in the EIA process and ensure that likely significant environmental effects are assessed on a reasonable ‘maximum case’, a Rochdale envelope of development parameters will be defined for the EIA. This approach allows for the Proposed Development to be assessed on the basis of maximum project design parameters in order to provide flexibility, while ensuring all potentially significant effects (adverse or beneficial) are reported.

4.4.2 For each of the topic ES Chapter, the maximum design scenario for each impact pathway will be identified from the range of potential options for each parameter to be set out in the ES Project Description Chapter. The maximum design scenario assessed is therefore the scenario which would give rise to the greatest potential impact for that specific pathway. This may vary from topic to topic: for example, a minimum-length construction programme and minimum daily working hours might be the maximum impact scenario for traffic effects (concentrating the HGV numbers required into the highest number per day or hour) whereas a maximum-length construction programme might be the maximum impact scenario for noise effects, due to the greater duration of impacts.

4.4.3 Whilst development parameters are yet to be agreed, detail of the Proposed Development for the purposes of scoping is provided in Section 3. All details (and any remaining optionality) are to be confirmed for the ES phase as the design is subject to change during the course of the EIA, as assessments and consultation will also feedback into design.

4.5 Reasonable alternatives

4.5.1 Paragraph 2 of Schedule 4 of the EIA Regulations requires the applicant to provide “a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an

indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

4.5.2 This will be set out in a specific ES Chapter, drawing from the iterative design, assessment and mitigation process as described above. A key aspect is expected to be consideration of alternative Site layouts, optimising the design based on the Site's environmental constraints, topography, and sensitivities in the area around the Site.

4.6 Assessment of cumulative effects

4.6.1 The requirement for cumulative effects assessment is set out in Schedule 4 of the EIA Regulations. At Schedule 4(5), the EIA Regulations *require 'A description of the likely significant effects of the development on the environment resulting from, inter alia: …(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.*

4.6.2 A cumulative effects assessment (CEA) will be undertaken for each topic area in the ES and these will be brought together in a CEA ES Chapter. The assessment will consider the effects of the Proposed Development in combination with other developments, and the effects of the Proposed Development on any new sensitive receptors (likely to experience greater effects than existing receptors) introduced by other developments.

4.6.3 The assessment will be developed and presented pursuant to the guidance set out in PINS Advice Note Seventeen on cumulative effects assessments and the Applicant will liaise with WMDC to help develop its long list of other development to be considered.

4.6.4 Consideration of the potential for cumulative effects will have regard to specific environmental receptors. This requires a judgement to be made on which other developments have the potential for cumulative effects with the Proposed Development via each relevant impact pathway, and where there are sensitive receptors common to both developments within a defined geographical area described as the Zone of Influence (ZoI) which takes account of all relevant environmental topics. The CEA chapter will explore the methodology in great depth.

4.6.5 An initial desk-based search has been undertaken for other developments that may be relevant to include in the CEA. This has been based on initial EIA topic ZoIs (based on the study areas for each topic set out in this report), with the overall search area defined by the current largest ZoI of 10 km for air quality. Further detail and a shortlist of the other developments provisionally identified for inclusion in the CEA is given at Section 17 and mapped in Figure 5.1.

4.7 Intra-related effects assessment

4.7.1 It is good practice to consider the intra-relationships between impact pathways and phases of development that could lead to greater environmental effects. For example, the separate impacts of noise disturbance and habitat loss may have a combined effect on a sensitive ecological receptor.

4.7.2 The intra-related effects assessment will consider the following two types of effect.

- Project lifetime effects: where impacts from the construction and operational phases of the Proposed Development overlap or where the extended duration of an impact (from construction into operation) potentially creates a more significant effect upon a receptor than if assessed in isolation for a single phase.
- Receptor-led effects: those where multiple different types of impact interact spatially and/or temporally to potentially result in greater combined effects upon a particular sensitive receptor then

if considered in isolation. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

4.7.3 This will be via a qualitative assessment which does not assign significance levels. The assessment will be used to identify where there is the potential for intra-related effects, and then to comment on whether the intra-related effects would be greater or lesser than the effects considered alone, and if so, whether this would be combined effect would be adverse or beneficial. Receptor groups (e.g. watercourses, heritage assets, residents, road users) will be used for the assessment rather than specific individual receptors.

4.7.4 The potential for receptor-led effects will be scoped initially through consideration of the ZoIs for each topic area. Outside of areas where these overlap, there would be no potential for intra-related effects. In some cases, intra-related effects may already have been fully assessed through the topic area methodology. For example, effects on each sensitive ecological receptor arising from pathways such as noise, visual/lighting disturbance, air quality impacts and water quality impacts (as applicable) would be considered within the ecology assessment. Where this is the case, further intra-related effects assessment will be not required; the focus will be on identifying any potential additional intra-related effects not already reported in each topic ES Chapter.

4.7.5 The potential intra-related effects will be identified and reported within the ES by reviewing the conclusions of the technical topics and their effects on common sensitive receptors. This will be presented in the Cumulative Effects ES Chapter.

Inter-related effects with climate change

4.7.6 Climatic change will affect the future baseline and has the potential to cause inter-related effects with other environmental impact pathways, for example by increasing the sensitivity of ecological receptors to impacts due to the stresses of climate change, or by affecting the sensitivity of the hydrological environment to impacts due to increased frequency of low-flow and drought conditions.

4.7.7 IEMA has published an ‘EIA Guide to Climate Change Resilience and Adaptation’ which provides a framework for the effective consideration of climate change resilience and adaption in the EIA process. This guidance states that the scoping of a project, taking into account climate change, should focus on general considerations rather than detailed, quantitative analysis. This is because EIAs consider proposals for specific sites, whereas climate change models are prepared at a regional or national-level model.

4.7.8 It is proposed that the inter-related effects of climate change, and how this may alter the future environmental baseline or sensitivity of receptors, are covered in the intra-related effects section in the cumulative effects ES Chapter. This will be based on projected potential changes in climatic parameters over the Proposed Development’s lifetime drawn from the UKCP18 dataset, for a high (RCP8.5) emissions scenario.

4.8 Transboundary Effects

4.8.1 Regulation 32 of the EIA Regulations sets out the procedural duties required where the SoS deems that a project being considered under the EIA Regulations is likely to have significant effects on the environment in a European Economic Area (EEA) State; or where an EEA State deems that its environment is likely to be significantly affected by a project being considered under the EIA Regulations. Further guidance is provided in PINS Advice Note 12.

4.8.2 The Applicant considers that transboundary impacts will not occur due to the localised physical nature of the works; and given that any emissions are unlikely to travel to any other EEA state from the Site Boundary.

4.9 Environmental Statement Structure

4.9.1 The EIA will be compiled into an ES document which will be produced in accordance with the EIA Regulations, and will comprise three main Volumes, as summarised in Table 4.5.

Table 4.5: Proposed EIA structure

Volume	ES Chapter no.	ES Chapter title
Volume 1	n/a	Non-Technical Summary
	n/a	Glossary, acronyms and units
Volume 2	1	Introduction
	2	Site Setting
	3	Project Description
	4	Consideration of Alternatives
	5	Relevant Legislation and Policy
	6	Environmental Impact Assessment Methodology
	7 to TBC	ES Chapters 7 onwards will provide technical assessments. This includes a review of the relevant baseline, outline the potential environmental effects and the scope of the assessment, under individual topic headings.
	TBC	Cumulative Effects, Intra-related Effects
	TBC	Summary of Mitigation, Monitoring and Residual Effects
Volume 3	n/a	Appendices
	n/a	Figures

5 Summary of the Proposed EIA Scope

5.1.1 As part of the EIA scoping process, issues within the topic areas that are identified as unlikely to give rise to significant environmental effects can be omitted ('scoped out') from the EIA and, where justified, it is reasonable to propose a reduced scope of topic areas where initial assessment clearly indicates significant effects are unlikely.

5.1.2 Table 5-1 identifies the topic areas proposed to be scoped in or out from the EIA, further to the discussion in each of the topic chapters. Where a reduced scope is considered appropriate for certain aspects of a given topic area, an explanation is provided for this.

Table 5-1 Summary of the proposed EIA scope

Effects	Construction or Operation	Scoped In or Out?	Justification
Transport			
Severance	Construction	In	It is anticipated that during construction the total increase in trips on limited sections of the highway network may exceed 10%, for links where the base flows are low. Depending on the nature of the location, these impacts may need to be scoped into the assessment. The extent to which they will need to be assessed will be confirmed in in the EIA when traffic generation figures are established.
Driver Delay	Construction	In	
Pedestrian Delay	Construction	In	
Pedestrian Amenity	Construction	In	
Fear and Intimidation	Construction	In	
Accidents and Safety	Construction	In	
Severance	Operation	Out	In contrast to the construction period, it is expected that operational traffic will be very low with carbon removed from Site by pipeline or rail. Therefore it is not expected that the 10% increase thresholds will be met and therefore the operational impacts will not require assessment as part of the EIA.
Driver Delay	Operation	Out	
Pedestrian Delay	Operation	Out	
Pedestrian Amenity	Operation	Out	
Fear and Intimidation	Operation	Out	
Accidents and Safety	Operation	Out	
Air Quality			
Dust emissions	Construction	In	Potentially significant without appropriate control measures.
Vehicle emissions	Construction	Out	Vehicle numbers not yet known. Level of assessment required to be determined as part of EIA process. If not below relevant assessment thresholds, as is expected, this will be scoped in.
Dust and odour emissions	Operation	Out	No significant sources identified and no sensitive receptors identified in close proximity to the Site.
Process emissions	Operation	In	Source of a potentially significant air quality effect.
Vehicle and rail emissions	Operation	Out	Vehicle numbers not yet known, although anticipated to be very low. Potential for in-combination effect with stack emissions. Level of assessment required to be determined as part of EIA process. If not below relevant assessment thresholds, as is expected, this will be scoped in.
Carbon and Greenhouse Gases			
Embodied carbon of construction materials	Construction	In	Likely to be minimal compared to operational emission benefits, but will be estimated and screened for significance, and will inform construction-stage mitigation proposals.

Transport and Site plant use	Construction	Out	Expected to make non-material contribution to the overall lifecycle impacts of the facility.
Climate risks	Construction	Out	No significant change in baseline risks from variable weather conditions (to which construction processes and contractors' working methods are adapted) are expected during the likely construction phasing in the mid-late 2020s.
GHG emissions from plant operation, including capture of CO_2 from Ferrybridge 1&2 EfWs	Operation	In	A likely significant beneficial effect. Information on transport and sequestration will also be provided.
Climate risks	Operation	Out	Significant change to the climate risk profile of the existing Ferrybridge 1&2 EfWs in operation with the addition of the CCS plant operation is not considered likely. Any changes to Flood risk will be assessed in the **Error! Reference source not found.** ES Chapter.
Noise			
Site activity noise	Construction	In	Potential for high levels of construction activity noise to affect medium or high sensitivity Noise Sensitive Receptors (NSRs).
Site activity vibration	Construction	Out	Significantly high vibration levels at unlikely at source and relatively large distance between vibration activity and NSRs; low risk for adverse vibration impact. Cumulative construction of the Proposed Scheme would not increase vibration levels
Road traffic noise	Construction	In	If construction flows greater than 10% of baseline road traffic flows, potential for high levels of noise to affect medium or high sensitivity NSRs.
Site activity noise	Operation	In	Potential for high levels of operational activity noise to affect medium or high sensitivity NSRs.
Site activity vibration	Operation	Out	No operational vibration sources.
Road traffic noise	Operation	Out	Negligible operational road traffic flows, less than 10% of baseline.
Ecology			
Protected Sites Statutory			
Fairburn and Newton Ings SSSI / LNR	Construction	Out	The SSSI lies 1.5km to the north lie at sufficient distance for bird populations, forming the special interest of the Site to remain undisturbed during construction phase.
Well Wood LNR	Construction	Out	Habitats forming the biological interest of the designation lie at sufficient distance (1.6km) to remain undisturbed during the construction phase or affected by airborne pollutants such as dust.

Protected Sites Non-Statutory			
Fryston Park LWS	Construction	In	Potential for habitat lying in proximity to the Site be affected by airborne pollutants such as dust.
Endless Flat Plantation SINC	Construction	In	Potential for habitat lying in proximity to the Site (approximately 260m northwest) be affected by airborne pollutants such as dust..
Bank of River Aire SINC	Construction	Out	At sufficient distance for no impacts to be likely during construction phase.
Byram Park SINC	Construction	Out	At sufficient distance for no impacts to be likely during construction phase.
Woodland at Edge of Byram Park SINC	Construction	Out	At sufficient distance for no impacts to be likely during construction phase.
Habitats			
Modified Grassland - amenity grassland Habitat loss / modification of habitat of negligible ecological importance	Construction	Out	Habitat loss / modification of habitat of negligible ecological importance
Neutral Grassland	Construction	Out	Habitat loss / modification, would not affect priority habitat.
Scattered Trees	Construction	Out	Habitat loss / modification of habitat of negligible ecological importance
Mixed scrub	Construction	Out	Habitat loss / modification of habitat of negligible ecological importance
Open water	Construction	In	Habitat loss / modification, would potentially affect priority habitat.
Hardstanding	Construction	Out	Habitat loss / modification Habitat of negligible ecological importance
Species			
Amphibians - loss / fragmentation of habitat, disturbance, killing / injury unlikely to include GCN.	Construction	Out	Habitats affected unlikely to be of importance in maintaining amphibian populations locally.
Badger	Construction	Out	Negligible ecological importance – common and ubiquitous species. No records on Site or within 200m of the site.
Bats	Construction	Out	Loss / fragmentation of habitat, disturbance, habitats affected unlikely to be of importance in maintaining bat populations locally. Should further surveys identify the presence of significant numbers of bats on Site, bats will be scoped into the assessment.

Birds	Construction	Out	Habitats affected of insufficient area to be of importance in maintaining bird populations locally.
Reptiles	Construction	Out	Unlikely to be present
Invertebrates	Construction	Out	Loss / fragmentation of habitat, disturbance, Habitats affected unlikely to be of importance in maintaining invertebrate populations locally.
Water vole	Construction	Out	Unlikely to be present
Protected Sites - Statutory			
Fairburn and Newton Ings SSSI / LNR	Operation	Out	The SSSI lies 1.5km to the north lie at sufficient distance for bird populations, forming the special interest of the Site to remain undisturbed during operational phase. The site is notified for its bird populations not habitats, therefore, the site is not considered sensitive to airborne sources of nitrogen.
Well Wood LNR	Operation	In	The LNR lies 1.6 km from the Site. Potential for changes in emissions to result in adverse impacts on habitats arising from changes to deposition of airborne pollutants from the Ferrybridge campus as a result of the Proposed Scheme.
Protected Sites Non-Statutory			
Fryston Park LWS	Operation	In	Potential for habitat lying in proximity to the Site be affected by airborne pollutants such as dust.
Endless Flat Plantation SINC	Operation	In	Potential for habitat lying in proximity to the Site be affected by airborne pollutants such as dust.
Bank of River Aire SINC	Operation	Out	At sufficient distance for no impacts to be likely during operational phase.
Byram Park SINC	Operation	Out	At sufficient distance for no impacts to be likely during operational phase.
Woodland at Edge of Byram Park SINC	Operation	Out	At sufficient distance for no impacts to be likely during operational phase.
Habitats			
Modified Grassland - amenity grassland Habitat loss / modification of habitat of negligible ecological importance	Operation	Out	Habitat loss / modification of habitat of negligible ecological importance
Neutral Grassland	Operation	Out	Habitat loss / modification, would not affect priority habitat.
Scattered Trees	Operation	Out	Habitat loss / modification of habitat of negligible ecological importance

Mixed scrub	Operation	Out	Habitat loss / modification of habitat of negligible ecological importance
Open water	Operation	In	Habitat loss / modification, would potentially affect priority habitat.
Hardstanding	Operation	Out	Habitat loss / modification Habitat of negligible ecological importance
Species			
Amphibians - loss / fragmentation of habitat, disturbance, killing / injury unlikely to include GCN.	Operation	Out	Habitats affected unlikely to be of importance in maintaining amphibian populations locally.
Badger	Operation	Out	Negligible ecological importance – common and ubiquitous species.
Bats	Operation	Out	Loss / fragmentation of habitat, disturbance, Habitats affected unlikely to be of importance in maintaining bat populations locally. Should further surveys identify the presence of bats on Site, bats will be scoped into the assessment.
Birds	Operation	Out	Habitats affected of insufficient area to be of importance in maintaining bird populations locally.
Reptiles	Operation	Out	Unlikely to be present
Invertebrates	Operation	Out	Loss / fragmentation of habitat, disturbance, Habitats affected unlikely to be of importance in maintaining invertebrate populations locally.
Water vole	Operation	Out	Unlikely to be present
Landscape and Visual			
The scope of the landscape and visual receptors assessed during the construction stages would be the same as those identified within the operation stage below.	Construction	Out	The effects during construction are likely to be short term and temporary in nature and are unlikely to be significant given the existing operational traffic associated with the Ferrybridge facilities and nearby land uses.
National Landscape Character Areas			
NCA30 Southern Magnesian Limestone	Operation	Out	NCAs will inform baseline assessments of the LVIA although due to the presence of more detailed LPA assessments, these will not be included as a specific receptor within the assessment of effects.
NCA39 Humberhead Levels	Operation	Out	

NCA38 Nottinghamshire, Derbyshire and Yorkshire Coalfield	Operation	Out	
Wakefield District Landscape Character Assessment			
Limestone Escarpment LCT	Operation	Out	Located within preliminary ZTV and study area but effects deemed not significant.
Northern Coalfield LCT	Operation	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
North Yorkshire and York's Landscape Character Assessment			
Magnesian Limestone Ridge LCT	Operation	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
Leeds Landscape Assessment			
Wooded Farmland LCT Ledsham to Lotherton LCA	Operation	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
Degraded River Valley LCT Lower Aire Valley LCA	Operation	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
Visual Effects on Visual Receptor Groups			
Visual Receptor Groups within the ZVI	Operation	In	Located within ZVI once identified.
Visual Receptor Groups outside the ZVI	Operation	Out	Located outside ZVI once identified.
Visual Effects on users of Key Transport Routes			
A1(M) adjacent to Site	Operation	In	Located within preliminary ZTV.
M62 – 0.5km west	Operation	In	Located within preliminary ZTV.
B6136 adjacent to Site	Operation	In	Located within preliminary ZTV.
A1246 – 0.8km east	Operation	In	Located within preliminary ZTV.
Visual Effects on users of Long Distance Recreational Trails and National Cycle Routes			
Wakefield Way promoted route – 1.6km south	Operation	In	Located within preliminary ZTV.
Visual Effects on users of Accessible and Recreational Landscapes			

Ledston Hall Registered Park and Garden – 4.8km north west	Operation	In	Located within preliminary ZTV.
Castleford recreational ground – 1.3km north west	Operation	In	Located within preliminary ZTV.
RSPB Fairburn Ings – 2.5km north west	Operation	In	Located within preliminary ZTV.
Pontefract Park – 3.75km west	Operation	In	Located within preliminary ZTV.
Other			
Massing Model Visualisations / Photomontages	Operation	Out	Due to the industrial context of the Site and the key components of the Proposed Development which would be of a similar scale to existing development within Ferrybridge 1&2, it is considered that no massing model visualisations or photomontages will be required.
Night-Time Effects and Lighting Assessment	Operation	Out	Due to the existing high lighting levels within the Site and its local context, it is unlikely that the Proposed Development would result in any significant effects from artificial lighting.
Residential Visual Amenity Assessment (RVAA)	Operation	Out	Due to the industrial context of the Site and the general lack of predicted intervisibility between the Site and residential areas, the LVIA will not include a separate Residential Visual Amenity Assessment (RVAA)
Water Resources and Flood Risk			
Change in on-site flood risk	Construction	In	The construction of the Proposed Development has the potential to be affected by the existing on-site flood risk and to change on-site flood risk due to changes in Site usage and ground levels.
Change in offsite flood risk	Construction	In	The construction of the Proposed Development has the potential to affect offsite flood risk due to changes to existing ground levels or changes to the culverted ordinary watercourse passing through the Site.
Change in surface water runoff from the Site	Construction	In	The construction of the Proposed Development has the potential to affect the peak rate and volume of surface water runoff from the Site due to changes in impermeable area.
Change in foul and trade flows from the Site	Construction	In	The construction of the Proposed Development has the potential to increase foul and trade flows from the Site.
Change in on-site flood risk	Operation	In	The operation of Ferrybridge the Proposed Development has the potential to be affected by the existing on-site flood risk and to change on-site flood risk due to changes in Site usage and ground levels.
Change in offsite flood risk	Operation	In	The operation of Ferrybridge the Proposed Development has the potential to affect offsite flood risk due to changes to existing ground levels or

			changes to the culverted ordinary watercourse passing through the Site.
Change in surface water runoff volume from the site	Operation	In	The operation of Ferrybridge the Proposed Development has the potential to affect the peak rate, and volume of surface water runoff from the Site due to changes in impermeable area.
Change in foul and trade flows from the Site	Operation	In	The operation of the Proposed Development has the potential to increase foul and trade flows form the Site.
Change in water supply	Operation	In	The operation of the Proposed Development has the potential to increase water supply demand
Change in potable water usage	Operation	Out	The operation of the Proposed Development has a negligible potential to increase potable water usage on account of the limited staff operating at the Site.
Geology, Hydrogeology and soils			
Potential Soil Contamination	Construction	In	Potential soil contamination is anticipated at the Site due to the former industrial nature of the Site. The development will affect and be effected by the soil contamination conditions. It may be necessary through further intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. This is anticipated that DCO requirements for intrusive investigation will be applied and addressed in due course following the EIA process.
Hydrogeology	Construction	In	The construction of the Proposed Development has the potential to be affected and effect the underlying , hydrogeological conditions. It may be necessary through intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. It is anticipated that DCO requirements for intrusive investigations will be applied and addressed in due course following the EIA process.
Soil resources and geology	Construction	Out	The low resource potential of the soils and geology (previously developed land site, significant thickness of Made Ground, absence of minerals resource area or other soils/geological land designations) indicates a justification to scope out of the assessment.

Potential Soil Contamination	Operation	In	Potential soil contamination is anticipated at the Site due to the former industrial nature of the Site. The development will affect and be affected by the soil contamination conditions. It may be necessary through further intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. This is anticipated that DCO requirements for intrusive investigation will be applied and addressed in due course post consent.
Hydrogeology	Operation	In	The construction of the Proposed Development has the potential to be affected and effect the underlying , hydrogeological and geological conditions. It will be necessary through intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. It is anticipated that DCO requirements for intrusive investigations will be applied and addressed in due course post consent.
Soil resources and geology	Operation	Out	The low resource potential of the soils (previously developed land site, significant thickness of Made Ground, absence of minerals resource area or other soils/geological land designations) indicates a justification to scope out of the assessment.
Historic Environment			
Archaeological Assets	Construction	In	The construction of the Proposed Development has the potential to impact buried archaeological remains that may survive below ground through the construction of foundations, temporary access routes, and other construction aspects that will interrupt the present ground surface.
Built Heritage Assets	Construction	In	It will be necessary to confirm, through assessment, that there will be no construction impact (e.g. from heavy traffic) on the Grade I Listed and Scheduled Monument, Ferrybridge bridge, to the east of the Site.
Archaeological Assets	Operation	Out	The operation of the Proposed Development is not anticipated to affect any buried archaeological remains present in the surrounding area.

Built Heritage Assets	Operation	In	Once the Proposed Development is constructed it is possible that the setting of some heritage assets, including Listed Buildings and Scheduled Monuments will be adversely affected, primarily due to the height of the additional stacks.
Population and Health			
Health effects of changes in air quality	Construction	In	The assessment will be completed in a concise manner to communicate how health has been addressed in each of the respective disciplines.
Health effects of changes in noise exposure	Construction	In	
Health effects of changes in transport nature and flow rate	Construction	In	
Changes in socio-economic factors (income and employment)	Construction	In	
Changes in opportunities for recreation and physical activity	Construction	Out	Due to being located on land already owned by the Applicant, no impact on resources used for recreation and physical activity during operation is anticipated.
Health effects of changes in air quality	Operation	In	The assessment will be completed in a concise manner to communicate how health has been addressed in each of the respective disciplines.
Health effects of changes in noise exposure	Operation	In	
Changes in socio-economic factors (income and employment)	Operation	In	
Changes in opportunities for recreation and physical activity	Operation	Out	Due to being located on land already owned by the Applicant, no impact on resources used for recreation and physical activity during operation is anticipated.
Health effects of changes in transport nature and flow rate	Operation	Out	Changes in operational traffic are expected to be minor, with no potential for significant population and health effects.
Other Environmental Impacts			

Major Accidents and Disasters	Construction and Operation	Out	Through review of the control measures in place in during construction and operational phases of the Proposed Development and the assumption that the site will not be a COMAH site, it is confirmed that the Proposed Development's vulnerability to accidents and disasters results in the risk of potential significant effects being ALARP and therefore Major Accidents and Disasters will not be considered in detail in the ES. With respect to human health, Section 15 of this EIA Scoping Report provides a proposed assessment methodology for the Proposed Development population and human health effects.
Materials and Waste	Construction and Operation	Out	The embodied carbon of construction materials and associated GHG emissions are considered within the Climate Change assessment, Section 8. Therefore, no further assessment is considered. Standard measures, such as, a site waste management and outline CEMP will be secured through DCO requirements and will be repeated as mitigation in the ES. Potential Sources of Contamination are assessed in Section 13, Geology, Hydrogeology and Soils. In operation, other than during maintenance, the Proposed Scheme will not be creating waste, except low quantities of spent solvent. Therefore, as potential construction effects can be mitigated, no further assessment is proposed.
Aviation	Construction and Operation	Out	It is anticipated that the new stacks would be no higher than the existing stack heights of 100m for Ferrybridge 1 and 119m for Ferrybridge 2. It is therefore intended that Aviation impact is scoped out of the EIA.
Electronic Interference	Construction and Operation	Out	The Proposed Development will not have a significant impact upon electrical interference given its location adjacent to existing structures of equivalent heights and distance from existing transmitters, and as such it is recommended that electrical interference is scoped out of the EIA.

6 Transport

6.1 Introduction

6.1.1 This Section of the EIA Scoping Report has been produced by Paul Basham Associates in relation to transport matters pertaining to the Proposed Development. The Transport EIA and associated reports will be undertaken by members of Paul Basham Associates Transport Planning team who are members of the Chartered Institute of Highways & Transportation (CIHT).

6.1.2 The approach proposed in this EIA Scoping Report has been informed by ongoing desk studies and reference to published best practice guidance and professional judgement. An assessment of construction traffic impacts is proposed to be scoped in to the EIA for the Proposed Development.

6.2 Legislative or policy requirements and technical guidance

6.2.1 The assessment will be carried out with reference to national and local policy including:

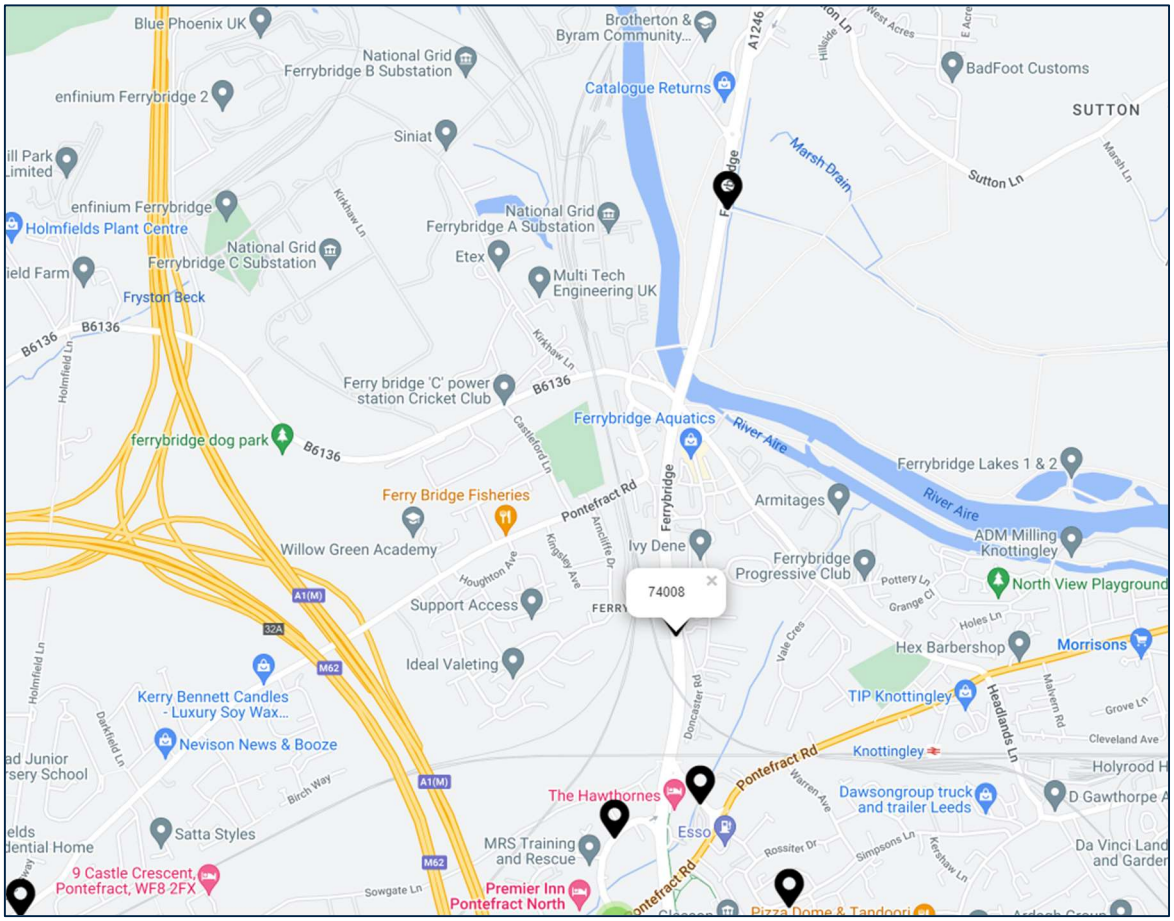
- Overarching National Policy Statement for Energy (EN-1) (2024)
- Institute of Environmental Assessment Guidelines: Environmental Assessment of Traffic and Movement (2023);
- Manual for Streets, Department for Transport (2007), & Manual for Streets 2, Chartered Institution of Highways & Transportation (2010);
- National Highways, Design Manual for Roads and Bridges (2020);
- National Planning Policy Framework (NPPF) (2023) and
- Wakefield District Local Development Framework (LDF) (as adopted January 2024)

6.3 Existing Baseline

Baseline environment

6.3.1 No Site specific surveys have yet been undertaken in regard to existing traffic flows. However the Department for Transport (DfT) produces road traffic statistics for roads across the country, derived from monitoring equipment and/or manual traffic counts. A DfT Count (data point 74008) is located on the A162 to the south of the Site which is located along the most direct route to the A1(M) / M62, as shown in Figure 6.1 below.

Figure 6.1 – DfT Count Data Point Locations



6.3.2 The most recent manual count was undertaken in 2018. Based on this count it is estimated that the Annual Average Daily Flow (AADF) was 13,667 two-way vehicles, of which 922 (6.7%) were Heavy Goods Vehicles (HGV). In addition this data shows that there were 1167 vehicles in the AM peak (0800-0900) and 1629 vehicles in the PM peak (1700-1800).

6.3.3 It is understood that all existing operations on-site were present at the time the manual 2018 DfT count was undertaken.

Proposed approach to surveys and further baseline data collection

6.3.4 Given the availability of data identified above within the DfT database, and the anticipated low volume of operational traffic, with the construction period being higher but for a temporary time period, it is considered that a reliance on the DfT data is appropriate in the first instance. As the scheme develops, should it be considered that further traffic data is required at any specific junctions then traffic surveys will be undertaken and the scope of these traffic surveys will be agreed with the local highway authority through follow up consultation.

6.3.5 Information on the net impact of the Proposed Development upon vehicular traffic generation at the Site during both the construction period and operational period will be provided by the Site operator, enfinium. This is considered the most accurate approach given the specialist nature of the Site.

6.4 Approach to assessment

6.4.1 The proposed methodology would follow the guidelines issued by the Institute of Environmental Management and Assessment (IEMA). Typically this would require links to be assessed where traffic flows

increase by 30% or any sensitive areas where flows increase by 10%. The nature of the development, with most inputs already present on-site and exports being removed by either rail or pipeline, is such that the road traffic generated by the development will primarily consist of staffing and delivery of consumables by Light Goods Vehicles (LGV) during the operational period. These trips are expected to total c. 50 additional two-way staff trips spread across 3 separate shift patterns, and 24 two-way LGVs (one delivery per hour over a 12-hour period). On this basis the environmental impacts on road transport are likely to be negligible during the operational phase and therefore the assessment will not focus on the operational phase.

6.4.2 During the construction period, greater volume of traffic, including a large proportion of HGVs, will arise and have the potential to generate environmental impacts. On this basis the construction phase will be included within the assessment.

Assessment criteria

6.4.3 The IEMA Guidelines suggest in paragraph 2.16 that two broad rules-of-thumb can be used as a screening process to delimit the scale and extent of the assessment. These are:

- Rule 1: include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%).
- Rule 2: include any other specifically sensitive areas where traffic flows have increased by 10% or more.

6.4.4 These rules-of-thumb form the starting point for the assessment of effects. The significance of the effects of the Proposed Development will be considered with respect to the following subject areas based on the IEMA Guidelines:

- Severance of communities;
- Road vehicle driver and passenger delay;
- Non-motorised user delay;
- Non-motorised user amenity;
- Fear and intimidation on and by road users;
- Road user and pedestrian safety;
- Hazardous/large loads.

Magnitude of impact

6.4.5 A Magnitude of Change Scale with respect to each of the IEMA guideline subject areas is defined in Table 6.1. The thresholds have been derived with reference to the IEMA Guidelines, best practice and professional judgment.

Table 6.1: Magnitude of Impact (Based on IEMA Guidelines)

Subject	Magnitude of Impact			
	Major	**Moderate**	**Slight**	**Negligible**
Severance	Change in highway link traffic flow of over 90%	Change in highway link traffic flow of 60% to less than 90%	Change in highway link traffic flow of 30% to less than 60%	Change in highway link traffic flow of less than 30%
Driver Delay	Increase in driver delay by over 90 seconds	Increase in driver delay by 30-90 seconds	Increase in driver delay by 10-30 seconds	Increase in driver delay by less than 10 seconds
Pedestrian Delay	Change in highway link traffic flow of over 60%	Change in highway link traffic flow of 30% to less than 60%	Change in highway link traffic flow of 10% to less than 30%	Change in highway link traffic flow of less than 10%
Non-motorised User Amenity	Change in highway link traffic flow of over 60%	Change in highway link traffic flow of 30% to less than 60%	Change in highway link traffic flow of 10% to less than 30%	Change in highway link traffic flow of less than 10%
Fear and Intimidation	Two step change in level	One step change in level with, >400 vehicle 19hr increase, or >500 HGV increase	One step change in level with, <400 vehicle 19hr increase, or <500 HGV increase	No step change
Accidents and Safety	Change in highway link/junction traffic flow of over 30%	Change in highway link/junction traffic flow of 10% to less than 30%	Change in traffic flow through junction of 5% to less than 10%	Change in traffic flow through junction of less than 5%
Hazardous/Large Loads	Considered on a case-by case basis			

Sensitivity of receptors

6.4.6 A scale for sensitivity of the relevant receptors is identified in Table 6.2. The thresholds have been derived with reference to the IEMA Guidelines, best practice and professional judgment.

Table 6.2: Value/sensitivity assessment

Receptor Value/Sensitivity	Description
High	Sensitive groups such as children and elderly Accident 'hot spots' Schools and town centres
Medium	Pedestrians on roads with no footways Pedestrians on roads with footways Cyclists Highway junctions operating close or over capacity Parks and recreational areas Retail areas
Low	Roads with active frontages Distributor roads
Negligible	Open space (such as agricultural land)

Significance of effect

6.4.7 The predicted level of effect is based on the consideration of magnitude of impact and sensitivity of the resource/receptor to come to a professional judgement as to how important this effect is.

Table 6.3: Magnitude/Significance of effect (Based on IEMA Guidelines)

Receptor Sensitivity	Magnitude of Impact			
	Major	Moderate	Minor	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

6.4.8 For the purposes of this assessment the level of impact is considered significant in circumstances when the overall significance of effect is moderate or above. In addition to the significance of the impact, the nature of the impact, being either beneficial, negligible, or adverse, has also been considered accordingly.

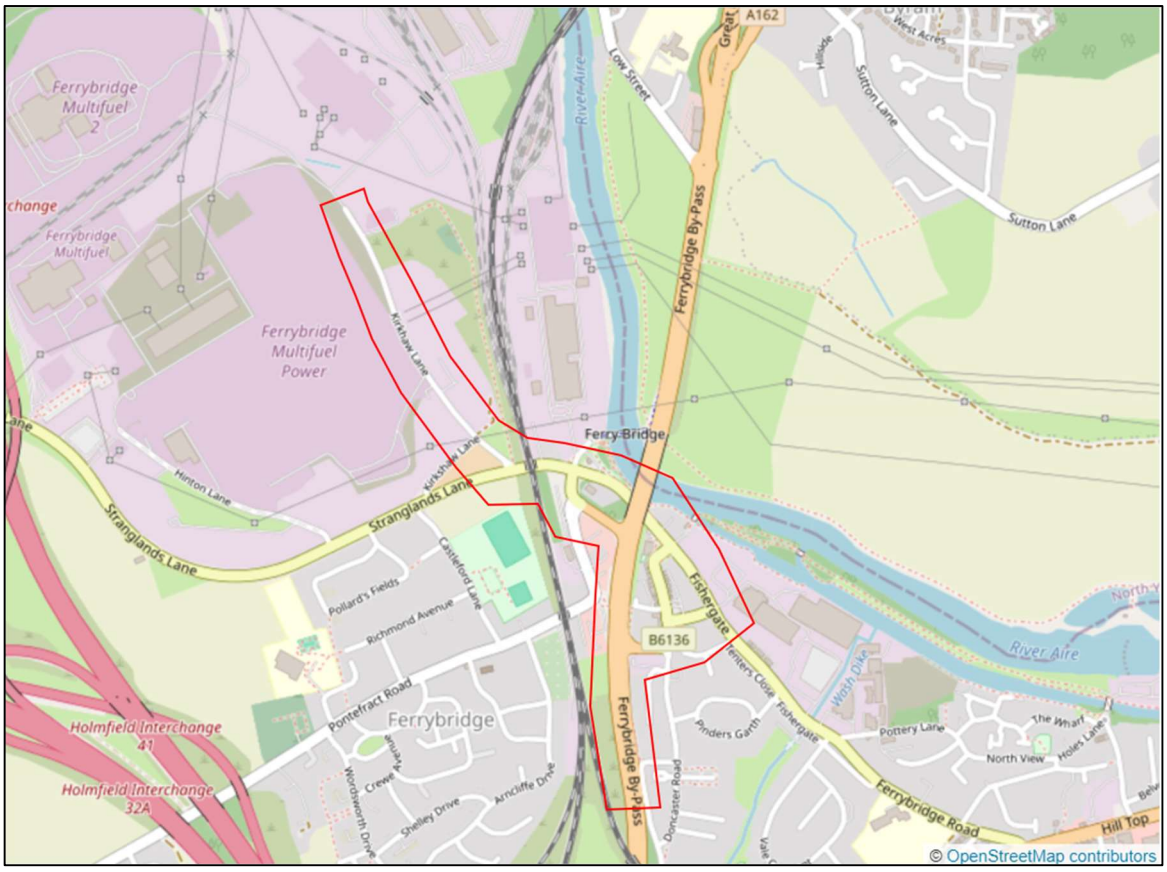
6.4.9 The above tables have been derived with reference to the IEMA Guidelines, such that locations in the study area that would experience an increase in traffic flow of 30% or more are considered in respect of Severance, and 10% or more are considered in respect of Non-Motorised User Delay and Amenity. With regards to Fear and Intimidation areas which would result in a step change in level in accordance with IEMA calculations are considered. In respect of accidents and safety, locations with a poor collision record are considered where they would experience an increase in traffic flow of 5% or more. In respect of Driver Delay, the corresponding figure is an increase in delay totalling > 10 seconds per vehicle. Hazardous and large loads are to be assessed on a case-by-case basis noting the potential range in effects .Professional judgement has been exercised in determining the degree of the effect and whether or not mitigation in the

form of an improvement to the existing road layout is required and, if required, what that improvement should comprise.

Geographical scope

6.4.10 The proposed study area will be confirmed through discussions with WMDC once trip generation estimates are agreed and distribution of traffic to or from the Site is established. However, based on an initial appraisal of the highway network the study area will likely comprise Kirkhaw Lane, the B6136 and the A162.

6.4.11 Figure 6.2 – Geographical Scope of Assessment



Temporal scope

6.4.12 The temporal scope is anticipated to cover the period of construction. For the purposes of assessment, the construction year is anticipated to begin in 2026, end in 2029 and be operational thereafter. As part of this assessment the peak construction period within this three year period will be identified and form the basis of the assessment.

6.5 Embedded mitigation and enhancement measures

6.5.1 As part of the design process a number of embedded mitigation measures and additional mitigation measures will be included within the development to reduce the overall impact of the scheme.

6.5.2 The removal of captured carbon material from the Site via pipeline and/or rail is a key scheme feature that minimises the impact of the scheme on road transport.

6.5.3 With regard to additional mitigation to reduce the impacts of the development, a comprehensive Outline Construction Traffic Management Plan (CTMP) will be implemented. This will help manage and mitigate construction highway impacts and subsequently reduce the overall impact of the Proposed Development

and will include measures such as designated construction traffic routes. The CTMP will also contain measures to encourage active, public or shared travel modes for construction workers.

6.6 Scope of environmental impacts and effects

6.6.1 At this stage the exact quantum of traffic generated by the Proposed Development during both construction and operational periods is not yet confirmed. It will therefore be quantified in due course, however given the high flow of vehicles along the nearby A162 it is considered that trips will not exceed 10% of daily trips along this route (equating to 1367 trips daily) during either the construction or operational period. It is however recognised that, particularly during construction the links between the Site and the A612 may experience percentage increases to trigger certain IEMA thresholds. This will be confirmed through further assessment following baseline data collection.

Construction

6.6.2 For the construction phase of Ferrybridge CCS, there will be a moderate increase in trips to/from the Site. It is expected that HGV trips will be spread evenly throughout the day to minimise focused times of increase. However due to the nature of construction shift work it is expected there will be a larger percentage increase in/around the peaks when construction staff arrive/depart the Site, during which time the 10% threshold for sensitive locations set out by IEMA may be exceeded.

6.6.3 Although temporary, these construction staff vehicle trips in combination with construction HGV movements will particularly impact upon driver delay and possibly other elements including impact upon NMUs. The extent of this will not be known until further assessment is undertaken, but at the time of writing it is considered there will likely be an adverse impact upon driver delay during the construction period and so this is proposed to be scoped in to the EIA.

Operation

6.6.4 During operation of Ferrybridge CCS, given the modest number of vehicle trips anticipated and the existing flows on the surrounding network it is anticipated that the impact will be negligible. Notwithstanding this, of all impacts experienced the greatest impact is likely to be on driver delay, by virtue of increased vehicle movements on a busy local road network.

6.6.5 Highway capacity modelling is not expected to be required as part of the accompanying Transport Assessment, given the low percentage impact of such flow increases on the local network

6.6.6 At the present time it is considered that there is unlikely to be significant impacts from the development on pedestrian delay/amenity, or fear/intimidation given the minor percentage increase in traffic flows during operation. The Transport Assessment undertaken to inform the DCO application will assess the road safety record and ensure that the access is safe and suitable for the vehicles it will serve. Given the low numbers involved, the impact on accidents or safety is also anticipated to be negligible at this stage.

6.6.7 It is therefore suggested that the transport impacts of the scheme during the operational phase are scoped out of the EIA.

6.7 Limitations and uncertainties

6.7.1 Limitations in the study include the forecasting of likely trip generation, with this undertaken on a First Principles approach and informed by the end user, enfinium. Whilst this represents an area of uncertainty given the potential fluctuation in numbers used, the potential impact of this will be moderated through the adoption of conservative estimates to ensure a robust assessment.

6.8 Intra-related effects

6.8.1 The main intra-related effect of transport typically relates to air quality, with air quality being dependent upon the transport data and any substantial air quality effects could have a negative impact upon Pedestrian Amenity. There can also be intra-relationships with road noise and with socio-economic or population and health impacts. However, given the highway impact is expected to be relatively modest it is not envisaged that there will be any impacts upon the transport assessment criteria. The vehicle flows and transport assessment data will be provided to inform the air quality, noise, socio-economic and population and health topics in the EIA.

6.9 Cumulative effects

6.9.1 From a Transport perspective, noting the low level of future operational trips and the presence of the Strategic Highway Network within close proximity it is considered there are no other developments which will generate cumulative effects. The only exception to this is the Mountpark development which is expected to result in a redesign of the local highway network, specifically a number of junction upgrades along the B6136. Depending on the timing of this development, the revised layout may be included in the assessment of construction phase effects.

6.9.2 During the construction period, there is potential for cumulative effects in combination with other permitted schemes that have not yet been built. This will be assessed further as part of the EIA once the specific forecast construction movements are known.

6.10 Summary of proposed EIA scope

6.10.1 The impacts scoped in or out for further transport assessment are as follows:

Table 6.4: Summary of transport impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Severance	In	It is anticipated that during construction the total increase in trips on limited sections of the highway network may exceed 10%, for links where the base flows are low. Depending on the nature of the location, these impacts may need to be scoped into the assessment. The extent to which they will need to be assessed will be confirmed in in the EIA when traffic generation figures are established.
Driver Delay	In	
Pedestrian Delay	In	
Pedestrian Amenity	In	
Fear and Intimidation	In	
Accidents and Safety	In	
Operation		
Severance	Out	In contrast to the construction period, it is expected that operational traffic will be very low with carbon removed from Site by pipeline/rail. Therefore it is not expected that the 10% increase thresholds will be met and therefore the operational impacts will not require assessment as part of the EIA.
Driver Delay	Out	
Pedestrian Delay	Out	
Pedestrian Amenity	Out	
Fear and Intimidation	Out	
Accidents and Safety	Out	

7 Air quality

7.1 Introduction

7.1.1 This Section of the EIA Scoping Report has been produced by Fichtner Consulting Engineers Ltd (Fichtner). The Air Quality EIA will be undertaken by members of Fichtner's environmental team who have are members of the Institute of Air Quality Management (IAQM) and are Chartered Environmentalists and/or Chartered Scientists..

7.1.2 The purpose of the project is to capture CO_2 from the flue gas of both F1 and F2 Energy from Waste facilities (EfWs). A full description of the project is provided in Section 3. In brief, the flue gas from each of the two EfWs will be ducted to CCS plant serving each EfW, after treatment by the existing flue gas treatment (FGT) technology. The flue gas will be cooled, and the CO_2 removed using an amine solution. The CCS plant process results in some trace gases entering the flue gas streams, including amines and amine degradation products. The flue gas will be further treated using best available techniques, as defined and regulated under an Environmental Permit, to minimise these emissions before being released to atmosphere.

7.1.3 The following air quality effects have been considered as part of the scoping exercise:

- Construction phase dust emissions;
- Construction and operational phase road traffic vehicle emissions;
- Operational phase rail emissions;
- Operational phase process emissions; and
- Operational phase dust and odour emissions.

7.1.4 Construction phase dust and operational phase process emissions are proposed to be scoped in. Operational phase dust and odour emissions are proposed to be scoped out. Operational phase rail emissions are proposed to be scoped out as it is expected the number of rail movements would fall below the screening thresholds set out in Local Air Quality Management Technical Guidance (LAQM TG(22)) (DEFRA, 2022) and therefore not result in a potentially significant effect on air quality, and this will be confirmed in the ES. If not below relevant assessment thresholds, as is expected, this will be scoped in.

7.1.5 It is expected that operational phase traffic levels will fall below the thresholds for assessment given in guidance and would therefore be scoped out (refer to Section 6, Transport). The volume of traffic generated during the construction phase is not yet known. The scoping in/out of construction and operational phase traffic emissions will be confirmed when traffic generation figures are established in the course of the EIA. The assessment criteria and approach for traffic emissions have been provided in case it is required.

7.1.6 Justification for the proposed scope is provided in Section 7.6.

7.2 Legislative or policy requirements and technical guidance

Legislative context

7.2.1 The CCS facilities will be regulated by the Environment Agency (EA) under the terms of an environmental permit (EP) issued under the Environmental Permitting (England and Wales) Regulations 2016 ("EP Regulations").

7.2.2 Each EfW has its own EP which contains limits on emissions to air based on the requirements of the EP Regulations, the Industrial Emissions Directive ("IED") (Directive 2010/75/EU), and the Best Available Techniques (BAT) Reference document (the "BREF") for the incineration of waste.

7.2.3 The Applicant's permitting strategy, in addition to the DCO application, is to submit application(s) to the EA for the new CCS facilities as it is expected that these will be operated by a separate legal entity or entities. If necessary the existing Environmental Permits will be caried to reflect any changes to operating practice required to accommodate the CCS facilities. These are expected to be minor. For those pollutants currently emitted by the EfWs the emission limits used in the air quality EIA will be those currently prescribed in the EPs, i.e. the same emission limit values will be applied.

7.2.4 The CCS plant will also result in emissions of additional substances in trace quantities, including amines, nitrosamines, nitramines and aldehydes, which are not currently regulated under the existing EPs. The emission concentrations of these substances are to be determined in the course of the EIA.. The emission limits will be in accordance with BAT guidance for post-combustion carbon capture facilities. In addition, the EA will not grant variations to the EPs to operate if emissions are shown to have an unacceptable impact. Therefore, the emission limits will be set at a level which is achievable using BAT and at which no significant environmental effects are predicted.

Policy

7.2.5 The Overarching National Policy Statement (NPS) for Energy EN-1 2024 sets out the Government's policy for delivery of major energy infrastructure and will be the primary basis for decision making. It states that significant air emissions and mitigation measures should be identified, distinguishing between stages of developments and including impacts from any road traffic, where relevant. Furthermore, existing air quality levels and the relative change in air quality from these levels should be described, including potential eutrophication impacts.

7.2.6 The NPS further states that consideration should be given the latest research in areas such as amine degradation where understanding is still developing (refer to section 7.5.10 and 7.7.6 for details of how such research will be included in the EIA).

7.2.7 Emphasis is placed on substantial weight being given to air quality considerations where developments would lead to a deterioration in air quality in an area where air pollution already exceeds national air quality limits, or would result in new exceedances of air quality limits where there are none currently.

7.2.8 The National Planning Policy Framework (NPPF), last revised in December 2023, notes that planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas (AQMAs), Clean Air Zones, and the cumulative impacts on air quality from individual sites in local areas. It also states that any new development in an AQMA must be consistent with the local Air Quality Action Plan (AQAP). The thrust of this guidance relates to emissions from traffic, which is the primary source of emissions in urban areas.

7.2.9 The assessment will also take account of the policies within the Wakefield District Local Development Framework (as adopted January 2024).

Guidance and best practice

7.2.10 The National Planning Practice Guidance (NPPG) Air Quality (last updated in November 2019) was developed to support the NPPF. The guidance provides a concise outline as to how air quality should be considered in order to comply with the NPPF and states when air quality is considered relevant to a planning application. The Air Quality NPPG makes it clear that air quality will be considered relevant to the application for the Proposed Development, as it modifies a potentially significant source of emissions to the air.

7.2.11 It is proposed to assess the impact of construction phase dust emissions qualitatively using the methodology provided in the Institute of Air Quality Management (IAQM) guidance document "Guidance on the assessment of dust from demolition and construction", last updated in 2024 (the IAQM 2024 Guidance).

This will be used to determine any potential risks from dust generating activities, recommend suitable mitigation measures and determine whether residual significant effects are likely.

7.2.12 It is proposed to assess the impact of process and vehicle emissions (if changes in traffic flow exceed the thresholds set out in the guidance) in accordance with the IAQM document "Land-Use Planning & Development Control: Planning for Air Quality" published in 2017 (the IAQM 2017 guidance). This will be used to determine whether a certain air quality effect requires detailed assessment and provides the assessment criteria for the quantification of impacts and assessment of significance.

7.2.13 The IAQM (2017) guidance specifically states that it is not designed for assessing the impact at ecological sites. In 2020, the IAQM published the latest version of the guidance document "A guide to the assessment of air quality impacts on designated nature conservation sites" (the IAQM 2020 guidance). This draws on EA guidance for defining screening criteria for the assessment of air quality impacts on designated ecological sites. This will be used to determine whether an air quality effect on a designated nature conservation site requires detailed assessment and provides the assessment criteria for the quantification of impacts and assessment of significance.

7.2.14 The assessment methodologies and assessment criteria taken from these best practice guidance documents are summarised in the Approach to Section 4 of this EIA Scoping Report.

7.3 Baseline

Baseline environment

7.3.1 A review of mapped background data provided by Defra shows that baseline pollutant concentrations in close proximity to the Proposed Development are generally low, with no exceedances of the air quality assessment levels (AQALs) set for the protection of human health likely. There are 4 AQMAs within 5 km of the Proposed Development, all of which have been declared due to concern over annual mean concentrations of nitrogen dioxide, principally because of traffic emissions. These are:

- Knottingley AQMA;
- A1 AQMA;
- Pontefract AQMA; and
- Castleford AQMA.

7.3.2 The impact of the Proposed Development on nitrogen dioxide concentrations within these AQMAs will be considered as part of the assessment. There are emissions of oxides of nitrogen from F1 and F2 in the current mode of operation. Emissions as a result of the implementation of the CCS facilities will be quantified and the change from the existing operation will be assessed.

7.3.3 The Air Pollution Information System (APIS) website provides information on baseline pollutant levels at European and UK designated ecological sites. This shows that baseline levels of nitrogen deposition are likely to exceed the habitat-specific Critical Levels and Critical Loads at ecological sites relevant to the assessment, as is common for most of the UK.

7.3.4 Potential future changes to the baseline, such as emissions from any developments in the area which are consented but not yet operational, will be considered, and baseline concentrations amended if necessary

Proposed approach to surveys and further baseline data collection

7.3.5 Baseline pollutant data will be obtained from a number of sources including local and national monitoring networks, the UK Air Quality Archive, and APIS. Consideration will be given to which sources of baseline data are most appropriate, with local monitoring taking precedence. For pollutants that are not monitored locally, the highest concentration within the modelling domain obtained from the Defra background maps

will be applied. For pollutants excluded from the Defra background maps, conservative values will be obtained from national monitoring networks.

7.3.6 Background concentrations and nitrogen and acid deposition for European and UK designated ecological sites will be obtained from APIS using the most applicable habitat type as advised by the ecology consultant.

7.3.7 There is very little baseline monitoring available in the UK for pollutants specific to the CCS plant (namely amines, nitramines, nitrosamines and aldehydes). A review of literature and recent applications for similar processes will be undertaken to determine appropriate baseline concentrations. As there are no other known existing sources of these compounds in the vicinity of the Proposed Development, and these compounds have a relatively short lifetime in the atmosphere (so would only be present in detectable concentrations close to existing sources), in the first instance it will be assumed that baseline concentrations of these compounds are zero unless evidence is found to the contrary. The determination of baseline concentrations will also take into consideration potential emissions from any other carbon capture projects in the local area that are sufficiently well advanced and in the public domain.

7.4 Approach to assessment

Assessment criteria and magnitude of impact

Construction phase dust emissions

7.4.1 It is proposed to use the assessment criteria detailed in the IAQM 2024 Guidance. The dust emission magnitude from construction phase activities will be defined as ‘small’, ‘medium’ or ‘large’ based on the scope of each activity. This will be combined with the sensitivity of the area to determine whether the risk of dust impacts on human health, dust soiling and ecology is ‘negligible’, ‘low risk’, ‘medium risk’, or ‘high risk’. The risk of dust impacts will then be used to define recommended site-specific mitigation measures. The final mitigation measures will be determined by the construction contractor and included in the Outline Construction Environmental Management Plan (CEMP) and/or Outline Construction Traffic Management Plan (CTMP) which will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application

Vehicle emissions

7.4.2 For the assessment of vehicle emissions, the IAQM 2017 guidance states an air quality assessment is required where a development would cause a “significant change” in light duty vehicles (LDVs) or heavy duty vehicles (HDVs). The indicative criteria to process to an assessment are:

- A change in LDV flows of:
  - more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA; or
  - more than 500 AADT elsewhere.
- A change in HDV flows of:
  - more than 25 AADT within or adjacent to an AQMA; or
  - more than 100 AADT elsewhere.

7.4.3 The AADT trip generation during the construction and operational phases is not yet confirmed but is anticipated to be below the indicative criteria for requiring a detailed assessment, particularly for the operational phase. However, if it is determined on the basis of the criteria that there is the potential for a significant effect due to either construction and/or operational vehicle emissions alone, or combined operational phase vehicle and process emissions, the impact will be assessed on a quantitative basis using the latest version of the ADMS Roads dispersion model, developed and supplied by Cambridge

Environmental Research Consultants (CERC). The approach to be taken will be confirmed with WMDC prior to the assessment being undertaken.

Process emissions – human health

7.4.4 Although the waste combustion-related air pollutants in the flue gas would continue to be subject to the same emission limits that apply to the existing EfWs with no increase, as regulated by the EPs, the change to the location of the emission points and flue gas characteristics could affect the environmental impacts and so these will be assessed.

7.4.5 In addition, the further process emissions introduced by operation of the CCS facilities, namely amines, nitrosamines, nitramines and aldehydes, will also be assessed.

7.4.6 For those pollutants subject to an AQAL, the criteria for the assessment of process emissions on human health (and vehicle emissions, if quantification of these emissions is required) will be taken from the IAQM 2017 guidance. This provides the following matrix for assessing the magnitude of annual mean impacts. The magnitude of change is based on the change in concentration relative to the AQAL and the overall predicted concentration with the scheme–- i.e. the future baseline plus the process contribution.

Table 7.1: IAQM magnitude of change descriptors

Long term average concentration at receptor in assessment year	% change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Negligible	Negligible
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

7.4.7 The above matrix is only designed to be used with annual mean concentrations. The approach for assessing the impact of short term emissions in line with the IAQM 2017 guidance does not take into account the background concentrations as it is noted that background concentrations are less important in determining the severity of impact for short term concentrations. Consequently, for short term concentrations (i.e., those averaged over a period of an hour or less), the following magnitude of change descriptors will be used to describe the impact:

- < 10% – negligible;
- 10 – 20% - slight;
- 20 – 50% - moderate; and
- 50% – substantial.

7.4.8 The IAQM 2017 guidance does not provide any descriptors for averaging periods of between 1 hour and a year. Therefore, for these periods the criteria detailed in EA guidance ‘Air emissions risk assessment for your environmental permit’, will be used. These state that process contributions can be considered ‘insignificant’ if:

- the long term process contribution is <1% of the long term environmental standard; and
- the short term process contribution is <10% of the short term environmental standard.

7.4.9 The above magnitude of change descriptors apply to all pollutants for which an AQAL applies, which includes mono-ethanolamine (MEA) and the most harmful known nitrosamine, n-nitrosodimethylamine (NDMA). The EA has defined AQALs for MEA and NDMA. The Norwegian Institute of Public Health (NIPH)

has also defined an AQAL for NDMA which is 50% higher than that defined by the EA. In the first instance it is proposed to assess the total concentrations of nitrosamines and nitramines against the EA's AQAL for NDMA as a conservative measure, unless research into alternative EALs (see section 7.5.10) is published ahead of submission of the EIA In addition, there are AQALs for formaldehyde. The impact of emissions of these pollutants from the CCS plant will be assessed against these AQALs, and in the case of aldehydes it will be assumed that all aldehydes are emitted as formaldehyde for comparison with the AQALs.

7.4.10 Whilst total nitrosamines and nitramines can be assessed against the AQAL for NDMA, apart from those for MEA and NDMA there are no substance-specific AQALs set for any other amines, nitrosamines and nitramines that may be released from the CCS facilities. The exact substances modelled will depend on the design of the CCS facilities and may be MEA and NDMA, or other amines and amine degradation products. . The EA has engaged Ricardo to derive AQALs for a suite of amines, nitrosamines and nitramines that would potentially be released by amine-based CCS facilities. It is anticipated that this project will be complete before the assessment work for the Proposed Development is undertaken and therefore the required AQALs will be available. If no AQAL is available for any substance that requires assessment, an appropriate AQAL will be derived using the EA's prescribed methodology for deriving environmental assessment levels (EALs).

7.4.11 The impact of metals emissions will be assessed using the methodology defined in the EA note, 'Guidance on assessing group 3 metal stack emissions from incinerators' (June 2016, version 4). This uses the same criteria as detailed in paragraph 7.4.8, with the additional criteria that if the total concentration is below the environmental standard then the impact can be screened out as 'insignificant'.

7.4.12 The EPs include a limit on emissions of dioxins and furans (collectively referred to as dioxins) and this will continue to apply. Owing to the change in emissions characteristics (temperature and flow rate) and release point the change in dispersion pattern might affect the pathways of potential exposure. Dioxins and dioxin-like polychlorinated biphenyls (PCBs) have the potential to accumulate within the food chain. The impact will be assessed in a Dioxin Pathway Intake Assessment. The UK-specific health criteria will be applied to assess the impact (this is the EA's preferred approach). This approach is explained in the EA's document "Human Health Toxicological Assessment of Contaminants in Soil", ref SC050021. For dioxins and dioxin-like polychlorinated biphenyls (PCBs) a Tolerable Daily Intake (TDI) is defined. A Mean Daily Intake (MDI) is also defined, which is the typical intake from background sources (including dietary intake) across the UK. The predicted intake of a substance due to emissions from the operation of the CCS facilities will be added to the MDI and compared with the TDI. The total impact will be compared to the TDI to ensure that the impact is not significant.

Process emissions – ecology

7.4.13 For the assessment of process emissions and (if necessary) vehicle emissions on designated ecological sites, the predicted impacts will be compared to the relevant Critical Levels for the protection of ecosystems and the habitat specific Critical Loads for deposition.

7.4.14 The IAQM 2020 guidance, drawing on the EA's 'Air Emissions Risk Assessment for your Environmental Permit' (EA Air Emissions Guidance), states that to screen out impacts as 'insignificant' at European and UK statutory designated sites:

- the long term process contribution (PC) is <1% of the long term environmental standard; and
- the short term process contribution is <10% of the short term environmental standard.

7.4.15 If the above criteria are met, no further assessment is required. If the long-term PC exceeds 1% of the long-term environmental standard, the predicted environmental concentration (PEC, the sum of the baseline and PC) must be calculated and compared to the standard. If the resulting PEC is less than 70% of the long-term environmental standard, the EA Air Emissions Guidance states that the emissions are 'insignificant'

and further assessment is not required. In accordance with the guidance, calculation of the PEC for short-term standards is not required.

7.4.16 The EA Air Emissions Guidance states further that to screen out impacts as 'insignificant' at local nature sites:

- the long-term PC must be less than 100% of the long-term environmental standard; and
- the short-term PC must be less than 100% of the short-term environmental standard.

7.4.17 The EA Air Emissions Guidance criteria above have been set to screen out insignificant impacts. With regard to the impact on local nature sites, the IAQM 2020 guidance states:

"For local wildlife sites and ancient woodlands, the Environment Agency uses less stringent criteria in its permitting decisions. Environment Agency policy for its permitting process is that if either the short-term or long-term PC is less than 100% of the critical level or load, they do not require further assessment to support a permit application. In ecological impact assessments of projects and plans, it is, however, normal practice to treat such sites in the same manner as SSSIs and European Sites, although the determination of the significance of an effect may be different. It is difficult to understand how the Environment Agency's approach can provide adequate protection."

7.4.18 As such, it is considered appropriate to also apply the screening criteria for SSSIs and European Sites detailed in paragraph 7.5.15 toother nature sites (i.e. local wildlife sites, local nature reserves, national nature reserves, and ancient woodland). This provides a conservative approach to their protection.

Sensitivity of receptors

Construction phase dust emissions

7.4.19 The following indicative examples of receptor sensitivity are given in the IAQM 2024 Guidance. These will be applied as a guide to determining receptor sensitivity in the assessment.

Table 7.2: Sensitivity of receptors to dust impacts

Receptor sensitivity	Indicative receptor types		
	Dust soiling	Human health	Ecology
High	Dwellings, museums, car parks and car showrooms	Dwellings, hospitals, care homes.	European designated sites
Medium	Parks, workplaces	Offices and shops	UK designated sites
Low	Playing fields, footpaths, roads	Playing fields, footpaths, parks, shopping streets	Local nature sites

Process and vehicle emissions

7.4.20 For the purpose of this assessment, all human receptors are considered to be of high sensitivity and the applicability of the assessment criteria is defined by the applicability of the averaging period of the AQAL. The following table extracted from Defra's Local Authority Air Quality Technical Guidance (LAQM.TG(22)) explains where the AQALs apply:

Table 7.3: Guidance on where AQALs apply:

Averaging period	AQALs should apply at:	AQALs should generally not apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building	Building façades of offices or other places of work where members of the public do not have regular access.

Averaging period	AQALs should apply at:	AQALs should generally not apply at:
	façades of residential properties, schools, hospitals, care homes etc.	Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
24-hour mean and 8-hour mean	All locations where the annual mean AQAL would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.
1-hour mean	All locations where the annual mean and 24 and 8-hour mean AQALs apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15-minutes or longer.	-

7.4.21 For the assessment of ecological impacts, the sensitivity of the receptor cannot be determined by the air quality assessor. For any designated ecological sites where the impacts cannot be screened out in accordance with the criteria detailed above, the assessment of the sensitivity of the receptor will be undertaken by the project ecologist, informed by the air quality assessment.

Significance of effect

Construction phase dust emissions

7.4.22 The IAQM 2024 Guidance is that the significance of effect should be judged after considering the mitigation measures recommended following the assessment of the risk of dust impacts. The recommended mitigation measures will be at the level required to ensure that the residual significance of effect is ‘not significant’.

Vehicle and process emissions

7.4.23 The IAQM 2017 guidance states that the conclusion as to whether an effect is significant or not will be based on professional judgment. The guidance advises that, where the air quality impact of a single development can be judged in isolation, it is likely that a ‘moderate’ or worse impact will lead to a significant effect, unless there is a reason to judge otherwise based on other factors. This method for the assessment of significance applies for all relevant pollutants for which an AQAL is defined or has been derived, including amines, nitrosamines, nitramines and aldehydes.

7.4.24 The effect of emissions of dioxins and dioxin-like PCBs will be considered ‘not significant’ if the total intake is below the TDI.

7.4.25 As noted above, the significance of effect of any impacts on ecology that cannot be screened out as 'insignificant' will be assessed by the project ecologist.

Geographical scope

7.4.26 The geographical scope of the assessment of construction phase dust emissions is limited by the initial screening distances defined in the IAQM 2024 Guidance of 250 m from the Site Boundary and 50 m from the routes used by construction vehicles on the public highway, up to 250 m from the Site entrance.

7.4.27 The geographical scope of the assessment of vehicle and process emissions will be limited to the areas where there is a potential significant air quality effect. It is proposed to model process emissions across a 10 x 10 km output grid of sufficiently fine resolution to capture the maximum contribution from the Proposed Development. The size of the output grid will be reviewed if necessary to identify the maximum impact but this is usually well within the size of output grid identified. In addition, the impact of emissions will be assessed at a number of representative human and ecological sensitive receptors. The human receptors will be determined following initial dispersion modelling to determine the areas where a significant effect is most likely. The selected receptors will include residential dwellings in the area where a significant effect is most likely, along with the schools, hospitals and care homes closest to the Proposed Development.

7.4.28 The ecological receptors to be assessed are those within the screening distances for habitats outlined in the EA Air Emissions Guidance, namely:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs), or Ramsar sites within 10 km of the Proposed Development; and
- Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR), Local Nature Reserves (LNRs), local wildlife sites and ancient woodlands within 2 km of the Proposed Development.

7.4.29 The following ecological receptors have been identified as requiring inclusion in the assessment:

Table 7.4: Ecological receptors

Name and designation	Approximate distance from Site at closest point (km)
European Designated Sites (within 10 km)	
None identified	
UK Designated Sites (within 2 km)	
Fairburn and Newton Ings SSSI	1.9
Local Nature Sites (within 2 km)	
Well Wood LNR	1.9
Fryston Park LWS	0.2
Bank of River Aire LWS	0.3
Byram Park LWS	1.6
Former Fryston Colliery LWS	1.8
Orchard Head LWS	1.8
Frog Hall Quarry LWS	1.9
SAC = Special Area of Conservation, SPA = Special Protection Area, SSSI = Site of Special Scientific Interest, LWS = Local Wildlife Site	

Temporal scope

7.4.30 The assessment will cover the construction and operational phases of the Proposed Development. If it is determined that a quantitative (dispersion modelling) study of vehicle emissions from the operation of the Proposed Development is required, this will specifically consider the expected first year of operation as a worst-case, as vehicle emissions are expected to decrease year-on-year as newer, cleaner vehicles enter the fleet.

7.5 Embedded mitigation and enhancement measures

7.5.1 The Proposed Development will be designed to minimise air quality effects. In particular, the following mitigation measures will be embedded into the design:

- The height of the new stacks, assuming that the flue gas is not routed back to the existing stack, will be chosen to be appropriate to avoid any significant air quality effects and secured through the parameters secured through the DCO;
- The EfWs already benefit from FGT systems to ensure that emissions to air from the stacks comply with the emission limits specified in the EPs, which will continue to be used. The CCS facilities will be fitted with additional emissions abatement technology to minimise emissions to air of compounds introduced by the CCS plant such as ammonia, amines, nitramines, nitrosamines, and aldehydes; and
- Either the Environmental Management Systems (EMSs) for the existing EfWs, as required by the EPs will be extended to include the CCS facilities, or standalone EMSs will be developed, in accordance with the EP strategy. Compliance with the EMSs and the EPs will ensure compliance with emission limits and the control of fugitive dust and odour emissions to prevent pollution beyond the Site Boundary. The EP variations and ancillary EMSs will be assumed to be effectively regulated by the EA, as required by the NPS, and will not be included within the scope of the ES or this application.

7.5.2 The results of the assessment of construction phase dust emissions will be used to determine appropriate mitigation measures during the construction phase. The exact mitigation measures to be implemented will be determined by the construction contractor and included in the outline CEMP and outline CTMP. An outline CEMP and outline CTMP will be developed to accompany the ES and will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application.

7.5.3 Air quality is a material consideration at the design stage and the CCS facilities will be designed to have no significant effect on air quality. Therefore, it is anticipated that no additional mitigation measures will be required to ensure that the air quality effect of the Proposed Development is not significant.

7.6 Scope of environmental impacts and effects

Construction

7.6.1 The construction phase of the Proposed Development will potentially affect sensitive receptors via vehicle emissions and construction dust emissions.

Operation

7.6.2 The number of operational phase vehicles is expected to be very low. The effects of vehicle emissions will be assessed if the number of vehicle movements generated is not sufficiently low to screen out the possibility of a significant effect.

7.6.3 With regard to process emissions, the existing EPs include both long- and short-term limits on emissions to atmosphere for a range of combustion pollutants. It is likely that the release point, the temperature, flow

rate and humidity of exhaust gas will be modified as a result of the installation of CCS plant. These emissions can affect sensitive human receptors via inhalation and, for dioxins, the emissions can also have an effect via accumulation in the environment and subsequent ingestion. The effect will be considered in the Dioxin Pathway Intake Assessment. Emissions can also affect ecological receptors via the concentration in air, or by deposition of nitrogen and acid. The calculation of nitrogen and acid deposition will include the contribution from the nitrogen contained in amines, nitrosamine and nitramines. As such, the Air Quality EIA will include an assessment of the potential change in impacts on human health via inhalation of pollutants and the ingestion of dioxins, and impacts on ecology of ambient air concentrations of pollutants and the deposition of nitrogen and acid.

7.6.4 Amines, nitrosamines and nitramines potentially released by the CCS facilities can also potentially affect human health via inhalation. Amines are common biological molecules found in all living organisms, and a number of manufactured products (such as pharmaceuticals and cosmetics) and are not considered highly hazardous to human health. However, some nitrosamines are known to be toxic and carcinogenic, and others are suspected carcinogens. There is less toxicological data available regarding nitramines, but this class of chemicals is also considered to be potentially carcinogenic. Nitrosamines and nitramines will be released from the CCS facilities in extremely small quantities, and further very small quantities would form via atmospheric reactions of the released amines with oxides of nitrogen. Despite the very low anticipated concentrations of these pollutants, the impacts and effects will be assessed in line with the approach set out in Section 7.4.

7.6.5 The assessment of process emissions will be undertaken via detailed dispersion modelling using the latest version of CERC's ADMS dispersion model (currently version 6), which is capable of modelling atmospheric chemical reactions of the amines, nitramines and nitrosamines emitted by the CCS facilities.

7.6.6 CERC has been engaged by the EA to research the chemical reaction parameters for a suite of amines commonly used in CCS facilities, to enable the modelling of atmospheric chemical reactions and the rate of formation of nitrosamines and nitramines in the atmosphere. It is anticipated that this project will be complete before the assessment work for the Proposed Development is undertaken and therefore the required reaction rate parameters will be available.

7.6.7 The modelling will take into account existing and proposed buildings which have the potential to influence dispersion and will use five years of hourly sequential meteorological ("met") data from Bramham, which is the closest and most representative met site.

7.6.8 Modelling will be undertaken for four scenarios: the current operation of the EfWs, and the operation of the EfWs with the CCS facilities individually and together, which will change the emissions from the existing stacks. The impact of the Proposed Development will be assessed as the difference between the current operation of the EfWs (the baseline) and each of the three other scenarios. The modelling will be undertaken using the discharge stack gas flow parameters for the CCS facilities and the emission limits specified in the EPs, and project-specific emission limits for compounds emitted by the CCS facilities, as appropriate. For those pollutants which have a short-term emission limit, the impact of the EfWs and the CCS facilities operating at this short-term emission limit will also be compared with the relevant short term AQALs.

7.6.9 The dispersion model will be used to predict the short-term and long-term process contributions ("PCs"), as applicable, for the following pollutants at the appropriate averaging periods and percentiles:

- oxides of nitrogen ("NOx", as NO_2);
- sulphur dioxide;
- particulate matter (as "PM_{10}" and "$PM_{2.5}$");
- carbon monoxide;
- hydrogen chloride;

- hydrogen fluoride;
- volatile organic compounds ("VOCs");
- ammonia;
- mercury compounds;
- cadmium and thallium compounds;
- other metals and their compounds (antimony, arsenic, cobalt, copper, chromium, lead, manganese, nickel and vanadium);
- dioxins/furans;
- PCBs;
- polycyclic aromatic hydrocarbons ("PAHs");
- amines;
- nitramines and nitrosamines; and
- aldehydes.

7.6.10 The dispersion modelling results will be used to determine suitable stack heights for the emission points from the CCS facilities to minimise the impact upon the local environment.

7.6.11 The operational phase of the Proposed Development will not include any significant sources of dust or odour. The only potential source of odour emissions during the operational phase will be the chemicals used. Notably, amines are known to have an unpleasant odour. However, the level of detection of the odour from the amines is much higher than the AQALs set for the protection of human health; therefore, as concentrations will necessarily be below the AQALs to ensure that there will be no significant effects on human health, it is concluded that the concentrations emitted by the CCS plant will be sufficiently low that there is no likely odour effect. Any potential sources of dust and odour will be controlled by EMSs in order to ensure compliance with the requirements of the EPs.

7.6.12 The closest highly sensitive receptors with regard to dust or odour emissions (e.g. residential dwellings) are approximately 200 m from the Site Boundary, and further from proposed process areas. As there will be no significant sources nor any highly sensitive receptors in close proximity, the assessment of operational dust and odour emissions is proposed to be scoped out.

7.7 Limitations and uncertainties

7.7.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified at this stage:

- The number of vehicle movements generated by the construction and operational phases is not yet confirmed. Consultation will be undertaken with the transport consultant to determine appropriately conservative trip generation figures and the distribution of vehicles on the local road network.
- Dispersion modelling of process emissions is reliant on data supplied from the technology provider. As a conservative measure, it will be assumed that pollutants are emitted from the process continually at the maximum permitted emission limits (where applicable), and the impact reported is the maximum over all five years of modelled weather data. In addition, it will be assumed that:
  - for pollutants with an AQAL averaged over less than 1 day that have a short-term emission limit, emissions are at the short-term emission limits during the worst-case weather conditions for dispersion;
  - all particulate matter is emitted as either PM_{10} or $PM_{2.5}$ for comparison with the relevant AQALs;
  - the entire VOC emissions consist of benzene or 1,3-butadiene for comparison with the relevant AQALs;
  - a worst case 70% long-term and 35% short-term conversion of NO_x to NO_2 is applied;
  - cadmium is released at the combined ELV for cadmium and thallium; and

- all aldehydes are released as formaldehyde.

- There are particular limitations in the assessment of emissions of amines, nitramines, and nitrosamines, namely:
  - Model validation: although the ADMS model has been validated, the amine chemistry module has not. Therefore it is subject to additional uncertainty. Suitably conservative assumptions will be made to account for this uncertainty.
  - Chemical reaction rates of amines, nitramines and nitrosamines are subject to uncertainty. A number of sensitivity analyses will be undertaken in accordance with guidance from the EA's Air Quality Modelling and Assessment Unit (AQMAU) to address this.
  - At present there are only AQALs defined for MEA and NDMA. The EA has commissioned a project to derive substance-specific AQALs for other amines, nitrosamines and nitramines, which will likely be complete before the assessment of emissions from the CCS facilities is undertaken. If any AQAL required for the assessment is not available, it will be derived using the EA's methodology. The uncertainty in the AQALs for these substances will be taken into consideration when assessing the significance of effect.
  - There is very limited data available regarding baseline concentrations of these pollutants. A review of available data and potential cumulative sources will be undertaken to determine whether the initial assumption that baseline concentrations will be below the limit of detection is appropriate.

7.7.2 A series of sensitivity analyses will be included which will consider the effect of varying model assumptions. This will be used to ensure the most appropriate model assumptions are applied.

7.8 Intra-related effects

7.8.1 Construction dust and process emissions have an intra-related effect with population and health impacts. These will be assessed, based on the results of the air quality assessment, in the Population and Health ES Chapter.

7.8.2 The effect of emissions on ecological receptors has potential intra-related effects. The intra-related effect of air quality impacts with habitat impacts will be assessed by the project ecologist.

7.8.3 The assessment of emissions from vehicles will be informed by the traffic generation figures and modelling undertaken in the Traffic and Transport ES Chapter.

7.8.4 Whilst not an air quality issue, the effect of visible plumes of water vapour from the stack and the coolers could have a landscape and visual effect. The dispersion modelling will be used to assess the frequency and length of visible plumes and the significance of this effect will be assessed by the project landscape and visual consultant.

7.9 Cumulative effects

7.9.1 Cumulative effects from construction dust would only occur for developments for which the construction phases and 250 m screening distances (detailed in paragraph 7.4.26) overlap. Any developments for which these conditions are met will be considered as requiring consideration of potential cumulative effects.

7.9.2 If vehicle emissions during the construction phase are determined to be above the threshold for requiring an assessment, the potential for cumulative effects with any other relevant plans and projects will be considered.

7.9.3 Consideration will be given to the potential intra-project cumulative effects of combined process and vehicle emission from the Proposed Development.

7.9.4 Consideration will be given to the cumulative operational phase impact of developments which will have an impact on emissions to air (either vehicle emissions, process emissions, or both) within the study area defined in paragraph 7.4.27. Table 17.1 of this EIA Scoping Report gives a shortlist of cumulative developments that will potentially require consideration for the assessment of Intra-Project cumulative effects. Any additional developments identified during the EIA process that have the potential for a significant cumulative air quality effect will be included in the assessment of cumulative effects.

7.10 Summary of proposed EIA scope

7.10.1 The effects scoped in or out for further (topic) assessment are as follows:

Table 7.5: Summary of air quality impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Vehicle emissions	Out	Vehicle numbers not yet known. Level of assessment required to be determined as part of EIA process. If not below relevant assessment thresholds, as is expected, this will be scoped in.
Dust emissions	In	Potentially significant without appropriate control measures.
Operation		
Dust and odour emissions	Out	No significant sources identified and no sensitive receptors identified in close proximity to the Site.
Process emissions	In	Source of a potentially significant air quality effect.
Vehicle and rail emissions	Out	Vehicle numbers not yet known, although anticipated to be very low. Potential for in-combination effect with stack emissions. Level of assessment required to be determined as part of EIA process. If not below relevant assessment thresholds, as is expected, this will be scoped in.

8 Climate Change

8.1 Introduction

8.1.1 This Section of the EIA Scoping Report has been produced by Savills Chartered Environmentalists and Full Member of IEMA, and presents the proposed scope of assessment for climate change effects.

8.1.2 Climate change in the context of EIA can be considered broadly in two parts:

- the impact of greenhouse gas emissions (GHGs) caused directly or indirectly by the Proposed Development, which contribute to climate change; and
- the potential impact of changes in climate on the Proposed Development, which could affect it directly or could modify its other environmental impacts.

8.1.3 Assessment of GHG emission impacts is proposed to be scoped in.

8.1.4 Assessment of climate risks to the Proposed Development is proposed to be scoped out, with the exception of flood risk which will be assessed including a climate change allowance in the **Error! Reference source not found.** ES Chapter.

8.1.5 Assessment of intra-related effects due to climate change in the future baseline is proposed to be scoped in, and assessed where relevant in each environmental topic chapter as discussed in Section **Error! Reference source not found.**, above.

8.2 Legislative or policy requirements and technical guidance

8.2.1 Key climate change legislation is the Climate Change Act 2008 (as amended in 2019) and the subsidiary Carbon Budget Orders 2011, 2016 and 2021, which set the applicable five-yearly carbon budgets for the UK in support of achieving net zero GHG emissions by 2050.

8.2.2 Related legislation and policy concerns the necessary steps and infrastructure investment required to achieve this, in the areas of energy generation decarbonisation, circular economy and sustainable resource management, transport decarbonisation and carbon capture and sequestration. Delivering carbon capture, usage and storage (CCUS) clusters is a key policy measure in the UK's 2023 Net Zero Growth Plan[8], with the East Coast Cluster being a supported project under the Industrial Carbon Capture Track 1 business model, and further clusters and capture projects anticipated to be supported under the forthcoming Track 1 Extension and Track 2 funding.

8.2.3 The Net Zero Growth Plan noted that "the UK ETS [Emissions Trading Scheme] could unlock investment at scale in the UK's greenhouse gas removal (GGR) sector by providing an integrated market where businesses can make economically efficient choices on how to decarbonise or remove their emissions." Subsequently, a consultation response on amendments to the UK ETS[9] has confirmed that it will be extended to cover the waste sector from 2028 and the emissions cap will be adjusted to be in line with the 2050 net zero goal.

[8] HM Government, March 2023: Powering Up Britain: The Net Zero Growth Plan. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147457/powering-up-britain-net-zero-growth-plan.pdf, accessed 16/10/23

[9] DESNZ and others, July 2023: Consultation outcome: Developing the UK Emissions Trading Scheme. [Online] Available at: https://www.gov.uk/government/consultations/developing-the-uk-emissions-trading-scheme-uk-ets, accessed 16/10/23

8.2.4 While not itself policy, the recommendations to government made by the Climate Change Committee are also very relevant and will be considered in the ES, including the recommendations of the Sixth Carbon Budget, progress reports for the UK, and the UK climate change risk assessment.

8.2.5 The Overarching National Policy Statement for Energy (EN-1)[10] 2024 affirms the *"urgent need for new carbon capture and storage (CCS) infrastructure to support the transition to a net zero economy"* (paragraph 3.5.1) and further describes the context of this national need for carbon CCS in Section 3.5 and decision-making regarding it in Section 4.9.

8.2.6 Climate change mitigation and adaptation is a key theme in the National Planning Policy Framework for England[11] states with regard to climate change that the core planning principle of the NPPF is that the planning system should:

"…support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure." (paragraph 152).

8.2.7 The main guidance used for the assessment of GHG emissions will be the Institute of Environmental Management and Assessment (IEMA) guide 'Assessing Greenhouse Gas Emissions and Evaluating their Significance'[12] .

8.2.8 The assessment will also take account of the policies within the Wakefield District Local Development Framework (as adopted January 2024).

8.3 Baseline

Baseline environment

8.3.1 The current climatic baseline is the regional climate and weather patterns, recorded in Met Office data, in the context however of trends in global climate changes affecting the UK climate, which are sufficiently well understood to be considered part of the known baseline. The future baseline with climate change will be assessed where relevant in each environmental topic ES Chapter as discussed in Section **Error! Reference source not found.**, above.

8.3.2 The current baseline of GHG emissions is the existing operation of the Ferrybridge 1&2 EfWs without carbon capture, including both their direct emissions (e.g. from waste combustion and transport) and indirect effects on GHG emissions, for example due to the energy they export. The CCS plant land itself has no significant baseline GHG emissions, being largely unused previously developed land and landscaping without material carbon stocks.

8.3.3 The Ferrybridge 1&2 EfWs have been subject to previous EIA and predictive GHG emissions assessments, and they also undertake verified annual monitoring of GHG emissions. Baseline energy recovery

[10] DESNZ, November 2023: Overarching National Policy Statement for Energy (EN-1). [Online] Available at: https://www.gov.uk/government/collections/national-policy-statements-for-energy-infrastructure, accessed 12/12/23

[11] DLUHC, December 2023: National Planning Policy Framework. [Online] Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2, accessed 03/01/24

[12] IEMA (2022): Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. 2nd Edition. [Online] Available at: https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions, accessed: 06/04/22

performance, emissions, and expected CCS plant performance and emissions data are all therefore available to inform the assessment.

Proposed approach to surveys and further baseline data collection

8.3.4 Baseline data collection will be from published documents and operator information. No field survey is required.

8.4 Approach to assessment

Overview

8.4.1 Direct and indirect GHG emissions will be calculated for construction and operation of the Proposed Development by applying published emissions factors that relate a given level of activity, a physical or chemical process, or amount of fuel, energy or materials used to the mass of GHGs released as a consequence.

8.4.2 This will comprise (a) the GHG emissions arising from the Proposed Development, (b) GHG emissions that it displaces or avoids, compared to the current or future baseline, and hence (c) the net impact on climate change due to these changes in GHG emissions overall.

8.4.3 To ensure that the assessment represents the full value chain of CO_2 capture, the assessment boundary will include the change in GHG emissions from existing Ferrybridge 1&2 operation, transportation of captured CO_2, and ultimately its long-term geological sequestration. This is expected to require use of published research or project information concerning carbon transport and storage elements that lie outside the DCO project boundary but are essential to the context of the GHG emissions assessment, i.e. rail transport of the captured carbon to Teesside as the rail receptor point (as the Applicant has a MoU with Navigator Terminals located in Teesside), and, in light of recent practice on other CCS schemes, onward transport followed by sequestration at an offshore CO2 storage site (currently assumed to be utilising Norway's Northern Lights[13]).

8.4.4 Annual operational GHG emissions over the proposed operating lifetime (taking into account changes in the future baseline such as grid electricity generation decarbonisation, where feasible) will be presented in the ES. Emissions factors and projections published by DESNZ and Defra or other literature sources will be used as required.

8.4.5 The GHGs considered in this assessment will be those in the 'Kyoto basket' of global warming gases expressed as tonnes of CO_2-equivalent global warming potential (GWP)[14] in units of tCO_2e. GWPs used will be typically the 100-year factors in the Intergovernmental Panel on Climate Change Sixth Assessment Report or as otherwise defined in emissions factors and for national reporting under the United Nations Framework Convention on Climate Change (UNFCCC).

8.4.6 The main guidance used for the assessment of GHG emissions will be the Institute of Environmental Management and Assessment (IEMA) guide 'Assessing Greenhouse Gas Emissions and Evaluating their Significance'[12].

[13] https://norlights.com/how-to-store-co2-with-northern-lights/

[14] Table 7.15 in IPCC (2021): Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2391 pp.

8.4.7 The principles of PAS2080 Section 7[15] are also relevant to defining the potentially relevant lifecycle stages to assess.

Magnitude of impact

8.4.8 As GHG emissions can be quantified directly and expressed based on their GWP, the magnitude of impact will be reported numerically as tCO_2e rather than requiring a descriptive scale.

Sensitivity of receptors

8.4.9 GHG emissions have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The global atmospheric mass of the relevant GHGs and consequent warming potential, expressed in tCO_2e, will therefore be treated as a single receptor of high sensitivity. It is considered to be of high sensitivity given the importance of the global climate as a receptor, the limited and decreasing capacity to absorb further GHG emissions without severe climate change resulting, and the cumulative contribution of GHG emission sources.

Significance of effect

8.4.10 The IEMA assessment guidance for GHG emissions describes five levels of significance for emissions resulting from a development, each based on whether the GHG emission impact of the development will support or undermine a science-based, 1.5°C-compatible trajectory towards net zero. To aid in considering whether effects are significant, the guidance recommends that GHG emissions should be contextualised against pre-determined carbon budgets or applicable existing and emerging policy and performance standards where a budget is not available or not meaningfully applicable at the scale of development assessed. It is a matter of professional judgement to integrate these sources of evidence and evaluate them in the context of significance.

8.4.11 Taking the guidance into account, the following will be considered in contextualising the Proposed Development's GHG emissions:

- The magnitude of gross and net GHG emissions as a percentage of the relevant UK carbon budgets;
- The GHG emissions intensity of the Proposed Development against future baseline emissions intensity energy production and use, and projections or policy goals for future changes in that baseline; and
- Whether the Proposed Development contributes to, and is in line with, the applicable UK policy for GHG emissions reductions, where this policy is consistent with science-based commitments to limit global climate change to an internationally-agreed level (as determined by the UK's current NDC to the UNFCCC).

8.4.12 Effects from GHG emissions will be described as adverse, negligible or beneficial based on the following definitions, which closely follow the examples in Box 3 of the IEMA guidance.

- Major adverse: the Proposed Development's GHG impacts would not be compatible with the UK's 1.5°C-aligned net zero trajectory. Its GHG impacts would not be mitigated, or would be compliant only with do-minimum standards set through regulation. The Proposed Development would not provide further emissions reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
- Moderate adverse: the Proposed Development's GHG impacts would not be fully compatible with the UK's 1.5°C-aligned net zero trajectory. Its GHG impacts would be partially mitigated and may

[15] British Standards Institution (BSI) (2016) PAS2080:2016 Carbon Management in Infrastructure. BSI, London.

partially meet the applicable existing and emerging policy requirements, but it would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.

- Minor adverse: the Proposed Development's GHG impacts would be compatible with the UK's 1.5°C-aligned net zero trajectory and would be fully consistent with up-to-date policy and good practice emissions reduction measures. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
- Negligible: the Proposed Development would achieve emissions mitigation that goes well beyond existing and emerging policy compatible with the 1.5°C-aligned net zero trajectory, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
- Beneficial: the Proposed Development would result in emissions reductions from the atmosphere, whether directly or indirectly, compared to the without-project baseline. As such, the net GHG emissions would be below zero. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

8.4.13 Major and moderate adverse effects and beneficial effects will be defined as significant.

8.4.14 Minor adverse and negligible effects will be defined as not significant.

Geographical scope

8.4.15 GHG emissions have a global effect rather than directly affecting any specific local receptor. The impact of GHG emissions occurring due to the Proposed Development on the global atmospheric concentration of the relevant GHGs, expressed in tCO_2e, will be considered in the assessment. As GHG impacts are global and cumulative with all other sources, no specific geographical study area is defined for the identification of receptors or assessment of effects.

8.4.16 However, GHG emissions caused by an activity are often categorised into 'scope 1', 'scope 2' or 'scope 3' emissions, following the guidance of the WRI and the WBCSD Greenhouse Gas Protocol suite of guidance documents[16].

- Scope 1 emissions: released directly by the entity being assessed, e.g. from combustion of fuel at an installation;
- Scope 2 emissions: caused indirectly by consumption of imported energy, e.g. from generating electricity supplied through the national grid to an installation; and
- Scope 3 emissions: caused indirectly in the wider supply chain, e.g. in the upstream extraction, processing and transport of materials consumed or the downstream use of products from an installation.

8.4.17 This assessment will seek to include emissions from all three scopes, where this is material and where it is reasonably possible from the information and emissions factors available.

8.4.18 The majority of GHG emissions are likely to occur within the territorial boundary of the UK and hence within the scope of the UK's national carbon budgets. However, in recognition of the climate change effect of GHG emissions (wherever occurring) and the need, as identified in national policy, to avoid carbon leakage

[16] WRI and WBCSD (2004): The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. Revised edition, Washington and Geneva: WRI and WBCSD.

overseas when reducing UK emissions, potential scope 3 GHG emissions that may physically occur outside the UK will be considered where relevant.

Temporal scope

8.4.19 GHG emissions from construction and from operation over the expected operating lifetime of the Proposed Development will be assessed.

8.4.20 The varying atmospheric residence time of GHGs once emitted, and their differing climate impact, will be considered through the use of 100-year GWP factors to express these in a common tCO_2e metric.

8.5 Embedded mitigation and enhancement measures

8.5.1 The purpose of the Proposed Development is to provide post-combustion carbon capture and to condition the captured CO_2 for onward transportation and sequestration, which is part of national policy to support net zero emission goals. Its operation is therefore inherently intended to achieve mitigation of GHG emissions from waste combustion at a local and national level.

8.5.2 Operationally, a further key embedded mitigation measure is the intended design of the CCS plant with a backpressure steam turbine to minimise energy generation losses from the Ferrybridge 1&2 EfWs.

8.5.3 Embedded mitigation for the construction phase is expected to include transport, energy and fuel efficiency measures in an Outline Construction Environmental Management Plan (CEMP) and a commitment to incorporate lifecycle-based carbon measurement at the detailed design stage, in decision-making about design and materials choices. The outline CEMP will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application. Landscape planting may also offer a minor opportunity for further carbon sequestration.

8.6 Scope of environmental impacts and effects

Construction

8.6.1 With regard to construction-stage GHG emissions, the main impact would be the ‘embodied carbon’ in construction materials used, i.e. the indirect GHG emissions from the supply chain for those materials, particularly for concrete, metals and the major engineered components of the development. These are expected to be relatively minor compared to operational emissions benefits from carbon capture, but will be estimated to consider whether effects may be significant, based on available published life cycle assessment studies or environmental product declarations for key materials and components.

8.6.2 Opportunities to use recycled steel and low carbon concrete will be explored with the design team. Direct GHG emissions from construction activities (e.g. transport movements and fuel consumption by construction plant) are judged to be non-material to the assessment, regulated by other legislation and are not proposed to be assessed quantitatively but will be reported qualitatively and mitigated via measures in the Outline CEMP, drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application.

8.6.3 Climatic changes over the expected circa three-year construction and commissioning programme during the mid-late 2020s are not considered likely to be significant or to introduce climate extremes at a higher risk level than construction contractors are adapted to, within the baseline variability of weather in north West Yorkshire. Assessment of construction-stage climate change risks is therefore proposed to be scoped out.

Operation

8.6.4 The purpose of the Proposed Development is to capture CO_2 emissions from the Ferrybridge 1&2 EfWs, to be transported for offshore sequestration. This capture of emissions will be the primary GHG impact. However, operation of the Proposed Development will require steam and electrical power which may indirectly affect net GHG emissions from the Ferrybridge 1&2 EfWs, and this will also be assessed.

8.6.5 The boundary of the assessment will include operation of the CCS plant and any associated changes in the operation of Ferrybridge 1&2 EfWs. Transport and long-term sequestration of the captured CO_2 will be assumed, and information available from published sources about the potential operation of transport and sequestration infrastructure will be referred to; however, detailed quantitative assessment of the specifics of operation of offsite transport and sequestration facilities will lie outside the boundary of GHG emission impacts calculated for operation of the Proposed Development and will be assessed qualitatively or using representative published information.

8.6.6 The main risk to the Proposed Development from climate change over its operating life is expected to be flooding, which will be assessed with climate change allowances in the **Error! Reference source not found.** ES Chapter. As an extension to the ongoing operation of EfW Site, the Proposed Development is not expected to change the climate risk profile of the facilities as a whole and no significant climate risks from potential increased summer heatwave / drought events or severe winter weather are considered likely. At this stage, further climate risk assessment is therefore proposed to be scoped out. However, as further development design information becomes available, any potential risk due to increased water consumption or any temperature risks to reagent storage will be considered if relevant.

8.7 Limitations and uncertainties

8.7.1 The main limitations and necessary assumptions are likely to be as follows.

- Use of emission factors to estimate Proposed Development GHG emissions, particularly where the carbon intensity is likely to change over time. To mitigate uncertainty, emission factors used in national GHG reporting and verified LCA studies will be used, and where necessary the assessment will consider scenarios or sensitivities to any material areas of uncertainty.
- The early design stage of the CCS plant at the time of EIA, with consequentially limited data on construction materials / products and their carbon intensity. As discussed above, the construction stage impacts are not considered likely to be significant relative to the operational stage impacts but will be estimated and further screened in the assessment.

8.8 Intra-related effects

8.8.1 Intra-related effects with climate change and other topic areas arise primarily from the effect that climate change may have on receptors and their sensitivity (including vulnerability and resilience), which could exacerbate effects via other impact pathways. The characterisation of future baseline conditions for each topic ES Chapter will take into account the likely effects of climate change, as far as these are known at the time of undertaking the EIA. This will be based on information available from the Met Office Hadley Centre's UK Climate Projections project (UKCP18), which provides information on plausible changes in climate for the UK, and on published documents such as the UK Climate Change Risk Assessment published by the Climate Change Committee.

8.9 Cumulative effects

8.9.1 All developments that emit GHGs have the potential to impact the atmospheric mass of GHGs as a receptor, and so may have a cumulative impact on climate change. Consequently, cumulative effects due to other specific local development projects will not be separately assessed but are already taken into account when

considering the impact of the Proposed Development by defining the atmospheric mass of GHGs as a high sensitivity receptor, in line with the supported IEMA GHG guidance.

8.10 Summary of proposed EIA scope

8.10.1 The effects scoped in or out for further climate change assessment are as follows.

Table 8.1: Summary of climate change impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Embodied carbon of construction materials	In	Likely to be minimal compared to operational emission benefits, but will be estimated and screened for significance, and will inform construction-stage mitigation proposals.
Transport and Site mobile plant use	Out	Expected to make non-material contribution to the overall lifecycle impacts of the facility.
Climate risks	Out	No significant change in baseline risks from variable weather conditions (to which construction processes and contractors' working methods are adapted) are expected during the likely construction phasing in the mid-late 2020s.
Operation		
GHG emissions from plant operation, including capture of CO_2 from Ferrybridge 1&2 EfWs and its transport and sequestration	In	A likely significant beneficial effect
Climate risks	Out	Significant change to the climate risk profile of the existing Ferrybridge 1&2 EfWs in operation with the addition of the CCS plant operation is not considered likely. Any changes to flood risk will be assessed in the **Error! Reference source not found.** ES Chapter.

9 Noise

9.1 Introduction

9.1.1 This Section of the EIA Scoping Report has been produced by the Savills Acoustics, Noise & Vibration Team, all members of whom are corporate (MIOA or FIOA) or associate (AMIO) members of the IOA (the UK's professional body for those working in acoustics, noise and vibration). The Team is also a member of the Association of Noise Consultants (ANC).

9.1.2 Generally, but dependent upon the specific circumstances, an assessment of noise and vibration effects associated with the construction and operation of this type of development is not scoped out of the EIA process. However, for this development, the following aspects could potentially be scoped out as they are unlikely to result in significant effects:

- depending on the construction methodology, an assessment of construction vibration effects may reasonably be scoped out, particularly if percussive/impact piling will not be required;
- an assessment of operational road traffic noise effects, on the basis that there would be only negligible road traffic movements; and
- an assessment of operational vibration effects, on the basis that there would no, or only negligible, vibration sources included.

9.1.3 Further justification for the aspects proposed to be scoped out is provided in Sections 9.7, and 9.11 below.

9.2 Legislative or policy requirements and technical guidance

Legislative Context

9.2.1 Section 60, Part III of the Control of Pollution Act 1974 (CoPA)[17] refers to the control of noise (including vibration) on construction sites. It provides legislation by which local authorities can control noise from construction sites, by stopping activities if necessary, to prevent noise disturbance occurring. In addition, it recommends that guidance provided by British Standard (BS) BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Parts 1&2'[18], is implemented to ensure compliance with Section 60. BS 5228 is an approved Code of Practice under the Act.

9.2.2 Section 61, Part III of the CoPA refers to prior consent for work on construction sites. It provides a method by which a contractor can apply for consent to undertake construction works in advance. If consent is given, and the stated method and hours of work are complied with, then the local authority cannot take action under Section 60.

9.2.3 Section 72, Part III of the CoPA refers to 'best practicable means' (BPM), which is defined as:

"reasonably practicable, having regards among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications'. While 'Means' includes 'the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and acoustic structures."

[17] The Stationery Office Limited. Control of Pollution Act, Chapter 40, Part III. 1974.

[18] British Standards Institution. British Standard 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites - Part 1: Noise & British Standard 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites - Part 2: Vibration

9.2.4 If BPM is applied, then it can provide a defence against prosecution by the consenting body, usually the local planning authority.

9.2.5 Part 3 of the Environmental Protection Act 1990 (the EPA)[19] contains the main legislation relating to statutory nuisance. A statutory nuisance is 'an unlawful interference with a person's use or enjoyment of land or some right over, or in connection with it'. Noise emitted from premises so as to be prejudicial to health or a nuisance constitutes a statutory nuisance.

Policy

9.2.6 Overarching National Policy Statement (NPS) for Energy EN-1 2024 sets out the Government's policy for delivery of major energy infrastructure and will be the primary basis for decision making.

9.2.7 Section 5.12 Noise and Vibration includes reference to the Noise Policy Statement for England (NPSE) (2010) and mirrors its requirements, and also provides guidance on what information should be included in a noise assessment for a Proposed Development.

9.2.8 National Planning Policy Framework (NPPF) 2023 presents the Government's planning policies for England and how these are expected to be applied. The NPPF notes a need mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life. Reference is also made to the NPSE.

9.2.9 The overarching aims of the NPSE are to ensure that development:

- avoids significant adverse impacts on health and quality of life;
- mitigates and minimises adverse impacts on health and quality of life; and
- where possible, contributes to the improvement of health and quality of life.

9.2.10 The assessment will also take account of the policies within the Wakefield District Local Development Framework (as adopted January 2024).

Guidance and Best Practice

9.2.11 The following is a list of relevant BSs and other documents which, as far as practicable, the noise and vibration assessment will be undertaken in accordance with:

- BS 7445-2:1991 'Description and measurement of environmental noise — Part 2: Guide to the acquisition of data pertinent to land use'[20];
- BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' – Part 1: Noise;
- BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'[21]; and
- Design Manual for Roads and Bridges, LA111 'Noise and Vibration' (DMRB)[22].

[19] The Stationery Office Limited. Environmental Protection Act, Chapter 43, Part III. 1990.

[20] British Standards Institution. British Standard 7445-2:1991 Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use.

[21] British Standards Institution. British Standard 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.

[22] Highways England. Design Manual for Roads and Bridges, LA111 'Noise and Vibration' (2020).

9.3 Baseline

Baseline environment

9.3.1 The location of the Proposed Development is to the north of Ferrybridge village and immediately adjacent to the A1(M) motorway. Currently on the site is the existing Ferrybridge 1 & 2 EfW facilities. Other large commercial/industrial land uses, and infrastructure, are located in the immediate vicinity.

9.3.2 The nearest residential noise sensitive receptors (NSRs) are located to the west, east and south of the Site, namely Oakland Hill Park Home Estate (200 m), Hall Court (1.3 km) and Pollard's Fields (1 km), respectively. Other buildings or land uses in the area are either not considered noise sensitive or are subject to other significant noise sources such as road traffic on the A1(M). Noise and vibration impacts to heritage receptors would be considered in the heritage chapter of the ES and impacts on ecological receptors in will be assessed within the Ecology ES chapter.

9.3.3 In 2009, baseline sound level surveys were undertaken in relation to the then proposed Ferrybridge 1 EfW. A summary of the results of those surveys is provided below in Table 9.1.

Table 9.1: 2009 Baseline Sound Levels

Period	West (Park Home Estate)		East (Hall Court)		South (Pollard's Fields)	
	$L_{A90,T}$	$L_{Aeq,T}$	$L_{A90,T}$	$L_{Aeq,T}$	$L_{A90,T}$	$L_{Aeq,T}$
Daytime	50	57	45	49	48	59
Night-time	40	47	38	42	42	45

9.3.4 Whilst a significant period of time has passed since the 2009 surveys, it is considered that baseline noise levels would be of a similar magnitude in 2023. This is due to the insensitivity of the decibel to noise change, i.e. if all the noise sources in an area were doubled or halved, or traffic on a road was doubled or halved, the resulting change would only be + or – 3 dB. With reference to Table 9.1 above, daytime background sound levels vary between 45 and 50 dB $L_{A90,T}$ and night-time between 38 and 42 dB $L_{A90,T}$; these are broadly commensurate with semi-rural/urban locations close to transport links.

Proposed approach to surveys and further baseline data collection

9.3.5 In order to quantify baseline sound levels at the nearest residential NSRs to the Site, as described in Section 9.4.2 above, further sound level surveys will be undertaken that will comprise deployment of up to three unattended sound level monitors over a period of up to 7-days, covering at least one weekend period. Consideration will also be given to any ecological receptors in the area that may be affected, the impacts of which will be assessed within the Ecology ES chapter.

9.3.6 Measured data will take account of weather conditions during the survey to obtain a dataset from which representative baseline environmental noise levels for the assessment will be derived, commensurate with BS 7445-2.

9.3.7 Proposed survey locations will include dwellings, or areas, representative of the nearest residential NSRs to the west, east and south of the Site.

9.3.8 Preferably, access to identified survey locations for the deployment of the survey equipment will be agreed in advance of the survey work commencing. If this cannot be facilitated, then the 'fall back' option would be to arrive on the day of survey deployment and attempt to agree access in person. If access cannot be agreed on the day, a series of attended short-term surveys would be undertaken during the daytime (07:00 to 19:00 hours), evening (19:00 to 23:00 hours) and night-time (23:00 to 07:00 hours) periods.

9.4 Approach to assessment

Assessment criteria

9.4.1 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact. This Section describes the proposed criteria that will be applied in the noise and vibration assessment to characterise the magnitude of potential impacts and sensitivity of receptors.

Construction noise

9.4.2 The magnitude of construction noise impacts at residential NSRs will be determined in accordance with Annex E of BS 52281:2009+A1:2014. The criteria for assessing noise impact from construction works will be based on Example Method 2 contained within Annex E.3.3 of BS 5228-1:2009+A1:2014. Of the two assessment options available, this is considered the more pragmatic and sensible method to choose for this project.

Construction traffic

9.4.3 The magnitude of construction road traffic noise impacts will be determined in accordance with the DMRB classification of magnitude of noise impacts in the short-term. These DMRB criteria best reflect the temporary nature of the construction impacts and allow for a robust, worst case assessment of response to construction traffic noise albeit the DMRB mostly relates to traffic on new trunk roads and motorways rather than increases in traffic on existing roads.

Operational noise

9.4.4 The calculation of specific sound levels at the nearest residential NSRs, associated with the operation of the Proposed Development, will be made using the methodology in ISO 9613-2:1996 'Acoustics - Attenuation of sound during propagation outdoors Part 2: General method of calculation'[23].

9.4.5 The calculation will be based on information provided regarding the Proposed Development. Where acoustic data for specific proposed plant and/or activity is unknown, the assessment will include assumptions based on professional judgement and experience of assessing the operational of similar projects.

Magnitude of impact

9.4.6 The magnitude of impact of the noise effects associated with the operation of the Proposed Development will be determined based upon the general methodology contained within BS 4141:2014+A1:2019.

Sensitivity of receptors

9.4.7 There is no nationally adopted guidance on how the sensitivities of NSRs should be determined. Therefore, for this assessment, the sensitivity of classes of receptor is defined through consideration of the vulnerability, recoverability and value/importance of that receptor class. The criteria for defining noise sensitivity are outlined in Table 9.2.

[23] International Standard ISO 9613-2:1996. Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation.

Table 9.2: Criteria for receptor sensitivity

Sensitivity	Typical NSRs identified
Very High	Subject to particular circumstances.
High	Schools, churches and concert halls etc. Designated sites of ecological significance (SPA/SSSI/Ramsar etc.)
Medium	Residential properties, hotels, hospitals, nursing homes and care homes and sites of historic or cultural importance
Low	Area used primarily for leisure, including PRoW, sports facilities, offices and retail businesses
Negligible	All other areas such as those used primarily for industrial or agricultural purposes

Significance of effect

9.4.8 The significance of the effect in EIA terms with regards to noise will be determined by correlating the magnitude of the impact and the sensitivity of the receptor.

9.4.9 In relation to the terms used in NPSE, a significance of no change is considered to be below the 'no observed effect level' (NOEL). A significance of negligible or minor is considered to be below the 'lowest observed adverse effect level' (LOAEL)[24]. A significance of moderate is considered to be between the LOAEL and the 'significant observed adverse effect level' (SOAEL)[25]. A significance of major or substantial is considered to be above the SOAEL.

9.4.10 For the purpose of the assessment, any effects with a significance level of minor or less will be considered to be not significant in EIA terms. Effects with a significance level of moderate will not automatically be considered to be significant. Further consideration of the assessment outcome will be given where a moderate effect is predicted before a determination of whether an effect is significant/not significant in EIA terms. Effects with a significance level of major or substantial will be considered to be significant in EIA terms.

Geographical scope

9.4.11 Noise and vibration levels decrease over distance. As the design of the Proposed Development will include mitigation measures to avoid significant effects at the nearest NSRs, the geographic scope of the noise and vibration assessment, for Site based activity, will be limited to an area up to and including the nearest NSRs.

9.4.12 With regard to offsite activity, i.e. construction traffic movements on the local road network, the geographic scope of the noise and vibration assessment will include sections of road for which road traffic movements are anticipated to increase by at least 10% above baseline. This is on the basis that an increase of less than 10% would result in a negligible increase in noise.

Temporal scope

9.4.13 The temporal scope of the noise and vibration assessment will include the construction and operational phases of the Proposed Development.

[24] The lowest level that has been observed to cause harm in an exposed population, as internationally defined.

[25] This is the level of noise exposure above which significant adverse effects on health and quality of life occur. Not internationally defined, but derived by extending the concepts of NOEL and LOAEL.

9.4.14 At this stage, the consent is not expected to be time-limited. As such, a decommissioning assessment is proposed to be scoped out.

9.5 Embedded mitigation and enhancement measures

9.5.1 The likelihood for adverse noise and/or vibration effects associated with the construction and operation of the Proposed Development will be minimised through the implementation of embedded, or inherent, mitigation.

9.5.2 At the construction stage, activities will be undertaken following BPM, with modern and well maintained plant utilised. An outline construction and environmental management plan (CEMP) will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application.

9.5.3 In the event that significant noise and/or vibration effects are predicted to occur with the embedded mitigation, the requirement for further mitigation measures will be considered.

9.5.4 This may include measures such as temporary barriers during the construction phase and attenuated stacks, or installation of permanent barriers or plant enclosures during the operational phase.

9.6 Scope of environmental impacts and effects

Construction

9.6.1 The combined construction of both Ferrybridge 1 & 2 CCS, both on-site activity and offsite road traffic movements, has the potential to result in high levels of noise and/or vibration at NSRs, resulting in adverse effects. As such, an assessment of construction noise effects will be scoped in to the assessment.

9.6.2 However, depending on the proposed construction methodology, significant vibration effects are considered unlikely, particularly if percussive/impact piling is not required, as the nearest NSRs are at least 200 m from the Site Boundary. On this basis, a construction vibration assessment is proposed to be scoped out of this assessment.

9.6.3 Where construction road traffic movements are anticipated to increase the total flow by at least 10%, a construction road traffic noise assessment will be scoped in and undertaken.

Operation

9.6.4 The combined operation of both Ferrybridge 1 & 2 CCS, both on-site activity and offsite road traffic movements, has the potential to result in high levels of noise and/or vibration at NSRs, resulting in adverse effects. As such, an assessment of operational noise effects will be scoped in to the assessment.

9.6.5 However, significant vibration effects are considered very unlikely, as no/negligible vibration sources are proposed and the nearest NSRs are at least 200 m from the Site Boundary. On this basis, an assessment of operational vibration effects is proposed to be scoped out of this assessment.

9.6.6 Furthermore, on the basis that there would only be negligible operational road traffic movements, an assessment of operational road traffic noise effects is proposed to be scoped out of this assessment.

9.7 Limitations and uncertainties

9.7.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified.

Construction methodology

9.7.2 Depending on the availability of the proposed construction methodology and acoustic data of proposed noise generating plant, the assessment may be undertaken based on assumed data, informed through professional judgement and experience. If this is necessary, assumptions will err on the side of caution, to allow for a robust assessment.

Operational sound source data

9.7.3 A quantitative assessment will be undertaken based on source levels provided by the plant manufacturer and measurement data on similar types of equipment. Where necessary, assumptions will be made based on the maximum design envelope parameters.

Prediction methods and assessment

9.7.4 There are uncertainties in any prediction methodology. International Organization for Standardisation (ISO) 9613 Part 2 provides a method for predicting acoustic propagation outdoors. The method is applicable in practice to a great variety of sound sources and environments. It is applicable (directly or indirectly) to most situations including industrial sound sources, construction activities and many other ground-based sound sources. The estimated accuracy for values of the average downwind sound pressure level is stated as +/- 3 dB for a mean source/receptor height of up to five metres and source/propagation separation distance of up to 1 km. For a mean source height between 5 and 30 m, the estimated accuracy is given as +/-1 dB for a source/propagation separation distance of 0 to 100 m and +/- 3 dB for a source/propagation separation distance of >100 m. This is a standard approach and is considered to be an acceptable prediction methodology.

9.7.5 With regard to subjective response, the noise standards adopted for the assessment will have been based upon the subjective response of the majority of the population or will be based upon the most likely response of the majority of the population. This is considered to be the best that can be achieved in a population of varying subjective response which will vary dependent upon a wide range of factors.

9.8 Intra-related effects

9.8.1 Potential intra-related impacts from construction and operational noise will be considered in the ecology and population & health assessments, where applicable. The intra-relationship with traffic generation has been noted above.

9.9 Cumulative effects

9.9.1 This assessment will be completed through communication with stakeholders to identify relevant projects and between the environmental topic teams to identify shared receptors. The risk for cumulative adverse effects will primarily be dependent on the proximity of the cumulative development to the NSRs closest to the Proposed Development. Any cumulative development, either noise generating or noise sensitive (i.e. residential or educational etc.) within 1 km of the identified NSRs would be considered.

9.9.2 The assessment of cumulative effects on NSRs will be based upon consideration of the effects of the Proposed Development on residential dwellings together with the likely effects of other developments that are under construction, those that are consented but not yet built and those that are currently at the application stage (and for which sufficient detail is available upon which to develop an assessment).

9.9.3 The assessment of cumulative effects will be based on the same assessment criteria for the individual development.

9.9.4 In addition, if any cumulative development results in a large increase in offsite traffic movements of above 10% on any roads also used by the Proposed Development, the potential for cumulative traffic noise effects will also be considered.

9.10 Summary of proposed EIA scope

9.10.1 The effects scoped in or out for further noise and vibration assessment are as follows:

Table 9.3: Summary of noise and vibration impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Site activity noise	In	Potential for high levels of construction activity noise to affect medium or high sensitivity NSRs.
Road traffic noise	In	If construction flows greater than 10% of baseline road traffic flows, potential for high levels of noise to affect medium or high sensitivity NSRs.
Site activity vibration	Out	Significantly high vibration levels at unlikely at source and relatively large distance between vibration activity and NSRs; low risk for adverse vibration impact. Cumulative construction of the Proposed Scheme would not increase vibration levels.
Operation		
Site activity noise	In	Potential for high levels of operational activity noise to affect medium or high sensitivity NSRs.
Site activity vibration	Out	No operational vibration sources.
Road traffic noise	Out	Negligible operational road traffic flows, less than 10% of baseline.

10 Ecology

10.1 Introduction

10.1.1 This ecological Section of the EIA Scoping Report has been prepared by Tyler Grange Group Ltd by a full Member of the Chartered Institute of Ecology and Environmental Management CIEEM and a Chartered Environmentalist..

10.1.2 The approach outlined in this EIA Scoping Report explains how the impacts of the Proposed Development on ecological resources including protected sites, habitats and protected and priority species will be assessed. It has been informed by desk-based study, Site survey work and published guidance.

10.1.3 An 'extended' Phase 1 habitat survey was undertaken on the 26th September 2023. The desk based study was also undertaken in September 2023. Based on the findings of both the survey and desk study, a number of protected species surveys have also been recommended.

10.1.4 Due to the potential for development to result in changes in airborne emissions to the surrounding environment and for open water habitat to be affected by the development footprint, Ecology is scoped into the EIA. Some receptors can screened out at the scoping stage. Further details of ecological receptors scoping into the EIA are provided in Table 10.6.

10.2 Legislative or policy requirements and technical guidance

10.2.1 Specific habitats and species are afforded protection in the UK under the following legislation:

- The Conservation of Habitats and Species Regulations 2017 (as amended) (The Habitat Regulations);
- Wildlife and Countryside Act (WCA) 1981 (as amended);
- The Countryside and Rights of Way (CRoW) Act 2000;
- Natural Environment and Rural Communities Act 2006
- The Protection of Badgers Act 1992 (PBA); and
- Hedgerow Regulations 1997 (as amended).

10.2.2 The Environment Act gained Royal Assent in November 2022. For the purposes of this section of the Scoping Report, the effect of this is to amend the Town and Country Planning Act (TaCPA), such that it will become a deemed condition on any grant of planning permission to secure Biodiversity Net Gain (BNG) of at least 10%, but the Secretary of State has the ability to change this. BNG requirements have not yet been introduced in respect of development authorised by a DCO, but this is likely to come into force in the future. The DCO Application will specifically include information in relation to the Proposed Development's approach to BNG.

National Policy

National Policy Statement for Energy EN-1

10.2.3 The Overarching National Policy for Energy EN-1 2024 contains policy statements of key relevance for the purpose of the assessment of environmental impacts on ecological features and biodiversity net gain. It outlines how an Applicant's assessment should be undertaken and notes specific requirements for DCO applications.

10.2.4 In support of the NPS, the government's policy for biodiversity in England is set out in the Environmental Improvement Plan 2023, the National Pollinator Strategy and the UK Marine Strategy.

Biodiversity and Geological Conservation

10.2.5 Reference is made to existing national planning policy relating to statutory nature conservation designations including Marine Conservation Zones (MCZ) and Marine Protected Areas (MPA). Similarly national planning policy in also referred to in respect on non-statutory nature conservation designations, ancient woodland, veteran trees and other irreplaceable habitats and species subject to legislative protection. Where subject to EIA, any effects on the above need to be considered in the Environmental Statement. Similarly the same process should be followed for non-EIA development, in proportion with the scale of the development proposed.

10.2.6 Wider ecosystem benefits should also be considered and benefits of natural capital considered beyond those delivered by BNG.

National Planning Policy Framework (NPPF), September 2023

10.2.7 The National Planning Policy Framework (NPPF) was updated in December 2023 and sets out the Government's planning policies for England and how these should be applied. It replaces the National Planning Policy Framework published in July 2019.

The Adopted Wakefield District Development Plan (WMDC)

10.2.8 The following documents form the current WMDC Local Development Framework, which was adopted in January 2024, and contain development policies for Wakefield District. The assessment will also take account of the policies within the WMDC Local Development Framework.

- Volume 1: Development Strategy, Strategic and Local Policies
- Volume 2: Settlement Specific Policies
- Policies Map

10.3 Baseline

Initial Scoping Methods

10.3.1 A desk-based study was undertaken in September 2023. The data search has been undertaken for a 10km radius around the Site for international statutory sites, a 2km radius for national statutory and non-statutory sites and a 1km radius for protected and priority species records.

10.3.2 An 'Extended Phase 1 Habitat Survey following methodology by the Joint Nature Conservation Committee (JNCC)[26] was undertaken on 26th September 2023 covering land within the Site and immediate adjacent land (where accessible). This method of survey provides information on habitats and assesses the potential for legally protected or otherwise notable species to occur in and adjacent to the sites and allows the ecological value of resources to be determined.

10.3.3 Consultation with respect to ecology has not been undertaken prior to submission of this EIA Scoping Report. However, consultation with Wakefield Council on the requirement for further surveys to inform the planning application will be undertaken and consultation internally with Air Quality consultants within the Environmental Assessment team will be undertaken to understand and assess any potential impacts to ecological receptors arising from airborne emissions.

[26] JNCC, 2010. Handbook for Phase 1 habitat survey - a technique for environmental audit. Peterborough: Joint Nature Conservation Committee (JNCC).

Protected Sites

Statutory Nature Conservation Designations

10.3.4 The DEFRA Magic website[27] confirmed that the application site does not support any statutory wildlife site designations: Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Sites of Special Scientific Interest (SSSI) or Local Nature Reserve (LNR). There are no international statutory nature conservations within 10 km of the Site. There are two national statutory nature conservation designations within 2 km of the Site:

- Fairburn and Newton Ings SSSI / LNR - 1.5km to the north consisting of permanent open water with diverse wetland flora. Large numbers of birds, especially wintering wildfowl and migrants.;
- Well Wood LNR - 1.6km to the northeast consisting of a mall calcareous grassland area surrounded by deciduous woodland. Plants include orchids such as common Twayblade, other plants include Yellow wort and trefoils. There are butterflies throughout spring and summer.

Non Statutory Nature Designations

10.3.5 West Yorkshire Ecology Service confirmed that the Site supports no non-statutory wildlife designations. There are three Local Wildlife Sites (LWS) within 2km:

- Fryston Park LWS - 63m to the east, consisting of limestone woodland/ grassland/ scrub, unimproved Magnesian limestone grassland habitats and associated species;
- Endless Flat Plantation LWS lies approximately 260m northwest of the Site;
- Bank of River Aire SINC 630m northwest consisting of riparian habitats along the River Aire;
- Byram Park SINC 1.2 km northwest consisting of an extensive woodland plantation; and
- Woodland at Edge of Byram Park SINC 1.2 km west also km northwest consisting of an extensive woodland plantation

Ancient Woodland

10.3.6 The Defra MAGIC website confirms that there is no ancient semi-natural woodland within 2km of the Site.

Habitats

10.3.7 The 'extended' Phase I habitat survey undertaken in September 2023 identified the following habitats:

Modified Grassland - amenity grassland

10.3.8 Areas of amenity grassland that lie within areas proposed for development surround various parts of existing power station infrastructure as part of landscaping. They are dominated by a typical amenity sward with some forbs such daisy *Bellis perennis*, dandelion *Taraxacum officinale* and ribwort plantain *Plantago lanceolata* also present.

Neutral Grassland - poor semi-improved

10.3.9 Poor semi-improved grassland which lies within the Site in the southern areas and grassland to the west bordering the boundary with the motorway.

10.3.10 The sward is variable but contains a range of grasses and forbs. Grasses include Red Fescue *Festuca rubra*, perennial ryegrass *Lolium perenne*, Yorkshire fog *Holcus lanatus* cocksfoot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus*, and tufted hairgrass *Deschampsia cespitosa*. The forb component of the sward includes ribwort plantain, white clover *Trifolium repens* red clover *Trifolium pratense*, black medic

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

Medicago lupulina, yarrow *Achillea millefolium*, tufted vetch *Vicia cracca*, broadleaved dock *Rumex obtusifolius* and field thistle *Cirsium arvense.*

Scrub

10.3.11 The following scattered trees are present as stands of mixed scrub consisting of Field maple *Acer campestre*, dogwood *Cornus sangiunium*, elder *Sambucus nigra* , hawthorn *Crataegus monogyna*, hazel *Corylus avellana* and spindle *Euonymus europaeus.*

Scattered Trees

10.3.12 Scattered specimens of cherry *Prunus sp* and rowan *Sorbus aucuparia* have recently been planted as whips within the poor semi-improved grassland which lies within the Site on the southern areas.

Open Water

10.3.13 Within the poor semi-improved grassland which lies within the Site on the southern areas of the Ferrybridge C there is one large pond within the Site approximately 1300m^2 in area surrounded by marginal vegetation consisting mainly of greater reedmace *Typha latifolia.*

Hardstanding

10.3.14 Consisting of access roads and hardstanding around buildings and other infrastructure.

Habitats on Adjacent Land

10.3.15 These largely consist of other existing infrastructure forming the power station or associated landscaping including areas of modified grassland and broadleaved planting. There are also areas of unmanaged grassland, ruderal vegetation scrub (developing into broadleaved woodland and bare ground. Stands of Himalayan balsam *Impatiens glandulifera* were noted in woodland offsite.

10.3.16 There is one attenuation pond situated immediately to the south of the Site, which could not be accessed for survey but appeared to be dry at the time of the survey, being completely colonised by greater reedmace.

Protected Species

10.3.17 A review of the phase 1 habitat survey and desk study data indicate that habitats within the Site indicate could potentially be suitable for the following protected species:

- Amphibians - The Site supports a pond which would potentially be suitable for breeding amphibians, including great crested newts (GCN) *Triturus cristatus*. However, it is an isolated waterbody with no other ponds lying within 250m. Previous surveys of a Pond at Ferrybridge C in 2009 facility found no GCN. Therefore the potential presence of GCN is deemed unlikely. Unmanaged grassland habitat within the Site could provide suitable terrestrial habitat for amphibians. No records of GCN within 2km were returned from the desk study, but there were records of smooth newt *Lissotriton vulgaris*, common frog *Rana temporaria* and common toad *Bufo bufo*. These were all historic being more than 10 years old and therefore only provide background information and are not used as a basis for decision making in relation to the need for further survey work.
- Badger - The Site itself is unsuitable for badger *Meles meles* setts and none were noted during the phase 1 survey. Due to data confidentiality, records were provided at 1km grid square resolution only. No records within 200m the Site were received but there are 2 records within 2km of the Site.
- Bats - Habitats such as the pond and scrub may provide some limited foraging resources for bats but due to their small size are unlikely to be of importance in maintaining populations locally. There are no mature trees that could potentially be exploited as roost sites by bats. Apart from 2 buildings

which lie in an area of Site which could not be accessed for survey, there are no buildings within any areas proposed for development. The two buildings which could not be accessed are large open metal sheds unlikely to be suitable for bat roosts but this would need to be confirmed once access is secured. Records returned from the local biological records centre which lie within 2km of the Site consist of historic records over 10 years old of 3 roost locations of pipistrelle species dating most recently form 2011 and numerous miscellaneous bat records all over 10 years old. There are also more recent records consisting of individuals where the species has been noted consisting of soprano pipistrelle *Pipistrellus pygmaeus,* noctule *Nyctalus noctula* foraging and brown long-eared bat *Plecotus auritus.*

- Birds - Small numbers of skylark *Alauda arvensis* or meadow pipit *Anthus pratensis* may use the open grassland. Area of scrub may support one or two territories common passerine such as whitethroat *Curruca communis* or wren *Troglodytes troglodytes.* The pond may support one or two waterfowl territories and fringing reedmace could support one or two sedge warbler or redd bunting territories. Due to the small size of the Site and habitats present within the Site are unlikely to be of importance for maintaining populations breeding or over-wintering birds. The local records centre returned records dating from 2012 within 2km of the Site of the following species; tufted duck *Aythya fuligula*, Black-headed Gull *Chroicocephalus ridibundus*, Coot *Fulica atra* and Gadwall *Mareca strepera* which are species that would potentially occur within the Site.
- Reptiles - Modified grassland habitats within the Site would potentially be suitable for supporting common reptile species. The desk study returned one record within 2km of the Site dating from 1981 of common lizard *Zootoca vivipara*. Given the history of the Site which has involved significant earth movement in the interim and lack of any recent records locally it is unlikely that reptile species occur in the grassland habitats on-site.
- Invertebrates - Modified grassland habitats within the Site are likely to support a range of commonly occurring species which could include priority invertebrates such as wall *Lasiommata megera* butterfly and moths such as brindled beauty *Lycia hirtaria,* historic records for which (more than 10 years old) exist within 2km of the Site. Given the paucity of forb species within grassland habitat within the Site and relatively small extent, it is unlikely to be of importance in maintaining populations of priority or red data listed invertebrate species.
- Water vole – Marginal vegetation within the large pond within the poor semi-improved grassland which lies within the Site on the southern areas of the Ferrybridge C could potentially provide suitable habitat for water vole. *Arvicola amphibious*. Local records within 2km exist but these historic dating back to the 1990's . Given the lack of more recent records and relative isolation of the pond to any other ponds or watercourses, the presence of water voles is deemed unlikely .

10.3.18 No other habitats suitable for other protected species were noted during the September 2023 phase 1 survey or from the desk-based study.

10.4 Approach to surveys and further baseline data collection

10.4.1 A desk-based study and extended phase 1 habitat survey were used to identify important ecological features (sites, habitats and species) which may be affected by the development proposals, to determine the potential 'zone of influence 'study area, and to inform the scope of further survey work required.

10.4.2 The study area extends beyond the Site Boundary to include a 10km radius for international statutory site designations, a 2km radius for national statutory and non-statutory site designations; and a 1km radius for all protected and priority species records.

Further Work Required

10.4.3 Detailed survey work and the analysis of ecological data gathered is still ongoing. Full details of the following surveys will be included with the ES, and will be used to inform the assessment of impacts:

- eDNA GCN of pond within Site to confirm presence / absence of GCN;
- Preliminary Roost Assessment of any existing buildings likely to be affected as a result of the Proposed Development;
- Once development layout is confirmed, if the on-site pond is to be affected, then a water vole survey may be required; and
- An assessment of Biodiversity Net Gain (BNG) - once the extent of habitat losses and a final masterplan and landscape strategy has been produced.

10.4.4 Where mitigation is required in respect of protected species or habitat loss, the details will need to be agreed with WMDC.

10.5 Approach to assessment

Assessment criteria

10.5.1 The Ecological Impact Assessment (EcIA) will assess protected sites, habitats and species in accordance with the CIEEM Ecological Impact Assessment guidance28, using the approach set out as follows.

Magnitude of Impact

10.5.2 The assessment will consider impacts including direct loss of habitats, fragmentation and isolation of habitats, disturbance or killing/injury of species, changes to key ecological features, and changes to the local hydrology or water quality (Table 10.1).

10.5.3 The following factors are considered when describing ecological impacts:

- Positive or negative – an impact can improve or reduce the quality of the environment, evaluated against nature conservation objectives and policy;
- Extent – this is the area over which an effect occurs;
- Magnitude – the size or amount of an effect, determined on a quantitative basis where possible;
- Duration – the time for which an effect is expected to last prior to recovery or replacement of the resource of feature;
- Timing and frequency – some effects are only likely if they happen to coincide with a critical life-stage or seasons. Others may occur if the frequency of an activity is sufficiently high;
- Reversibility- an irreversible (permanent) effect is defined as one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible (temporary) effect is one from which spontaneous recovery is possible or for which effective mitigation is both possible and enforceable; and
- Cumulative effects – where consideration is given to any other developments within the study area, together with the Proposed Development, may result in significant effects.

[28] CIEEM, 2016. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Winchester: Chartered Institute of Ecology and Environmental Management (CIEEM).

Table 10.1 : Environmental Impacts

Magnitude	Environmental Impact
Substantial	An effect which will have a positive or negative impact on the integrity or conservation status of an ecological feature that is significant at a national level or above.
High	An effect which will have a positive or negative impact on the integrity or conservation status of an ecological feature that is significant at a regional level.
Moderate	An effect which will have a positive or negative impact on the integrity or conservation status of an ecological feature that is significant at a county level.
Minor	An effect which will have a positive or negative impact on the integrity or conservation status of an ecological feature that is significant at a local or site level.
Negligible	An effect which will have an insignificant impact on an ecological feature.
Neutral	No effect which will impact an ecological feature.

Sensitivity of Receptors

10.5.4 The results of the initial desk study, site surveys and data gathered during detailed surveys will be used to evaluate the importance of ecological resources within the study area in accordance with the CIEEM EcIA guidance .

10.5.5 The guidance provides a framework for the evaluation of features that considers the direct biodiversity importance of habitats and species, the indirect importance of features which help support the ecological integrity of key features, legal protection for both sites and species, and evaluation against national and local planning guidance and objectives. It uses a geographic frame of reference for identifying important ecological features in accordance with the scale in Table 10.2 overleaf.

Table 10.2: Importance of Ecological Features

Designation	Receptors
International	An ecological feature (species, designated site or habitat) which is important at an international level. A population that would meet the published selection criteria as a qualifying feature for designation of a SAC. An internationally designated site or candidate site, i.e. an SPA, proposed SPA (pSPA), SAC, candidate SAC (cSAC), Ramsar site, or an area which would meet the published selection criteria for such designation. Other significant areas of Annex 1 priority habitats listed in the Habitats Directive, the loss of which would significantly change the overall range and area at the European scale in the long term.
National	Nationally significant populations of species identified in the NERC Act - as being of principle importance for the conservation of biodiversity in England, or otherwise formally deemed to be nationally rare and threatened (e.g. 'red-listed'), the loss would significantly change the species' overall conservation status (i.e. range, abundance, population trend) at the national scale. A population that would meet the published selection criteria as a qualifying feature of a SSSI. A nationally designated site, i.e. SSSI, NNR or discrete area which would meet the published selection criteria for national designation. A significant area of a non-designated priority habitat type identified in the NERC Act as being of principle importance for the conservation of biodiversity in England, the loss of which would significantly change the overall range and area should be a major component of areas that are at near-equivalence to SSSIs, meeting most of the published SSSI selection criteria.

Regional (England)	Regionally significant populations of species identified in the NERC Act Part 1 as being of principal importance for the conservation of the biodiversity of England, or otherwise formally deemed to be nationally rare and threatened (e.g. 'red-listed'), the loss of which would significantly change the species' overall conversation status (i.e. range, abundance, population trend) at the regional scale. A significant area of non-designated habitat type identified in the NERC Act, as being of principal importance for the conservation of biodiversity in England, the loss of which would significantly change the overall range and area of that habitat at the regional level in the long term. Significant areas of semi-natural ancient woodland that do not meet the national value criteria (above) should be considered at this scale due to the irreplaceable nature of such habitat.
County (Wakefield)	Significant populations of species identified in the NERC Act as being of principal importance for the conservation of biodiversity in England, or otherwise formally deemed to be nationally rare and threatened (e.g. 'red-list'), or priority species in the County BAP the loss of which would significantly change the species' overall conservation status (i.e. range, abundance, population trend) at the County scale. Sites formally recognised by local authorities, e.g. SBI, or considered to meet published ecological selection criteria for such designation. A significant area of a non-designated habitat type identified as in the NERC Act in the as being of principle importance for the conservation of biodiversity in England, the loss of which would significantly change the overall range and area of that habitat at the county scale in the long term. A significant area of key habitat identified in the County BAP.
Local (Wakefield)	Species listed on any of the above-mentioned priority lists, that appreciably enrich District/Borough biodiversity, but which are not in themselves of District/Borough importance of greater. Semi-natural habitats, listed on any of the above-mentioned priority lists, that appreciably enrich local biodiversity, but which are not in themselves of District/Borough importance or greater.
Site	Species populations of limited ecological importance due to their size, composition or lack of threat/rarity. The loss of such features would have no discernible impact on the species'/habitat's overall range and conservation status at any administrative scale in the long term. Areas of habitat of limited ecological importance due to their size, species composition or lack of threat/rarity. The loss of such features would have no significant impact on the habitat's overall range and conservation status at any administrative scale in the long term.

Geographical Scope

10.5.6 The study area extends beyond the Site Boundary to include a 10km radius for international statutory site designations, a 2km radius for national statutory site designations; and a 1km radius for all protected and priority species records. Noise impacts on ecological sites will be considered

Temporal scope

10.5.7 The Ecological Impact Assessment will cover both the construction and operational phases of the development.

Significance of effects

10.5.8 The significance of an effect is the product of the magnitude of the impact and the importance or sensitivity of the ecological feature affected. The CIEEM EcIA Guidance provides a complex framework for the consideration of impacts to ecological features and the reader is referred to the actual guidance for full details. However, in summary, greater levels of significance are generally ascribed to large impacts on features of higher ecological importance and lesser levels of significance are generally ascribed to small impacts on features of higher ecological importance, or larger impacts on features of lower ecological importance.

10.5.9 In accordance with professional guidance and terminology; a significant effect, in ecological terms, is defined as an effect (positive or negative) on the integrity of a designated site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area, including cumulative effects. Insignificant effects are those that would not result in such changes.

10.5.10 The importance of any features that would be significantly affected is then used to identify geographical scales at which the effect is significant. This value relates directly to the consequences, in terns of legislation, policy and/or development control at the appropriate level. So, a significant negative effect on a feature of importance at one level would be likely to trigger related planning policies and, if permitted, generate the need for development control mechanisms as described in those policies.

10.5.11 Significant effects on features of ecological importance should be mitigated (or compensated for) in accordance with the guidance derived from policies applies at the scale relevant to the feature or resource.

10.5.12 Effects are unlikely to be significant where features of local importance or sensitivity are subject to small scale or short-term effects. However, where there are a number of small scale effects that are not significant alone, it may be that, cumulatively, these may results in an overall significant effect.

10.5.13 The assessment of effects uses the terminology described above. Effects with a significance level of moderate will not automatically be considered to be significant However, to provide consistency with the terminology throughout the ES potential and residual effects (positive or negative) are also described using the terms set out in Table 10.3.

Impact Prediction Confidence

10.5.14 It is also of value to attribute a level of confidence by which the predicted impact has been assessed. The criteria for these definitions are set out in Table 10.3 below:

Table 10.3 Confidence Levels

Confidence Level	Description
High	The predicted impact is either certain i.e. a direct impact, or believed to be very likely to occur, based on reliable information or previous experience.
Low	The predicted impact and its levels are best estimates, generally derived from first principles of relevant theory and experience of the assessor. More information may be needed to improve confidence levels.

Assessment of Ecological Impacts Potentially Arising from Changes in Air Quality

10.5.15 The proximity of nature conservation designations means that the potential for adverse ecological impacts arising from airborne emissions arising from the CO_2 capture process during operation of the development and any increase in daily movements of vehicles to and from the EfW arising from both construction and operation of the carbon capture scheme will need to be assessed.

10.5.16 The Air Quality section of this report sets out the methodologies that will be used to assess these airborne emissions which will follow the Institute of Air Quality Management (IAQM) Guidelines 2017. In addition The IAQM 2020 guidance "A guide to the assessment of air quality impacts on designated nature conservation sites" will also be used to screen in or out impacts as either significant or insignificant..

10.5.17 Table 10.4 below set out the process in the 2020 guidance that will be followed to determine potential effects on ecological receptors which might arise as a result of changes in Air Quality.

Table 10.4 Potential effects on air quality receptors arising due to air quality change

Considerations	Actions
Pollutants: Are there any that may cause adverse effects on vegetation or habitats?	Identify designated sites
Study area: Has the relevant regulator specified any screening distances from air pollution sources?	Scope out any sites with habitats/species not sensitive to air pollution.
Has the ecologist identified any other designated sites that might be affected by the change in emissions?	Provide mapping showing the sites to be assessed.

10.5.18 Where relevant, the critical loads will be referenced from the above guidance for those for gaseous pollutants where harmful effects are not thought to occur below a certain threshold.

10.5.19 While the guidance is intended for the assessment of potential impacts in relation to European conservation designations, habitats lying within lesser statutory or non-statutory designations can experience similar degrees of sensitivity to pollution and therefore the same process for the assessment of impacts arising from airborne emissions will also be followed for these receptors in the assessment of ecological impacts.

Habitats Regulations Assessment (HRA)

10.5.20 Due to the physical distance of the Site no potential impact pathways to any European / International nature conservation designations have been identified as part of this EIA Scoping Report and the Site does not lie within any Impact Risk Zones (IRZ) for any European conservation designations. Therefore it is considered that shadow HRA should not be required in respect of this development.

10.5.21 This position will be kept under review to consider the outputs from air dispersion modelling, receiving views from Natural England and reviewing the outcomes of the intra-related effects assessment.

10.6 Embedded mitigation and enhancement measures

10.6.1 Details of any embedded mitigation are yet to be confirmed but it is anticipated that the baseline ecological conditions will be used to inform the development and refinement of the development layout and from this elements of embedded mitigation will be determined.

10.6.2 An Outline Construction Environmental Management Plan (CEMP) will detail ecological mitigation and pollution control measures for the construction phase. It will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application

10.6.3 An Outline Landscape and Ecological Management Plan (LEMP) will be required to determine management requirements for any existing retained and new habitats within the Site and should also include habitats adjacent to the wider Site.

10.6.4 Discharges to air, ground and water during operation will be regulated by the EA under the facility's Environmental Permit, setting limits that are protective of adverse environmental effects. The discharge of air pollutants will be from a stack of suitable height to provide dispersion and dilution, which will be determined in the course of the EIA through air quality modelling and the assessment of potential impacts on sensitive human and ecological receptors.

10.7 Scope of ecological impacts and effects

Construction

10.7.1 Potential impacts during the construction phase, in the absence of mitigation, are summarised in Table 10.5. below.

Table 10.5 Significance of Effects Construction Phase

Feature / Nature of Impact	Importance	Environmental Impact	Significance of Effect	Confidence Level
Protected Sites Statutory				
Fairburn and Newton Ings SSSI / LNR The SSSI lies 1.5km to the north lie at sufficient distance from bird populations forming the special interest of the Site to remain undisturbed during the construction phase.	National	Negligible	Neutral	High
Well Wood LNR Habitats forming the biological interest of the designation lie at sufficient distance to remain undisturbed during the construction phase or affected by airborne pollutants such as dust.	National	Negligible	Neutral	High
Protected Sites Non-Statutory				
Fryston Park LWS Potential for habitat lying in proximity to the Site be affected by airborne pollutants such as dust. Impacts however are likely to be temporary, hence minor rather than moderate impact predicted.	County	Minor Negative	Minor Adverse	Low*
Endless Flat Plantation SINC Potential for habitat lying in proximity to be affected by airborne pollutants such as dust. Impacts however are likely to be temporary, hence minor rather than moderate impact predicted.	County	Minor Negative	Minor Adverse	Low*
Bank of River Aire SINC At sufficient distance for no impacts to be likely during construction phase.	County	Neutral	Neutral	High
Byram Park SINC At sufficient distance for no impacts to be likely during construction phase.	County	Neutral	Neutral	High
Woodland at Edge of Byram Park SINC. At sufficient distance for no impacts to be likely during construction phase.	County	Neutral	Neutral	High
Habitats				
Modified Grassland - amenity grassland Habitat loss / modification of habitat of negligible ecological importance	Negligible	Negligible	Negligible	High
Scattered Trees - Habitat loss / modification of habitat of negligible ecological importance	Negligible	Negligible	Negligible	High

Mixed scrub - Habitat loss / modification	Local	Minor Negative	Minor Adverse	High
Hardstanding - Habitat loss / modification Habitat of negligible ecological importance	Negligible	Neutral	Neutral	High
Neutral Grassland - wildflower grassland Habitat loss / modification	Local	Minor Negative	Minor Adverse	High
Open water habitat loss / modification	Local	Minor Negative	Minor Adverse	High
Species				
Amphibians – loss / fragmentation of habitat, disturbance, killing / injury unlikely to include GCN.	Local	Minor Negative	Minor Adverse	Low*
Badger - disturbance, killing / injury	Negligible	Neutral (but legislative requirement)	Neutral	High
Bats – loss / fragmentation of habitat, disturbance, unlikely to be of significance to populations locally.	Negligible	Negligible	Negligible	High
Birds - loss / fragmentation of habitat unlikely to unlikely to be of significance to populations locally, disturbance, killing / injury	Negligible	Negligible	Negligible	High
Reptiles- unlikely to be present	Negligible	Neutral	Neutral	High
Invertebrates - loss / fragmentation of habitat.	Negligible	Negligible	Negligible	High
Water vole - unlikely to be present	Negligible	Neutral	Neutral	High
***The assessment of impacts to these species will be confirmed following completion of surveys and analysis of ecological and other environmental data.**				

Operation

10.7.2 Potential impacts during the operational phase, in the absence of mitigation, are summarised in Table 10.6. below.

Table 10.6 Significance of Effects Operational Phase

Feature / Nature of Impact	Importance	Environmental Impact	Significance of Effect	Confidence Level
Protected Sites Statutory				
Fairburn and Newton Ings SSSI / LNR The SSSI lies 1.5km to the north lie at sufficient distance for bird populations, forming the special interest of the Site to remain undisturbed during operational phase	National	Negligible	Neutral	High
Well Wood LNR Habitats forming the biological interest of the LNR. Potential for changes in emission to result in adverse impacts on habitats arising from deposition of airborne pollutants.	Local	Minor Negative	Minor Adverse	Low*
Protected Sites Non-Statutory				
Fryston Park LWS Potential for habitat lying in proximity to be affected by changes in emission	County	Moderate Negative	Moderate Adverse	Low*

to result in adverse impacts on habitats arising from deposition of airborne pollutants.				
Endless Flat Plantation SINC Potential for habitat lying in proximity to be affected by changes in emission to result in adverse impacts on habitats arising from deposition of airborne pollutants.	County	Moderate Negative	Moderate Adverse	Low*
Bank of River Aire SINC At sufficient distance for no impacts to be likely during operational phase.	County	Neutral	Neutral	High
Byram Park SINC At sufficient distance for no impacts to be likely during operational phase.	County	Neutral	Neutral	High
Woodland at Edge of Byram Park SINC At sufficient distance for no impacts to be likely during operational phase.	County	Neutral	Neutral	High
Habitats				
Modified Grassland - amenity grassland Habitat loss / modification of habitat of negligible ecological importance	Negligible	Negligible	Negligible	High
Neutral Grassland - wildflower grassland Habitat loss / modification	Local	Minor Negative	Minor Adverse	High
Scattered Trees - Habitat loss / modification of habitat of negligible ecological importance	Negligible	Negligible	Negligible	High
Open water habitat loss / modification	Local	Minor Negative	Minor Adverse	High
Mixed scrub - Habitat loss / modification	Local	Minor Negative	Minor Adverse	High
Hardstanding - Habitat loss / modification Habitat of negligible ecological importance	Negligible	Neutral	Neutral	High
Species				
Amphibians – loss / fragmentation of habitat, disturbance, killing / injury unlikely to include GCN.	Local	Minor Negative	Minor Adverse	Low*
Badger - disturbance, killing / injury	Negligible	Neutral (but legislative requirement)	Neutral	High
Bats – loss / fragmentation of habitat, disturbance, unlikely to be of significance to populations locally.	Negligible	Negligible	Negligible	High
Birds - loss / fragmentation of habitat unlikely to unlikely to be of significance to populations locally, disturbance, killing / injury	Negligible	Negligible	Negligible	High
Reptiles- unlikely to be present	Negligible	Neutral	Neutral	High
Invertebrates - loss / fragmentation of habitat.	Negligible	Negligible	Negligible	High
Water vole - unlikely to be present	Negligible	Neutral	Neutral	High
*The assessment of impacts to these species will be confirmed following completion of surveys and analysis of ecological data.				

10.8 Limitations and uncertainties

10.8.1 No limitations or uncertainties are identified in relation to phase 1 survey or desk -study data used for this scoping opinion.

10.8.2 Once detailed the ecological surveys listed in Section 10.5 have been completed any limitations or uncertainties arising from these survey results will be described in the ecology ES Chapter.

10.8.3 Where necessary, where information is not available or where survey results are inconclusive, assumptions may be made (with justification) to assess potential impacts on ecological receptors and any mitigation solutions proposed. In such instances in accordance with CIEEM guidelines[28] the precautionary principle will be applied which states that: “In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effects, mitigation/compensation measures should be applied in accordance with the precautionary principle”.

10.9 Intra-related effects

10.9.1 Final layout, including landscape design, and impacts arising from noise / air quality could have a bearing on the potential impacts relating to ecology.

10.10 Cumulative effects

10.10.1 Cumulative impacts could arise in relation to any changes in air quality as a result of the development in its operational phase.

10.10.2 The assessment of cumulative effects will use the CIEEM EcIA guidance**Error! Bookmark not defined.**.

10.10.3 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects are particularly important in EcIA as ecological features may be already exposed to background levels of threat or pressure and may be close to critical thresholds where further impact could cause irreversible decline. Cumulative effects can also make habitats and species more vulnerable or sensitive to change.

10.10.4 With respect to this development cumulative effects would particularly potentially arise from the combined effects of emissions to the environment during the operational phase of the CCS.’s. The identification of potential impacts would be identified though consultation with the Air Quality consultant. If necessary, consultation with stakeholders (in this case the local planning authority) would be undertaken. Where required measures to avoid / mitigate impacts would be proposed by the Air Quality consultant and development designers.

10.11 Summary of proposed EIA scope

10.11.1 Table 10.7 below summarises the EIA scoping for ecological receptors during the construction and operational phases.

Table 10.7: Summary of Ecological impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Protected Sites Statutory		
Fairburn and Newton Ings SSSI / LNR	Out	The SSSI lies 1.5km to the north lie at sufficient distance for bird populations, forming the special interest of the Site to remain undisturbed during construction phase
Well Wood LNR	Out	Habitats forming the biological interest of the designation lie at sufficient distance (1.6km) to remain undisturbed during the construction phase or affected by airborne pollutants such as dust.
Protected Sites Non-Statutory		
Fryston Park LWS	In	Potential for habitat lying in proximity to the Site be affected by airborne pollutants such as dust.
Endless Flat Plantation SINC	In	Potential for habitat lying in proximity to the (approximately 260m northwest) Site be affected by airborne pollutants such as dust..
Bank of River Aire SINC	Out	At sufficient distance for no impacts to be likely during operational phase.
Byram Park SINC	Out	At sufficient distance for no impacts to be likely during construction phase.
Woodland at Edge of Byram Park SINC	Out	At sufficient distance for no impacts to be likely during construction phase.
Habitats		
Modified Grassland - amenity grassland Habitat loss / modification of habitat of negligible ecological importance	Out	Habitat loss / modification of habitat of negligible ecological importance
Neutral Grassland	Out	Habitat loss / modification, would not affect priority habitat.
Scattered Trees	Out	Habitat loss / modification of habitat of negligible ecological importance
Mixed scrub	Out	Habitat loss / modification of habitat of negligible ecological importance
Open water	In	Habitat loss / modification, would potentially affect priority habitat.
Hardstanding	Out	Habitat loss / modification Habitat of negligible ecological importance
Species		

Amphibians - loss / fragmentation of habitat, disturbance, killing / injury unlikely to include GCN.	Out	Habitats affected unlikely to be of importance in maintaining amphibian populations locally.
Badger	Out	Negligible ecological importance – common and ubiquitous species. No records on Site or within 200m of the site.
Bats	Out	Loss / fragmentation of habitat, disturbance, habitats affected unlikely to be of importance in maintaining bat populations locally. Should further surveys identify the presence of bats on Site, bats will be scoped into the assessment.
Birds	Out	Habitats affected of insufficient area to be of importance in maintaining bird populations locally.
Reptiles	Out	Unlikely to be present
Invertebrates	Out	Loss / fragmentation of habitat, disturbance, Habitats affected unlikely to be of importance in maintaining invertebrate bat populations locally.
Water vole	Out	Unlikely to be present
Operation		
Protected Sites - Statutory		
Fairburn and Newton Ings SSSI / LNR	Out	The SSSI lies 1.5km to the north lie at sufficient distance for bird populations, forming the special interest of the Site to remain undisturbed during operational phase. The site is notified for its bird populations not habitats, therefore, the site is not considered sensitive to airborne sources of nitrogen.
Well Wood LNR	In	The LNR lies 1.6 km from the Site. Potential for changes in emissions to result in adverse impacts on habitats arising from changes to deposition of airborne pollutants from the Ferrybridge campus as a result of the Proposed Scheme.
Protected Sites Non-Statutory		
Fryston Park LWS	In	Potential for habitat lying in proximity to be affected by changes in emissions resulting in adverse impacts on habitats arising from deposition of airborne pollutants.
Endless Flat Plantation SINC	In	Potential for habitat lying in proximity to be affected by changes in emissions to resulting in adverse impacts on habitats arising from deposition of airborne pollutants.
Bank of River Aire SINC	Out	At sufficient distance (630m) for no impacts to be likely during operational phase.
Byram Park SINC	Out	At sufficient distance for no impacts to be likely during operational phase.
Woodland at Edge of Byram Park SINC	Out	At sufficient distance for no impacts to be likely during operational phase.
Habitats		
Modified Grassland	Out	Habitat loss / modification of habitat of negligible ecological importance

Neutral Grassland	Out	Habitat loss / modification, would not affect priority habitat.
Scattered Trees	Out	Habitat loss / modification of habitat of negligible ecological importance
Mixed scrub	Out	Habitat loss / modification of habitat of negligible ecological importance
Open water	In	Habitat loss / modification, would potentially reduce priority habitat locally in the absence of mitigation.
Hardstanding	Out	Habitat loss / modification Habitat of negligible ecological importance
Species		
Amphibians	Out	Loss / fragmentation of habitat, disturbance, killing / injury (unlikely to include GCN). Habitats affected unlikely to be of importance in maintaining amphibian populations locally
Badger	Out	Negligible ecological importance – common and ubiquitous species.
Bats	Out	Loss / fragmentation of habitat, disturbance, Habitats affected unlikely to be of importance in maintaining bat populations locally. Should further surveys identify the presence of bats on Site, bats will be scoped into the assessment.
Birds	Out	Habitats affected of insufficient area to be of importance in maintaining bat populations locally
Reptiles	Out	unlikely to be present
Invertebrates	Out	loss / fragmentation of habitat, disturbance, Habitats affected unlikely to be of importance in maintaining bat populations locally.
Water vole	Out	Unlikely to be present

11 Landscape and Visual Impact Assessment

11.1 Introduction

11.1.1 This Section of the EIA Scoping Report has been produced by LDA Design and the topic of Landscape and Visual effects is to be scoped in to the EIA. The Landscape and Visual Impact Assessment will be undertaken by members of LDA's Environmental Planning Team, who are members of the Landscape Institute (LI) and are Chartered landscape Architects.

11.1.2 This Section of the EIA Scoping Report sets out the approach and scope of the Landscape and Visual Impact Assessment (LVIA) to be undertaken, the legislative and policy context, baseline conditions, approach to the assessment and methodology, embedded mitigation and enhancement measures, and the likely potential effects.

11.2 Legislative or policy requirements and technical guidance

National Policy Statement (NPS) EN-1

11.2.1 The Overarching NPS EN-1 2024 sets out the Government's policy for delivery of major energy infrastructure and will be the primary basis for decision making. Section 5.10 Landscape and Visual sets out the overarching national policy and guidance for assessment of impact on landscape character and visual amenity for major energy infrastructure projects within England.

11.2.2 Para 5.10.4 states that "Landscape effects arise not only from the sensitivity of the landscape but also the nature and magnitude of change proposed by the development, whose specific siting and design make the assessment a case-by-case judgement". This statement also clarifies that "virtually all nationally significant energy infrastructure projects will have adverse effects on the landscape, but there may also be beneficial landscape character impacts arising from mitigation."

11.2.3 Furthermore, the statement acknowledges in para 5.10.12 that "all proposed energy infrastructure is likely to have visual effects for many receptors around proposed sites."

11.2.4 With reference to assessment, para 5.10.15 that "the applicant should carry out a landscape and visual impact assessment and report it in the ES" and that "the landscape and visual assessment should include reference to any landscape character assessment and associated studies as a means of assessing landscape impacts relevant to the proposed project"

11.2.5 In regard to mitigation measures, para 5.10.26 states that "adverse landscape and visual effects may be minimised through appropriate siting of infrastructure within that site, design including colours and materials, and landscaping schemes, depending on the size and type of the proposed project. Materials and designs of buildings should always be given careful consideration."

National Planning Policy Framework (NPPF)

11.2.6 Relevant aspects of the National Planning Policy Framework (NPPF, December 2023) will be addressed within the LVIA, including those relating to sustainable development (Section 2), design (Section 12), and the natural environment (Section 15).

11.2.7 Particular consideration will be given to Section 15 of the NPPF covers both ecological and landscape matters. Paragraph 174 requires that decisions should contribute by:

"a) protecting and enhancing valued landscapes, … (in a manner commensurate with their statutory status or identified quality in the development plan);

b) recognising 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;

c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate; …"

11.2.8 In respect of valued landscapes, paragraph 175 notes that planning policy should *"distinguish between the hierarchy of international, national and locally designated sites".* The Site and proposed study area lies outside any internationally or nationally designated sites relevant to landscape and visual matters such as National Parks, the Broads and Areas of Outstanding Natural Beauty, as identified in paragraphs 176 – 178 of the NPPF.

Wakefield Council Local Development Framework January 2024

11.2.9 The following documents form the current WMDC Local Development Framework, which was adopted in January 2024, and contain development policies for Wakefield District. The assessment will also take account of the policies within the WMDC Local Development Framework.

- Volume 1: Development Strategy, Strategic and Local Policies
- Volume 2: Settlement Specific Policies
- Policies Map

11.3 Baseline

Baseline Environment

11.3.1 The Site as a whole covers approximately 41 hectares, is located within Knottingley, West Yorkshire, and is situated within the administrative area of the WMDC. The Site is located to the west of the River Aire and the east of the A1(M), at Ferrybridge Power Station. The Site currently hosts Ferrybridge 1&2 EfW.

11.3.2 The Site and its immediate context are currently industrialised, predominantly through the presence of existing large-scale structures associated with the aforementioned EfW facilities. Existing electricity pylons, overhead lines and surrounding land uses such as further industrial/storage or distribution uses add to the industrial character of the immediate landscape. Major road corridors and large settlements are also present in close proximity.

11.3.3 Beyond the immediate industrialised context of the Site, Ferrybridge Golf Club is situated to the north-west of the A1(M), separated from the eastern edge of Castleford by large woodland blocks known locally as Whin Covert and Park Plantation. The residential edge of Pontefract is located approximately 1km to the south, on the southern side of the junction between the M62 and A1M.

11.3.4 The Site is not located within any statutory or non-statutory landscape designations.

Study Area

11.3.5 It is accepted practice within LVIA that the extent of the study area is defined by the visual envelope arising from the Proposed Development based upon the Zone of Theoretical Visibility (ZTV) mapping and fieldwork. In this case, a 5km study area is considered appropriate to cover the extent and likelihood of effects which would be significant or material to the decision-making process. The proposed 5km study area for the LVIA is shown on Figure 11.1 which accompanies the EIA Scoping Report. The ZTV illustrated on Figure 11.1 is based on an indicative location of the proposed stacks and to a height of the highest stack at the operational EfW for the purposes of Scoping. As the project progresses, the location and height of the stack will be confirmed and the ZTV will be re-run as the basis for the LVIA.

Landscape Character

11.3.6 Landscape character is defined on page 157 of The Guidelines for Landscape and Visual Impact Assessment, 3rd edition (GLVIA3) as the *"distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse".* The effects on landscape character considers how the introduction of new landscape elements physically alters the landform, landcover, landscape pattern, and perceptual attributes or how visibility of the Proposed Development changes the way in which landscape character is perceived.

National Landscape Character Areas

11.3.7 At the national level, the character of England has been described and classified in the National Character Area (NCA) profiles published by Natural England. The Site falls within NCA30 'Southern Magnesian Limestone'. There are two other NCA situated within the study area, situated to the east and west of the Site, these are named NCA39 'Humberhead Levels' and NCA38 'Nottinghamshire, Derbyshire and Yorkshire Coalfield' respectively.

11.3.8 The key characteristics, management and strategic environmental objectives of NCA 30, NCA 38 and NCA 39 will inform the baseline conditions of the LVIA. However, due to the availability of more detailed local authority assessments undertaken at the local level described below, these will not be assessed in detail within the LVIA.

Local Landscape Character Assessment

11.3.9 The landscape character assessment of Wakefield District covers the Site and the study area. The landscape character assessment was published in 2004 and identifies 6 no. Landscape Character Types (LCTs) across the district. Specifically, the Site is situated within the Limestone Escarpment LCT. The Northern Coalfield LCT is also situated within the wider 5km study area. The study area includes surrounding landscape areas which have been characterised within other published landscape character assessment reports such as North Yorkshire and York's landscape character assessment produced by Chris Blandford Associates in 2011 and Leeds Landscape Assessment produced by Land Use Consultants in 1994.

11.3.10 The following LCTs and Landscape Character Areas (LCAs) are located within the 5km study area:

- Limestone Escarpment LCT (Wakefield District Landscape Character Assessment)
- Northern Coalfield LCT (Wakefield District Landscape Character Assessment)
- Magnesian Limestone Ridge LCT (North Yorkshire and York's landscape character assessment)
- Wooded Farmland LCT/Ledsham to Lotherton LCA (Leeds Landscape Assessment)
- Degraded River Valley LCT/Lower Aire Valley LCA (Leeds Landscape Assessment)

Visual Amenity

11.3.11 Visual amenity is defined within GLVIA3 as the "overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area." The effect on visual amenity considers the changes in views arising from the Proposed Development in relation to visual receptors (or people) within the surroundings towns and villages, as motorists using local roads, as walkers using public footpaths, or equestrians using bridleways.

11.3.12 In order to identify those groups who may be significantly affected ZTV mapping, desk studies and Site visits would be used. Representative viewpoints have been selected to inform the assessments within the LVIA and these will be agreed with WMDC. In addition, specific viewpoints may be identified where there are key promoted viewpoints within the study area, or illustrative viewpoints to *"demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations"* (GLVIA3, para 6.19).

11.3.13 Visual receptors that would be assessed within this technical ES Chapter would typically include:

- Local residents and visitors
- Walkers using public footpaths and long distance recreational routes (PRoW)
- Cyclists using national cycle routes (NCR's)
- Equestrians using bridleways
- Workers within the surrounding industrial estates
- Motorists using nearby roads
- Passengers using railway connections

Visual Receptor Groups

11.3.14 Visual effects will be assessed for groups of visual receptors within close proximity of each other and which are judged to experience similar or commonality of effects. These will be referred to as Visual Receptor Groups (VRG's) and may include different types of receptors. The VRG's will be defined within the ZTV and a refined Zone of Visual Influence (ZVI) or main area of visibility that will be ground truthed through Site visits.

11.3.15 For those visual receptors located outside of the ZVI there would be very limited or no visibility of the Proposed Development, such that the effects would be Negligible at most. Visual receptors located outside of the ZVI will not be taken forward for detailed assessment within the LVIA.

Representative Viewpoints

11.3.16 Representative viewpoints will be selected from publicly accessible locations to provide a proportionate range of views of the Proposed Development at different distances and directions from the Site. The viewpoint locations will represent a wide range of receptors, providing a 'sample' of the potential effects from the locality, with locations purposefully selected to illustrate the range of visual effects; or specifically to ensure representation from an identified receptor. The viewpoints would be 'micro-sited' during the field surveys to represent the 'worst case scenario' or greatest extent of visibility for the particular viewpoint. Due to the industrial context of the Site and the key components of the Proposed Development which would be of a similar scale to existing development within the Site, it is considered that no massing model visualisations or photomontages will be required. The preliminary ZTV and LVIA viewpoints submitted for consultation with the local authority are shown on Figure 11.1 and Table 11.1.

Table 11.1: Preliminary LVIA Viewpoints

No.	Location	Receptors	Grid Ref	Approx Distance (m) and Direction (N, E, S, W)
1	Silver Street, Fairburn	Motorists; Residential	447458 , 427459	1.82km, North
2	Gauk Street, Brotherton	Motorists; Residential	448200 , 425899	0.71km, East
3	Public Right of Way – footpath 35.16/1/1	PRoW users south of Byram	448895 , 425071	1.15km, South East
4	Wordsworth Drive, Ferrybridge	Motorists; Residential	447802 , 423782	0.97km, South
5	Wakefield Way promoted route	PRoW users	446830 , 420645	3.95km, South
6	Darkfield Lane, Pontefract	Residential	446844 , 423703	0.93km, South
7	Meadow Court, Castleford	Residential	446001 , 424776	1.06km, West
8	Wakefield Way promoted route at Pontefract Racecourse – footpath 33	PRoW users	443618 , 423302	3.75km, West
9	Wheldale Lane, Castleford	PRoW users	446380 , 426783	1.4km, North
10	Ledston Hall, Ledston	Visitors to Ledston Hall Registered Park and Garden	443595 , 428877	4.8km, North West

Key Transport Routes

11.3.17 The LVIA will assess the effects of the Proposed Development on users of the following key transport routes including motorways, A roads, proximal B roads and railway connections located within the ZTV and 5km study area:

- A1(M) travelling in the north and south bound directions – adjacent to the western Site Boundary;
- M62 travelling in the east bound direction – 0.5km west;
- B6136 travelling in the east and west bound directions – adjacent to the southern Site Boundary; and
- A1246 travelling in the north and south bound directions – 0.8km east.

Long Distance Recreational Trails

11.3.18 The LVIA will assess the effects of the Proposed Development on users of the Wakefield Way promoted route, which is located 1.6km south of the Site and the only long distance recreational trail located within the ZTV and 5km study area. It will also assess effects on users of the River Aire, which is navigable, and associated towpaths 0.5km east of the Site.

Accessible and Recreational Landscapes

11.3.19 The LVIA will assess effects on users of the following accessible and recreational landscapes located within the Zone of Theoretical Visibility (ZTV) mapping for the 5km study area:

- Castleford recreational ground – 1.3km north west;
- RSPB Fairburn Ings – 2.5km north west;
- Pontefract Park – 3.75km west; and
- Ledston Hall Registered Park and Garden – 4.8km north west.

Landscape Designations

11.3.20 The Site is not located within any statutory or non-statutory landscape designations. The Liverpool, Manchester and West Yorkshire Green Belt is situated adjacent to the Site. Green Belt is a land use designation rather than one which indicates a valued landscape. The Site is not located within the Green Belt and therefore effects on the Green Belt will not be assessed within the LVIA.

11.4 Approach to assessment

Assessment criteria

11.4.1 *"Landscape and Visual Impact Assessment is a tool used to identify and assess the significance of and the effects of change resulting from development on both the landscape as an environmental resource in its own right and people's views and visual amenity."* (GLVIA 3, para. 1.1).

11.4.2 Paras. 2.20-2.22 of the same guidance indicate that the two components (assessment of landscape effects, and assessment of visual effects) are *"related but very different considerations".*

11.4.3 The assessment method for this LVIA draws upon the established GLVIA3; An Approach to Landscape Character Assessment (Natural England, 2014); Landscape Institute Technical Information Note (LI TIN) 05/2017 regarding townscape character; LI TGN 02/2019 Residential Visual amenity assessment (RVAA); Landscape Institute's Technical Guidance Notes 02-21: Assessing landscape value outside national designations; LI Technical Guidance Note 06/19 Visual Representation of development proposals and other recognised guidelines.

Sensitivity of receptors

11.4.4 Susceptibility (Table 11.2) indicates the ability of a landscape or visual receptor to accommodate the Proposed Development "without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies." (GLVIA3, para. 5.40).

Table 11.2: Susceptibility

High	Undue consequences are likely to arise from the Proposed Development.
Medium	Undue consequences may arise from the Proposed Development.
Low	Undue consequences are unlikely to arise from the Proposed Development.

11.4.5 Susceptibility of landscape character areas is influenced by their characteristics and is frequently considered (though often recorded as 'sensitivity' rather than susceptibility) within documented landscape character assessments and capacity studies.

11.4.6 Susceptibility of designated landscapes is influenced by the nature of the special qualities and purposes of designation and/or the valued elements, qualities or characteristics, indicating the degree to which these may be unduly affected by the development proposed.

11.4.7 Susceptibility of accessible or recreational landscapes is influenced by the nature of the landscape involved; the likely activities and expectations of people within that landscape and the degree to which those activities and expectations may be unduly affected by the development proposed.

11.4.8 Susceptibility of visual receptors is primarily a function of the expectations and occupation or activity of the receptors (GLVIA 3rd version, para 6.32).

11.4.9 Landscape Value (Table 11.3) is "the relative value that is attached to different landscapes by society" (GLVIA3, page 157).

Table 11.3: Landscape value

National/International	Designated landscapes which are nationally or internationally designated for their landscape value.
Local / District	Locally or regionally designated landscapes; also areas which documentary evidence and/or site observation indicates as being more valued than the surrounding area.
Community	'Everyday' landscape which is appreciated by the local community but has little or no wider recognition of its value.
Limited	Despoiled or degraded landscape with little or no evidence of being valued by the community.

11.4.10 Areas of landscape of greater than Community value may be considered to be 'valued landscapes' in the context of NPPF paragraph 170.

11.4.11 Sensitivity (Table 11.4) is assessed by combining the considerations of susceptibility and value described above. The differences in the tables below reflect a slightly greater emphasis on value in considering landscape receptors, and a greater emphasis on susceptibility in considering visual receptors.

Table 11.4: Sensitivity

Landscape Sensitivity		Susceptibility		
		High	**Medium**	**Low**
Value	**National/International**	High	High-Medium	Medium
	Local/District	High-Medium	Medium	Medium-Low
	Community	Medium	Medium-Low	Low
	Limited	Low	Low-Negligible	Negligible
Visual Receptor Sensitivity		**Susceptibility**		
		High	**Medium**	**Low**
Value	**National/International**	**High**	High-Medium	Medium
	Local/District	High-Medium	High-Medium	Medium
	Community	High-Medium	Medium	Medium-Low
	Limited	Medium	Medium-Low	Low

11.4.12 For visual receptors; susceptibility and value are closely linked - the most valued views are also likely to be those where viewer's expectations will be highest. The value attributed relates to the value of the view, e.g. a National Trail is nationally valued for access, not necessarily for the available views.

Magnitude of impact

11.4.13 Scale of effect (Table 11.5) is assessed for all landscape and visual receptors and identifies the degree of change which would arise from the development.

Table 11.5: Scale

Large	Total or major alteration to key elements, features, qualities or characteristics, such that post development the baseline will be fundamentally changed.
Medium	Partial alteration to key elements, features, qualities or characteristics, such that post development the baseline will be noticeably changed.
Small	Minor alteration to key elements, features, qualities or characteristics, such that post development the baseline will be largely unchanged despite discernible differences.
Negligible	Very minor alteration to key elements, features, qualities or characteristics, such that post development the baseline will be fundamentally unchanged with barely perceptible differences.

11.4.14 Duration of effect (Table 11.6) is assessed for all landscape and visual receptors and identifies the time period over which the change to the receptor as a result of the development would arise.

Table 11.6: Duration

Permanent	The change is expected to be permanent and there is no intention for it to be reversed.
Long-term	The change is expected to be in place for 10-25 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.
Medium-term	The change is expected to be in place for 2-10 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.
Short-term	The change is expected to be in place for 0-2 years and will be reversed, fully mitigated or no longer occurring beyond that timeframe.

11.4.15 Most effects will be Long term or Permanent; however, Medium or Short term effects may be identified where mitigation planting is proposed or local factors will result in a reduced duration of effect (for example where maturing woodland will screen views in future). The effects arising from the construction of the development will usually be Short term.

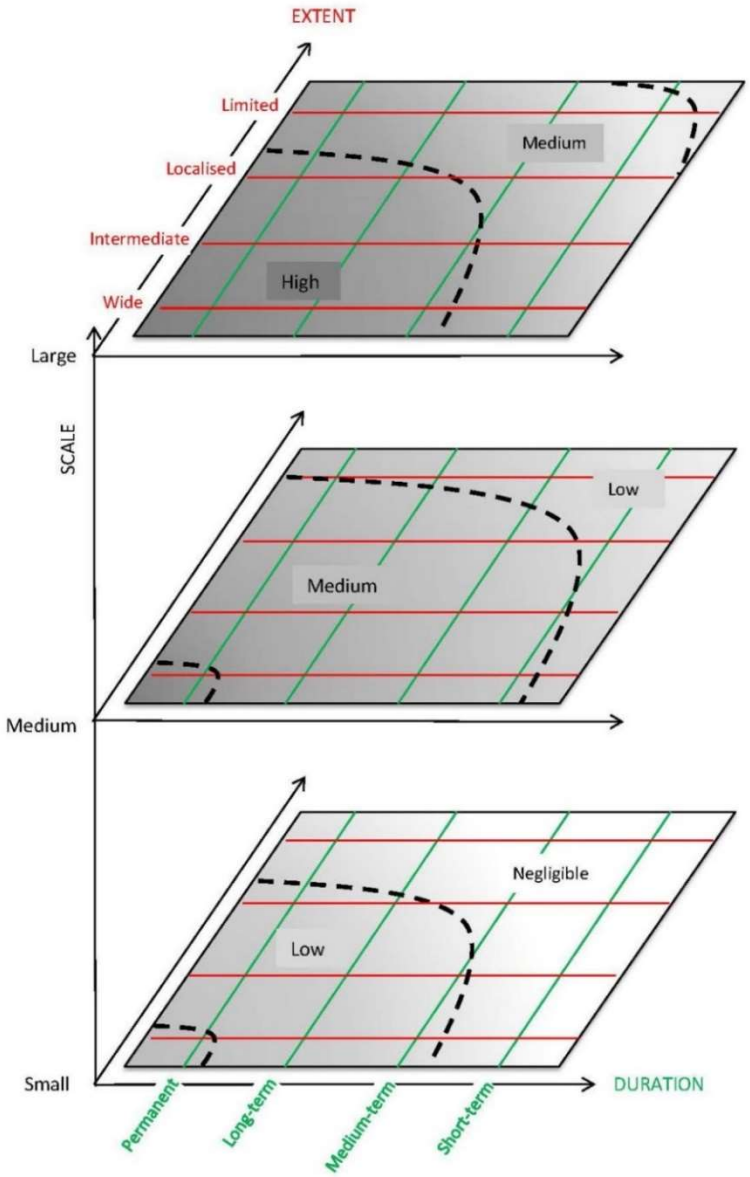
11.4.16 Extent of effects (Table 11.7) is assessed for all receptors and indicates the geographic area over which the effects will be felt.

Table 11.7: Extent

Wide	Beyond 4km, or more than half of receptor.
Intermediate	Up to approx. 2-4km, or around half of receptor area.
Localised	Site and surroundings up to 2km, or part of receptor area (up to approx. 25%).
Limited	Site, or part of site, or small part of a receptor area (< approx. 10%).

11.4.17 The Magnitude of impact is informed by combining the scale, duration and extent of effect. Diagram 11.1 below illustrates the judgement process:

Diagram 11.1: Magnitude of impact



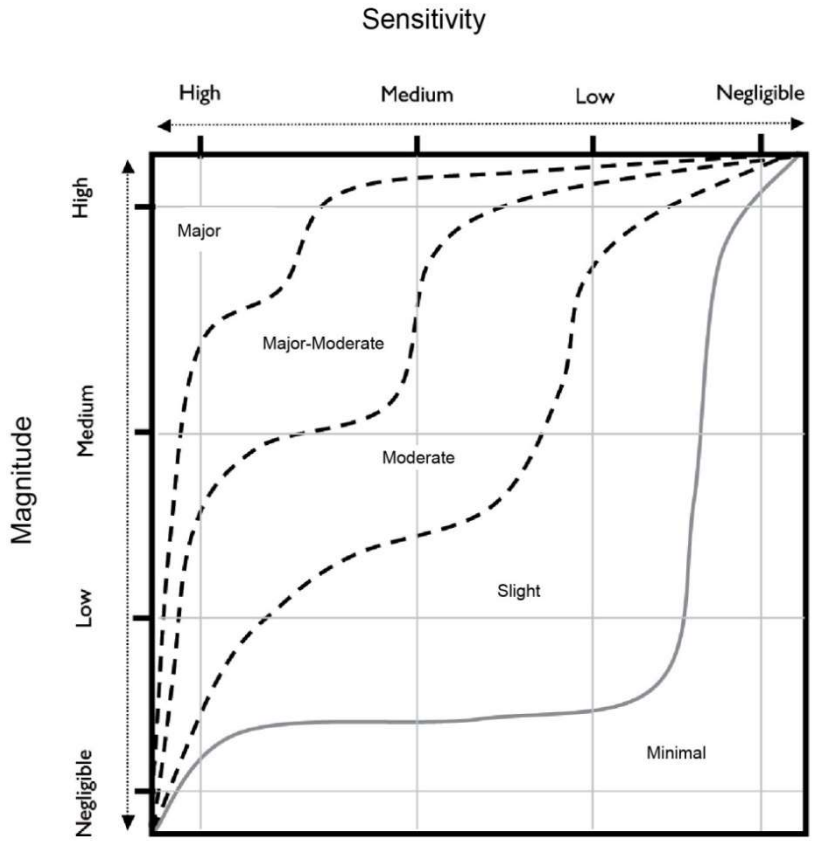
11.4.18 As can be seen from the illustration above, scale (shown as the layers of the diagram) is the primary factor in determining magnitude; most of each layer indicates that magnitude will typically be judged to be the same as scale, but may be higher if the effect is particularly widespread and long lasting, or lower if it is

constrained in geographic extent or timescale. Where the Scale of effect is judged to be Negligible the Magnitude is also assumed to be Negligible and no further judgement is required.

Significance of effect

11.4.19 Significance indicates the importance or gravity of the effect. The process of forming a judgement as to the degree of significance of the effect is based upon the assessments of magnitude of impacts and sensitivity of the receptor to come to a professional judgement of how important this effect is. This judgement is illustrated by the diagram below:

Diagram 11.2: Significance



11.4.20 The significance ratings indicate a 'sliding scale' of the relative importance of the effect, with Major being the most important and Minimal being the least. Effects that are Major-Moderate or Major are considered to be significant. Effects of Moderate significance or less are "*of lesser concern"* (GLVIA, 3rd edition, para 3.35). It should also be noted that whilst an effect may be significant, that does not necessarily mean that such an impact would be unacceptable, or should necessarily be regarded as an *"undue consequence"* (GLVIA, 3rd edition, para 5.40).

11.4.21 Where intermediate ratings are given, e.g. "Moderate-Slight", this indicates an effect that is both less than Moderate and more than Slight, rather than one which varies across the range. In such cases, the higher rating will always be given first; this does not mean that the impact is closer to that higher rating but is done to facilitate the identification of the more significant effects within tables. Intermediate judgements may also be used for judgements of Magnitude.

Positive / Adverse / Neutral effects

11.4.22 Effects are defined as adverse, neutral or positive. Neutral effects are those which overall are neither adverse nor positive but may incorporate a combination of both.

11.4.23 The decision regarding the significance of effect and the decision regarding whether an effect is beneficial or adverse are entirely separate. For example, a rating of Major and Positive would indicate an effect that was of great significance and on balance positive, but not necessarily that the proposals would be extremely beneficial.

11.4.24 Whether an effect is Positive, Neutral or Adverse is identified based on professional judgement. GLVIA 3rd edition indicates at paragraph 2.15 that this is a "*particularly challenging"* aspect of assessment, particularly in the context of a changing landscape.

Geographical scope

11.4.25 As set out at paragraph 11.4.1. the study area for the LVIA will be 5km from the Site Boundary.

Temporal scope

11.4.26 There is no limit to the operational lifespan of the proposed CCS plant therefore the decommissioning stage will not be considered within the LVIA ES Chapter. As explained within paragraph 11.7.5, the effects during construction stages are likely to be short term and temporary in nature and are unlikely to be significant in landscape and visual terms given the existing operational traffic associated with the Ferrybridge facilities and surrounding land uses. The effects during the construction stage have therefore been scoped out of the LVIA.

11.5 Embedded mitigation and enhancement measures

11.5.1 The LVIA will be undertaken as part of an iterative design and assessment process. Embedded mitigation and enhancement measures will be proposed as part of the Outline Construction Environmental Management Plan (CEMP), which will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application, and the Outline Landscape and Ecological Management Plan (LEMP) for the Site with the proposed CCS plant additions to reduce any of the identified effects, as appropriate. Embedded mitigation measures may include a mixture of on-site and offsite proposals depending on the requirements identified by the assessment. The assessment of effects during the operation (year 1 and 15) stages will be inclusive of the embedded mitigation. The identified operational effects within the LVIA will therefore also be the residual effects.

11.6 Scope of landscape and visual effects

11.6.1 The layout of the CCS is subject to further work and amendments are likely. The final design will all be located within the Site shown. The potential visual effects arising from the Proposed Development during the operational (year 1 and 15) stages are likely to arise in relation to the following key components of the Proposed Development, as outlined within Section 3 of this report:

- Absorber column(s).
- Stripper column(s).
- Flue gas cooling/heat exchanger(s).
- Solvent cooling/heat exchanger(s).
- Flue gas re-heater(s).
- Carbon Processing and Conditioning Plant(s) for the conditioning, compression, dehydration, liquefication and refrigeration of the captured carbon, driven by electricity, and onward transport as a liquid by rail; or.

- Carbon Processing and Conditioning Plant(s) for the conditioning, compression and dehydration of the captured carbon, driven by electricity, and onward transport as a pressurised gas by pipeline.
- Control and ancillary equipment.
- Infrastructure to deal with the captured CO2 on Site, such as CO2 and other storage tanks and CO2 connections within the Site.
- Flue gas connections to each EfW.
- Above-ground installation within Site Boundary (providing a connection point for the export pipeline if this option is chosen).
- Railhead with tank car loading facility, if rail transport is taken forward.
- Drainage requirements.
- Utility connections within the Site.
- Internal and external EfW modifications to F1 and F2 as required.
- Access, parking, tanker loading and welfare facilities.
- Biodiversity and landscape mitigation.

11.6.2 The precise layout and dimensions of the Proposed Development would be determined as part of the iterative design and assessment process for the EIA. All visual analysis and baseline assessment undertaken to date has assumed stacks are to be 119m high, which reflects the current height of the existing tallest stack within the Site for Ferrybridge 2. As the height of the release point will be determined using dispersion modelling techniques as part of the assessment, this will be kept under review and will be adjusted if necessary. The Proposed Development would be situated within the extent of the Site Boundary, proximal or adjacent to the EfW existing facilities. In addition to these key components, the LVIA will also consider the visible plume from the proposed flue gas stack which could be perceptible during the operational stages and within certain atmospheric or weather conditions.

Construction

11.6.3 The landscape and visual effects during the construction stages would be managed through the Outline Construction and Environmental Management Plan (CEMP) and the Outline Landscape and Ecological Management Plan (LEMP) secured through DCO requirements. Traffic movements including Abnormal indivisible loads (AIL) and Heavy Goods Vehicles (HGV), cranes and lifting equipment, plant and machinery, excavators, temporary lighting and highway works are likely to be visible during the construction stage at close proximity to the Site. The effects during construction stages are likely to be short term and temporary in nature and are unlikely to be significant in landscape and visual terms given the existing operational traffic associated with the Site and surrounding land uses.

Effects on Landscape Character

11.6.4 The introduction of any development into a landscape adds a new feature which can affect the ‘sense of place’ in its near vicinity, but with distance, the existing characteristics reassert themselves.

11.6.5 Effects during construction would be temporary and short term and would be of notably lower magnitude than those on completion, although more likely to be perceived as adverse. Although the ZTV of the proposed stack at Ferrybridge 1 CCS indicates potential visibility from LCTs and LCAs beyond the Limestone Escarpment LCT in which the Site is located, it is unlikely that the construction activity associated with the Proposed Development would result in significant effects on landscape character due to the industrial context of the Site and its proximal location to the EfW existing facilities. In addition, the industrial, storage and distribution uses adjacent to the Site also serve to industrialise the local context; these include Blue Phoenix UK to the North of the combined site with Siniat Ltd to the North East and IPTS to the East. MultiTech Engineering, Castleford & Fryston Skip Services and GMOS Ferrybridge RWE Generation UK lie to the south east of the Site, with Ferrybridge power station to the South. Effects on the Limestone

Escarpment LCT will be assessed, but effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing context, and will be scoped out of the assessment.

Visual effects

11.6.6 With the exception of specific viewpoints, each route, settlement or location will encompass a range of possible views, which might vary from no view of the development to very clear, close views. Therefore, effects are described in such a way as to identify where views towards the development are likely to arise and what the scale, duration and extent of those views are likely to be. In some cases, this will be further informed by a nearby viewpoint and in others it will be informed with reference to the ZTV, aerial photography and site visits. Each of these individual effects are then considered together in order to reach a judgement of the effects on the visual receptors along that route, or in that place.

11.6.7 The appearance of the Site is significantly influenced by the existing development within the Site Boundary as well as the surrounding industrial land uses, as listed above.

11.6.8 Given the industrial character of the Site and its locality, it is unlikely that the construction of the key components of the Proposed Development would result in significant visual effects. The construction of the proposed stack is deemed to be the most visually prominent element of the construction stage, given its relative height and scale when compared to the other smaller scale elements of the Proposed Development. The proposed stack location and height is subject to confirmation, but has been modelled as a worst-case scenario at 119m high. Wherever the construction of the proposed stack is visible, it would generally appear adjacent to the existing stacks and industrial buildings within the context of the Site, resulting in limited additional effects on visual amenity.

11.6.9 Within close proximity to the Site, views of the construction of the Proposed Development would be possible from the A1(M), B6136 and M62 east bound. There would likely be visibility from Fryston Park, also known as Ferrybridge Golf Club, to the north west and also from the northern residential edge of Pontefract given their proximity to the Site. Beyond the immediate context of the Site, it is likely that the construction of the proposed Carbon Capture Plant and gas flue would be visible to varying degrees from a small number of locations within residential areas of both Ferrybridge to the south and Castleford to the west. Beyond 2km, the construction of the lower-level elements of the Proposed Development is likely to be screened by a combination of mature landscape features within the wider study area and existing development within surrounding settlements such as Pontefract, Castleford and Knottingley. The construction of taller elements of the Proposed Development, such as the stack, is likely to be visible between 2-5km from a relatively small number of publicly accessible locations. Where visible, construction of the stack would be visible on the skyline alongside existing taller development within the Site and its context.

Operation

11.6.10 During the operation stage (year 1 and 15), the Proposed Development would likely result in medium term or permanent effects. During the early part of this operational phase, the effects are likely to be at their greatest. Over time, the scale of effects may reduce from receptors as on-site or offsite vegetation matures to gradually screen or filter views of the development. The landscape features would be subject to ongoing management through the Landscape and Ecological Management Plan (LEMP) to ensure the screening effects of the on-site vegetation are achieved during operation.

Effects on Landscape Character

11.6.11 The exact details relating to architectural design, building materials and finishes of the Proposed Development are yet to be confirmed, but would aim to appear consistent and in-keeping with the industrial character of the existing development and infrastructure located within and adjacent to the Site. It is predicted that the Proposed Development would generally appear integrated with the surrounding industrial context at Ferrybridge.

11.6.12 Although the ZTV of the proposed stack indicates potential visibility from LCTs and LCAs beyond the Limestone Escarpment LCT in which the Site is located, it is unlikely that the mass, scale and form of the Proposed Development would result in significant effects on landscape character due to the industrial context of the Site and its proximal location to the EfW existing facilities. In addition, the industrial, storage and distribution uses adjacent to the Site, as described above, also serve to industrialise the local context. For these reasons, it is unlikely that the Proposed Development would result in significant adverse effects upon the local landscape character.

Visual effects

11.6.13 Given the industrial character of the Site and its locality, it is unlikely that the key components of the Proposed Development would result in significant visual effects. The proposed stack is deemed to be the most visually prominent element of the Proposed Development, given its relative height and scale when compared to the other smaller scale elements of the Proposed Development. The proposed stack location and height is subject to confirmation, but has been modelled as a worst-case scenario at 119m high. It is considered that the proposed stack would appear in keeping with its immediate industrial context, being seen alongside existing stacks of a similar scale. The lower-level elements of the Proposed Development would also appear visually in-keeping with their immediate industrial context. As such, wherever the proposed stack is visible, it would generally appear adjacent to the existing stacks and industrial buildings within the context of the Site, resulting in limited additional effects on visual amenity.

11.6.14 Within close proximity to the Site, views of the Proposed Development would be possible from the A1(M), B6136 and M62 east bound. There would likely be visibility from Fryston Park, also known as Ferrybridge Golf Club, to the north west and also from the northern residential edge of Pontefract given their proximity to the Site. Beyond the immediate context of the Site, it is likely that the proposed Carbon Capture Plant, gas flue and visible plume would be visible to varying degrees from a small number of locations within residential areas of both Ferrybridge to the south and Castleford to the west. Beyond 2km, the lower-level elements of the Proposed Development are likely to be screened by a combination of mature landscape features within the wider study area and existing development within surrounding settlements such as Pontefract, Castleford and Knottingley. The taller elements of the Proposed Development, such as the stack, are likely to be visible between 2-5km from a relatively small number of publicly accessible locations. Where visible, the stack and visible plume would be visible on the skyline alongside existing taller development within the Site and its context.

11.7 Limitations and uncertainties

Desk Study and Fieldwork

11.7.1 This EIA Scoping Report for the LVIA has been informed by a desk-based assessment of the Site and the previous documents submitted for the existing Ferrybridge 1&2 EfWs . Detailed site surveys and fieldwork would be undertaken for the LVIA once the EIA scoping opinion has been issued by the local authority.

Zone of Theoretical Visibility (ZTV) mapping

11.7.2 A preliminary ZTV plan (Figure 11.1) has been produced and used as a tool to inform the professional judgements made in this EIA Scoping Report. The preliminary ZTV indicates areas of potential visibility based upon the indicative locations of 2no. stacks, both at a height of 119m above ground level (agl). The preliminary ZTV includes settlements and woodlands (with heights derived from LiDAR terrain data with a $2m^2$ resolution) as visual barriers in order to provide a more realistic indication of potential visibility. The ZTV mapping will be updated once further details regarding precise locations of the key components of the Proposed Development are known. However, the preliminary ZTV plan (Figure 11.1) is considered to be appropriate for the EIA Scoping Report and for consultation with the local landscape officer.

Seasonal Constraints

11.7.3 It is intended that the LVIA fieldwork would be carried out during the summer months of 2024, depending on programme constraints. Judgements will be made with consideration to the likely winter conditions – i.e. when the vegetation is out-of-leaf. All references to the role of intervening / boundary vegetation in filtering or screening views will assume a degree of permeability accounting for seasonal variations of leaf coverage based upon fieldwork and professional judgement.

Residential Visual Amenity Assessment (RVAA)

11.7.4 Due to the industrial context of the Site and the general lack of predicted intervisibility between the Site and residential areas, the LVIA will not include a separate Residential Visual Amenity Assessment (RVAA). It is considered that the likely effects arising from the Proposed Development would fall below the acceptability threshold referred to within Landscape Institute's Technical Guidance Note 02/2019.

11.7.5 TGN 02/2019 indicates that "it is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing a new development into the landscape. In itself, this does not necessarily cause particular planning concern. However, there are situations where the effect on the outlook / visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur where they did not exist before." Given the nature and context of the Proposed Development and the locations of surrounding settlements and residential properties, an RVAA is not considered necessary and will be scoped out from the ES Chapter.

Potential Night-time Effects and Lighting

11.7.6 The Site and its context are already heavily influenced by artificial lighting, primarily due to the Site's location adjacent to the well-lit A1(M) and also due to lighting associated with Ferrybridge 1&2, and other industrial uses adjacent to the Site. Due to relatively high levels of illumination, light spill and skyglow in the baseline condition, it is not considered likely that that the Proposed Development would result in any significant effects through additional lighting. A detailed lighting strategy could be prepared and secured through an appropriate DCO requirement. Given the existing lighting levels within the context of the Site, a night-time assessment is not considered necessary and will be scoped out of the ES Chapter.

11.8 Intra-related effects

11.8.1 The identified effects within the LVIA will inform other disciplines and ES Chapters. The physical effects on the fabric of the Site, the Outline CEMP and the Outline LEMP will inform the embedded mitigation and contribute to the Biodiversity Net Gain (BNG) requirements for the Ecology ES Chapter. The ZTV mapping and representative viewpoints within the LVIA will also assist the Historic Environment ES Chapter.

11.9 Cumulative effects

11.9.1 Cumulative assessment relates to the assessment of the effects of more than one development. Agreement will be reached with WMDC as to whether and how any identified cumulative schemes within the 5km study area should be included in the assessment.

11.9.2 Developments that are subject to a valid planning application will be included where specific circumstances indicate there is potential for cumulative effects to occur, with progressively decreasing emphasis placed on those which are less certain to proceed. Typically, operational and consented developments are treated as being part of the landscape and visual baseline, i.e. it is assumed that consented schemes will be built except for occasional exceptions where there is good reason to assume that they will not be constructed.

11.9.3 Due to the location of the Site within an extensive industrial complex, it is unlikely that the Proposed Development will result in any significant cumulative effects with other in-planning or consented developments.

11.10 Summary of proposed LVIA scope

11.10.1 In summary, the potential impacts which are scoped in or scoped out of the LVIA ES Chapter are follows:

Table 11.8: Summary of landscape and visual impacts proposed to be scoped in and out of the EIA for Ferrybridge 1&2 CCS

Impacts	Scoped in or out?	Justification
Construction Stage*		
** The scope of the landscape and visual receptors assessed during the construction stages would be the same as those identified within the operation stage below.*	Out	The effects during construction are likely to be short term and temporary in nature and are unlikely to be significant given the existing operational traffic associated with the Ferrybridge facilities and nearby land uses.
Operational Stage		
National Landscape Character Areas		
NCA30 Southern Magnesian Limestone	Out	NCAs will inform baseline assessments of the LVIA although due to the presence of more detailed LPA assessments, these will not be included as a specific receptor within the assessment of effects.
NCA39 Humberhead Levels	Out	
NCA38 Nottinghamshire, Derbyshire and Yorkshire Coalfield	Out	
Wakefield District Landscape Character Assessment		
Limestone Escarpment LCT	Out	Located within preliminary ZTV and study area but effects deemed not significant.
Northern Coalfield LCT	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
North Yorkshire and York's Landscape Character Assessment		
Magnesian Limestone Ridge LCT	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
Leeds Landscape Assessment		
Wooded Farmland LCT Ledsham to Lotherton LCA	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
Degraded River Valley LCT Lower Aire Valley LCA	Out	Effects on the other LCTs and LCAs within the 5km study area would not be significant, given the character of the existing Site context.
Visual Effects on Visual Receptor Groups		
Visual Receptor Groups within the ZVI	In	Located within ZVI once identified.

Visual Receptor Groups outside the ZVI	Out	Located outside ZVI once identified.
Visual Effects on users of Key Transport Routes		
A1(M) adjacent to Site	In	Located within preliminary ZTV.
M62 – 0.5km west	In	
B6136 adjacent to Site	In	
A1246 – 0.8km east	In	
Visual Effects on users of Long Distance Recreational Trails and National Cycle Routes		
Wakefield Way promoted route – 1.6km south	In	Located within preliminary ZTV.
River Aire and associated towpaths – 0.5km east	In	Located within preliminary ZTV.
Visual Effects on users of Accessible and Recreational Landscapes		
Ledston Hall Registered Park and Garden – 4.8km north west	In	Located within preliminary ZTV.
Castleford recreational ground – 1.3km north west	In	Located within preliminary ZTV.
RSPB Fairburn Ings – 2.5km north west	In	Located within preliminary ZTV.
Pontefract Park – 3.75km west	In	Located within preliminary ZTV.
Other		
Massing Model Visualisations / Photomontages	Out	Due to the industrial context of the Site and the key components of the Proposed Development which would be of a similar scale to existing development within Ferrybridge 1&2, it is considered that no massing model visualisations or photomontages will be required.
Night-Time Effects and Lighting Assessment	Out	Due to the existing high lighting levels within the Site and its local context, it is unlikely that the Proposed Development would result in any significant effects from artificial lighting.
Residential Visual Amenity Assessment (RVAA)	Out	Due to the industrial context of the Site and the general lack of predicted intervisibility between the Site and residential areas, the LVIA will not include a separate Residential Visual Amenity Assessment (RVAA)

12 Water Resources and Flood risk

12.1 Introduction

12.1.1 This section of the EIA Scoping Report has been produced by Waterman Infrastructure & Environment Limited (Waterman) Chartered Civil Engineers and Environmentalists, and sets out the potential water resource and flood risk implications of the Proposed Development. An overview of the proposed approach for the Water Environment ES Chapter, which is proposed to be scoped into the EIA, is presented.

12.1.2 In summary the Water Environment ES Chapter will present an assessment of the likely effects of the Proposed Development on the flood risk, drainage (surface water and foul), and water usage within the Site and the wider study area as identified through desk-based research, a site walkover at the Site, and consultation with key stakeholders, such as the Environment Agency (EA), Lead Local Flood Authority/local planning authority WMDC. Consideration of surface water quality is made in respect of the potential wastewater effluent generated by the Proposed Development during operation. The ES Chapter will assess the current condition of the Site in relation to its Water Environment, alongside the level of impact and resultant magnitude of impact. Proposed mitigation measures will be identified where necessary to manage any potentially adverse impact associated with the Proposed Development.

12.1.3 Consideration of surface and groundwater quality pertaining to potential disturbance of existing contamination within the ground (construction and once operational), contamination during construction and in relation to the operation of the CCS plant at both the Ferrybridge 1&2 EfWs is dealt with under Geology, Hydrogeology and Soils Section 14 of this Scoping Report.

12.2 Legislative or policy requirements and technical guidance

12.2.1 This section details legislation, national and local policies and guidance affecting this Proposed Development pertaining to the Water Environment.

Legislative Context

Water Industry Act

12.2.2 Yorkshire Water is the local Sewerage Undertaker and provides sewerage services under the guidance of the Water Industry Act 1991.

12.2.3 Under Section 106 of the Water Industry Act, the developer currently maintains the automatic right to ‘communicate’ with the public foul water sewer system.

Water Framework Directive

12.2.4 The Water Framework Directive (WFD) was adopted and came into force in 2000 and represents a culmination in European Union (EU) water resource protection. It establishes a legislative framework for the protection of surface waters (including rivers, lakes, transitional waters (estuarine) and coastal waters) and groundwater throughout the EU.

12.2.5 The WFD is transposed into law in England and Wales by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 The WFD aims to protect and enhance the quality of the water environment. The principal aim is that a good status is achieved in all water bodies by a certain date, usually 2027, or good potential status if a water body is artificially or heavily modified.

Planning policy context

National Policy Statement EN-1

12.2.6 Overarching National Policy Statement (NPS) for Energy EN-1 2024 sets out the Government's policy for delivery of major energy infrastructure and will be the primary basis for decision making. NPS EN-1 recognises that infrastructure can have adverse effects on the water environment. It states that the effects could lead to adverse impacts on health or on protected species and habitats and could result in surface waters, groundwaters or protected areas failing to meet environmental objectives established under the WFD.

12.2.7 It states that where developments are likely to have effects on the water environment, applicants should undertake an assessment of the existing status of, and impacts of, the proposed project on water quality, water resources and physical characteristics of the water environment and how this might change due to the impact of climate change on rainfall patterns and consequently water availability across the water environment, as part of the ES.

12.2.8 It states that the ES should particularly describe existing quality of watercourses, existing water resources, existing physical characteristics of the water environment, impacts on protected water bodies and areas, climate change and cumulative effects.

12.2.9 Section 5.7: Flood Risk of NPS EN-1 details that developments of 1 hectare or greater in Flood Zone 1 in England and all developments for energy projects located in Flood Zones 2 and 3 in England should be accompanied by a FRA.

12.2.10 In determining an application for a DCO, the Secretary of State should be satisfied that, where relevant:

- The application is supported by an appropriate FRA;
- The sequential test has been applied as part of site selection, and that the exception test can be passed (this will likely be required for the Proposed Development);
- A sequential approach has been applied at the site level to minimise risk by directing the most vulnerable uses to areas of lowest flood risk;
- The proposal is in line with any relevant national and local flood risk management strategy;
- Priority has been given to the use of sustainable drainage systems (SuDS);
- In flood risk areas the project is designed and constructed to remain safe;
- The project includes safe access and escape routes where required, as part of an agreed emergency plan, and that any residual risk can be safely managed over the lifetime of the development;
- Land that is likely to be needed for present or future flood risk management infrastructure has been appropriately safeguarded from development to the extent that development would not prevent or hinder its construction, operation or maintenance operational during its lifetime, without increasing flood risk elsewhere.

National Planning Policy Framework[29]

12.2.11 The National Planning Policy Framework (NPPF) 2023 states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

[29] DLUHC (last updated September 2023)L National Planning Policy Framework, DLUHC. Available at: www, assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf

12.2.12 The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the Proposed Development in areas with a lower risk of flooding.

12.2.13 If it is not possible for development to be located in zones with a lower risk of flooding (considering wider sustainable development objectives), it may be necessary to demonstrate through the Exception Test that:

- The development would provide wider sustainability benefits to the community that outweigh the flood risk; and
- The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

12.2.14 The NPPF states that when determining planning applications, Local Planning Authorities (LPAs) should ensure that flood risk is not increased elsewhere.. Development should only be allowed in areas at risk of flooding where it can be demonstrated that:

- Within the Proposed Development, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
- The development is appropriately flood resistant and resilient;
- It incorporates Sustainable Drainage Systems (SuDS), unless there is clear evidence that this would be inappropriate;
- Any residual risk can be safely managed; and
- Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

12.2.15 Major developments should incorporate SuDS unless there is clear evidence that this would be inappropriate. The systems used should:

- Take account of advice from the Lead Local Flood Authority (LLFA);
- Have appropriate proposed minimum operational standards;
- Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
- Where possible, provide multifunctional benefits.

12.2.16 Flood risk vulnerability is split into five classifications in Annex 3 of the NPPF as follows, the Proposed Development is classed as Essential Infrastructure:

- Essential Infrastructure, e.g., essential transport and utility infrastructure, wind turbines;
- Highly Vulnerable, e.g., emergency services (those required to be operational during flooding), basement dwellings;
- More Vulnerable, e.g., residential dwellings, hospitals, schools, hotels, drinking establishments;
- Less Vulnerable, e.g., retail, offices, storage and distribution, leisure, restaurants; and
- Water-Compatible Development, e.g., docks, marinas, wharves.

Planning Practice Guidance[30]

12.2.17 The Planning Practice Guidance (PPG) provides additional guidance to LPAs to ensure effective implementation of the planning policies set out within the NPPF regarding development in areas at risk of flooding. An update to the PPG that affects site-specific FRAs is in force from 25 August 2022. This includes the updates as follows:

[30] DLUHC (last updated June 2021): Planning Practice Guidance. Available at: www.gov.uk/government/collections/planning-practice-guidance

- Flood Zone 3b is now defined as 1 in 30 (3% AEP) rather than 1 in 20 (5% AEP) – this could restrict land available for development on policy grounds.
- Lifetime of commercial development is now assumed at 75 years – this is likely to require an increase in climate change allowance.
- The “design flood” now includes the 1 in 100 (1% AEP) pluvial/surface water flood event, which must also be accounted for when assessing access and egress routes.
- Evacuation procedures need to consider the 1 in 1,000 (0.1% AEP) extreme flood.
- Inclusion of a new "non-major" category of development that sits between minor/permitted and major.

12.2.18 The PPG states that developers and LPAs should seek opportunities to reduce the overall level of flood risk in the area and beyond, through the layout and form of the development, and the appropriate application of SuDS. Referencing information provided by the EA, the PPG provides advice on taking account of climate change, setting out recommended contingency allowances for net sea level rise and peak rainfall intensities. It also advises on flood resilience and resistance measures when dealing with the residual risks remaining after applying the sequential approach and mitigating actions.

12.2.19 The PPG also includes advice on flood risk vulnerability and flood zone compatibility. The following flood zones refer to the probability of river and sea flooding, without the presence of defences:

- Zone 1 - low probability: less than 1 in 1000 annual probability of river or sea flooding (<0.1%) in any year;
- Zone 2 - medium probability: between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% to 0.1%) or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% to 0.1%) in any year;
- Zone 3a - high probability: 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability flooding from the sea (>0.5%) in any year; and
- Zone 3b - the functional floodplain: where water has to flow or be stored in times of flood; identification should take account of local circumstances but would typically flood with an annual probability of 1 in 30 (3.3%) or greater in any year or is designed to flood in an extreme 1 in 1,000 (0.1%) flood.

Non-statutory Technical Standards for Sustainable Drainage[31]

12.2.20 The Non-Statutory Technical Standards for Sustainable Drainage Systems was published in March 2015 and is the current guidance for the design, maintenance and operation of SuDS.

12.2.21 The standards set out that the peak runoff rate should be as close as is reasonably practicable to the greenfield rate but should never exceed the pre-development runoff rate.

12.2.22 The standards also set out that the drainage system should be designed so that flooding does not occur on any part of the Proposed Development for a 1 in 30-year rainfall event, and that no flooding of a building (including basement) would occur during a 1 in 100 year rainfall event.

12.2.23 It is also noted within the standards that pumping should only be used when it is not reasonably practicable to discharge by gravity.

[31] DEFRA (2015): Non-Statutory Technical Standards for Sustainable Drainage systems. Available at: www.assets.publishing.service.gov.uk/media/5a815646ed915d74e6231b43/sustainable-drainage-technical-standards.pdf

Calder Catchment Strategic Flood Risk Assessment (SFRA)[32]

12.2.24 The SFRA[i] forms an essential reference tool providing the building blocks for future strategic planning. SFRA forms the basis for preparing appropriate policies for flood risk management within the area and this will be considered within the assessment of flood risk.

Wakefield District Local Development Framework January 2024

12.2.25 The assessment will take account of the policies within the Wakefield District Local Development Framework (as adopted January 2024)..

Guidance and Best Practice

12.2.26 SuDS design should follow the guidance provided in the CIRIA SuDS Manual[33], with due regard for any national or local regulatory requirements. SuDS design should, as much as possible, be based around the following:

- Using surface water as a resource;
- Managing rainwater close to where it falls;
- Managing runoff on the surface;
- Allowing rainwater to soak into the ground;
- Promoting evapotranspiration;
- Slowing and storing runoff to mimic natural runoff characteristics;
- Reducing contamination of runoff through pollution prevention and controlling the runoff at source; and,
- Treating runoff to reduce the risk of urban contaminants causing environmental pollution.

12.2.27 Consideration of WFD will be undertaken with reference to the guidance which includes:

- PINS Advice Note Eighteen
- Water Framework Directive risk assessment[34]; and
- Water Framework Directive assessment: estuarine and coastal waters35.

12.2.28 The WFD assessment process for the Proposed Development will be staged, commencing with WFD Screening. The Applicant will engage with the EA on the development of the WFD assessment .

12.3 Baseline

12.3.1 Based on the information gathered to date, a summary of the baseline environment is provided below. This baseline will be expanded within the finalised FRA, Drainage Strategy Report and ES Chapter.

12.3.2 The Site (described in detail within Section 2) consists of two existing EfWs (Ferrybridge 1&2) and the Proposed Development will infill the Site with CCS plant to enhance the offering of the existing EfWs.

Flood Risk

12.3.3 The River Aire (Main River) is located approximately 700m to the east of the Site.

[32] JBA Consulting (2016): Calder Catchment Strategic Flood Risk Assessment. Available at: ww.calderdale.gov.uk/v2/sites/default/files/calder-catchment-sfra-volume-2.pdf

[33] CIRIA (2015): The SuDS Manual. Available at: www.ciria.org/ItemDetail?iProductCode=C753F&Category=FREEPUBS

[34] Environment Agency (2016): Water Framework Directive risk assessment. Available at: Water Framework Directive risk assessment (publishing.service.gov.uk).

35 Environment Agency (2023): Water Framework Directive assessment: estuarine and coastal waters. Available at: Water Framework Directive assessment: estuarine and coastal waters - GOV.UK (www.gov.uk)

12.3.4 A culverted ordinary watercourse (the Fryston Beck) passes through the Site, potentially running beneath the proposed location of the Proposed Development.

12.3.5 The southern section of the Site is located within Flood Zone 3 and as such is considered at high probability of fluvial flooding. The standard protection from flood defences are not yet known, data has been requested from the EA and will be used when completing full assessment for the ES and FRA.

12.3.6 The EA online mapping shows that the Site is generally at a low probability of overland surface water flooding.

12.3.7 There is no recorded historical flood extent within the Site Boundary.

12.3.8 The northern end of the Site could be affected in the event of a reservoir breach from a series of reservoirs to the north west of the Site. However, this is highly unlikely due to the high standards to which reservoirs are maintained under the Reservoirs Act.

Groundwater

12.3.9 Flood risk from groundwater is considered to be low, with groundwater encountered 9 m below ground level (bgl). This is based on the historical Ferrybridge Multifuel 2 Permit Well Monitoring Factual Report, Prepared by AECOM, dated May 2019, which states that groundwater was encountered at boreholes between 12-16m bgl.

Surface Water Quality

12.3.10 The River Aire (Main River) is located approximately 700m to the east of the Site.

12.3.11 Review of the EA data for cycle 3 of the WFD requirements indicate that the River Aire from Wyke Beck to Fryston Beck Water Body is of a Moderate Ecological Status and 'Fail' for Chemical Status.

12.3.12 Surface and groundwater quality is discussed in detail within the Geology, Hydrogeology, and Soils Section 14 of this EIA Scoping Report.

Drainage and water use

12.3.13 The existing Site is a mix of permeable green space and impermeable areas (roofs, roads, etc.) associated with the existing EfWs. There is an existing drainage network based on two on-site surface water attenuation basins (lagoons) created under the existing planning consent, which was designed and implanted to achieve greenfield runoff rates.

12.3.14 There are no existing foul water flows from the proposed locations of the CCS facility

Proposed approach to surveys and further baseline data collection

Obtaining flood risk information pertinent to the Site

12.3.15 This will be achieved through the following steps:

- Consultation with EA, Lead Local Flood Authority/Local Planning Authority, and Yorkshire Water to obtain the latest flood risk and drainage information relating to the Site
- Further review of existing and historical site information (e.g. relevant previous planning applications) to establish the current situation and any site-specific precedents in terms of flood risk.

Obtain drainage information pertinent to the Site

12.3.16 This will be achieved through obtaining information on existing drainage network from the following sources, where available:

- As-built drainage plans for the existing development (in accordance with its planning consent)
- Yorkshire Water Sewer Records
- Further on-site survey should that be required following the review of available drainage information.

12.3.17 Site information will be reviewed in greater detail to understand the existing drainage network in more detail, including but not limited to:

- The extent and layout of the drainage network;
- The contributing catchment areas;
- Permeable and impermeable areas; and
- Downstream discharge location and design flow rate.

12.4 Approach to assessment

12.4.1 An NPS EN-1 and NPPF compliant FRA and Surface Water Drainage Strategy (including SuDS) will be appended to the ES. The FRA will consider the risk of flooding from all sources (fluvial/tidal sources, reservoirs, groundwater, sewer surcharging and overland flow), together with relevant flood defence infrastructure and a review of the best available datasets to inform the assessment of flood risk. The FRA will include the following assessments:

- Potential sources of flooding including those recorded to date
- Flood alleviation measures already in place, and their state of maintenance
- Potential impacts of flooding to the Site and identification of any necessary mitigation measures
- Residual risks after implementation of any necessary mitigation measures, allowing for the future impacts of climate change

12.4.2 The Surface Water Drainage Strategy would be developed in line with the LLFA guidance to ensure that flood risk is not increased offsite. This would include an assessment of the following:

- Identification of the existing surface water runoff rate from the Site;
- Identification of the necessary rate of restriction for surface water runoff in line with policy requirements;
- The volume of attenuation required on-site to restrict surface water to the required rate;
- Preliminary details of appropriate SuDS required to accommodate the attenuation and provide multi-functional benefits to the Site;
- An indicative SuDS management and maintenance plan would be prepared, in line with current guidance requirements;
- A plan illustrating an outline foul and surface water drainage layout; and
- Pre-development consultation with the LLFA.

12.4.3 As indicated in Section 3 of this EIA Scoping Report there are both water inputs and process effluent associated with the CCS plant. A small continuous flow of water will be required, and potentially a greater amount of water if this is required for cooling. An assessment will be undertaken of considering water demand on the capacity of water supply.

12.4.4 If water is used for cooling some process effluent will be produced. As indicated earlier in this EIA Scoping Report a Further Feasibility Study will assess the most suitable means of treatment (or recycle) and discharge requirements for any concentrated effluents. This information will feed into the water environment ES Chapter as it is anticipated existing drainage infrastructure will be used. Further consideration of the potential impacts of any discharge of wastewater effluent will be undertaken with reference to the WFD to ensure the objectives are not compromised.

Assessment criteria

12.4.5 The following section provides an overview of the approach to EIA in relation to the water environment. It will largely follow the overarching EIA methodology defined earlier in this EIA Scoping Report but differs in some respects with regard to defining the sensitivity of receptors.

Magnitude of impact

12.4.6 For the impacts identified and reported within the ES, an assessment will be made in relation to the relative significance of the likely environmental effects identified. This will be carried out with reference to definitive standards and legislation, where available. Where it is not possible to quantify effects, qualitative assessments will be carried out, based on available knowledge and professional judgement. The significance of predicted effects will be determined with reference to assessment criteria.

12.4.7 Table 12.1 sets out the magnitude of change.

Table 12.1: Magnitude of change

Criteria	Description	
	Adverse	Beneficial
Unchanged	No appreciable change in flood risk. No change to demand for surface and/or foul water infrastructure or capacity. No change to demand for the capacity of water supply and the existing water supply infrastructure. No measurable effects on WFD quality elements	
Low	Minor local-scale increases in flood risk. Increase in surface and / or foul water discharge which would require modifications to existing infrastructure. Increase in water supply demand which would place additional pressure on existing local supplies and existing water supply infrastructure. Localised adverse effects on WFD quality elements, although not sufficient to change WFD status of water body.	Minor local-scale reductions in flood risk. Temporary local scale reduction in demand for surface and / or foul water infrastructure. Temporary local scale reduction in demand for water supply. Localised beneficial effects on WFD quality elements, although not sufficient to change WFD status of water body.
Medium	Moderate local-scale or minor regional-scale increases in flood risk. Increase in surface and / or foul water discharge which would place undue pressure on existing infrastructure. Increase in water supply demand which would place undue pressure on existing local supplies and existing water supply infrastructure. Contribution to a reduction in water body WFD classification.	Moderate local-scale or minor regional-scale reductions in flood risk. Minor permanent reduction in demand for surface and / or foul water infrastructure. Permanent local scale reduction in water demand. Contribution to an improvement in water body WFD classification.
High	Substantial local-scale or moderate to substantial regional-scale increases in flood risk. Increase in surface and / or foul water discharge which would require new infrastructure.	Substantial local-scale or moderate to substantial regional-scale reductions in flood risk. Major permanent reduction in demand for surface and / or foul water infrastructure.

Criteria	Description	
	Adverse	Beneficial
	Increase in water supply demand which would exceed the water resource capacity of the region and therefore require new sources e.g. application of an abstraction licence. Reduction in water body WFD classification.	Permanent regional scale reduction in water supply demand. Improvement in water body WFD classification.

Sensitivity of receptors

12.4.8 A summary list of potentially sensitive receptors is below:

- Infrastructure on-site
- Infrastructure on adjacent sites to both the east and west
- Main River (River Aire) /surface water bodies adjacent to the Site on all sides
- Ordinary Watercourses/surface water bodies in hydraulic connectivity to the Site
- Surface and foul water sewers on-site
- Surface and foul water sewers downstream of the Site
- Water mains

12.4.9 These will be assessed based on the sensitivity criteria in Table 12.2.

Table 12.2: Receptor sensitivity criteria

Criteria	Sensitivity	Commentary
Flood risk receptors	Low	Less Vulnerable Development – Police, ambulance and fire stations not required to be operational during flooding, buildings used for shops, financial, professional and other services. Restaurants, offices, general industry, storage, agriculture and forestry, wate treatment, minerals workings, water treatment works which do not need to remain operational during times of flood, sewage treatment works, car parks.
	Medium	More Vulnerable Development – Hospitals, residential institutions (e.g. care homes, prisons), dwellings, drinking establishments, nightclubs, hotels, non-residential uses for health services, nurseries and educational establishments, landfill, short-let caravans and camping.
	High	Highly Vulnerable Development and Essential Infrastructure – Police and ambulance stations, fire stations, telecommunications required to be operational during flooding, emergency dispersal points, basement dwellings, caravans, mobile homes and park homes intended for permanent residential use, installations requiring hazardous substances consent.
Surface and foul water sewers	Low	Private water drainage infrastructure in rural areas or within a commercial facility.
	Medium	Private water drainage infrastructure in urbanised or industrial areas.
	High	Public water drainage infrastructure in urbanised and rural areas.
Water mains	Low	Private water drainage infrastructure in rural areas or within a commercial facility.
	Medium	Private water drainage infrastructure in urbanised or industrial areas.
	High	Public water drainage infrastructure in urbanised and rural areas.
Main River and other watercourses	Low	Watercourse having a WFD classification of Poor to Bad.
	Medium	Watercourse having a ‘Moderate’ WFD classification.
	High	Watercourse having a ‘Good’ or ‘High’ WFD classification.

Significance of effect

12.4.10 Table 12.3 sets out the significance of the effects criteria. Effects of moderate and higher are considered to be likely significant effects.

Table 12.3: Significance of effects criteria

Magnitude of Impacts					
Sensitivity of Receptors		High	Medium	Low	Unchanged
	High	*Major*	*Moderate*	*Moderate/Minor*	*Negligible*
	Medium	*Moderate*	*Moderate*	*Minor/Negligible*	*Negligible*
	Low	*Moderate*	*Minor*	*Negligible*	*Negligible*

Geographical scope

12.4.11 The FRA will consider flood risk within the Site and the areas downstream of the Site. Further to this, the Water Environment ES Chapter also considers any potential wider effects within the local hydrological catchment surface water catchment and the wider River Aire catchment.

Temporal scope

12.5 The construction and operational phases of the Proposed Development will be assessed, and the duration of environmental effects will be characterised as follows:.

- 'Short' to 'medium-term' effects are considered to be those associated with the Site preparation and construction works; and
- 'Long-term' effects are those associated with the completed and operational facility.

12.6 Embedded mitigation and enhancement measures

12.6.1 The process of EIA will identify the baseline at the Site with regard to Water Environment. This will be established through the finalisation of a FRA and drainage strategy and consultation with WMDC.

12.6.2 The Proposed Development may require the infilling of an existing greenspace which will result in an increase of the Site's impermeable area. Additional surface water attenuation will need to be provided to compensate for the increased impermeable area and any loss of existing surface water storage. The Site and its drainage strategy will be designed to be safe from flooding over its lifetime and not increase flood risk elsewhere, in line with the NPS EN-1 and NPPF.

12.6.3 The volume and quality of the wastewater effluent will be considered within the design of the Proposed Development in respect of discharge or reuse within the Proposed Development to ensure adverse effects are minimised.

12.7 Scope of environmental impacts and effects

Construction

12.7.1 The construction of Ferrybridge CCS is anticipated to involve the excavation of soils, construction of foundations and the construction of above ground structures. During the Construction Phase and the potential effects will be:

- Change in on-site flood risk which may affect Site users, Site infrastructure and construction equipment, including the implications of below ground works upon groundwater flow and flood risk;
- Change in offsite flood risk due to changes to existing ground levels or changes to the culverted ordinary watercourse passing through the Site;
- Change in surface water runoff (peak rate and volume) due to increase in impermeable area; and
- Change in foul and trade flows from the Site.

Operation

12.7.2 Once constructed and Ferrybridge CCS is operational the potential affects will be to:

- Change in on-site flood risk which may affect Site users, Site infrastructure and construction equipment, including the implications of below ground works upon groundwater flow and flood risk;
- Change in offsite flood risk due to changes to existing ground levels or changes to the culverted ordinary watercourse passing through the Site;
- Change in surface water runoff (peak rate and volume) due to increase in impermeable area;
- Change in foul and trade flows from the Site; and
- Change in water usage.

12.8 Limitations and uncertainties

12.8.1 Assessment of flood risk relies on the quality of the information available. There are inherent limitations in the accuracy of hydraulic modelling used for assessment of flood risk. This will be manged through the

cross checking of multiple flood risk datasets (EA, SFRA etc.) and taking a conservative approach to the assessment of probability and consequence of flooding.

12.8.2 There are inherent uncertainties within hydrological data used for assessment of rainfall and surface water drainage. This will be managed through the cross checking of multiple hydrological datasets (FEH, recorded/gauged data) and taking a conservative approach to the assessment of likely rainfall intensities and the associated attenuation that is required.

12.8.3 There are inherent uncertainties with the climate change projections for both rainfall and sea level rise. This will be managed through the diligent application of the EA climate change guidance.

12.9 Intra-related effects

12.9.1 Surface and groundwater quality is discussed in detail within the Geology, Hydrogeology, and Soils ES Chapter. The FRA will incorporate appropriate allowances for climate change in line with EA guidance. The ecology assessment will include the consequences of any changes in surface water body quality for protected species or habitats.

12.9.2 It is not anticipated that there will be any other intra-related effects with the Water Environment at this time.

12.10 Cumulative effects

12.10.1 The cumulative effects of consented schemes in the wider area on the Site Water Environment will be considered, taking into account the effects of the proposals for the Site. However, the potential for cumulative effects related to hydrology is low as national and local policy relating to flood risk and drainage dictates that development should be safe over its lifetime without resulting in offsite detriment. Additionally, it will be confirmed with the local water supplier Yorkshire Water that there is capacity to provide any additional water required by the Site.

12.11 Summary of proposed EIA scope

12.11.1 The impacts scoped in or out for the Water Environment ES Chapter are as follows:

Table 12.4: Summary of Water Environment impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Change in on-site flood risk	In	The construction of the Proposed Development has the potential to be affected by the existing on-site flood risk and to change on-site flood risk due to changes in Site usage and ground levels.
Change in offsite flood risk	In	The construction of the Proposed Development has the potential to affect offsite flood risk due to changes to existing ground levels or changes to the culverted ordinary watercourse passing through the Site.
Change in surface water runoff from the Site	In	The construction of the Proposed Development has the potential to affect the peak rate and volume of surface water runoff from the Site due to changes in impermeable area.
Change in foul and trade flows from the Site	In	The construction of the Proposed Development has the potential to increase foul and trade flows from the Site.
Operation		
Change in on-site flood risk	In	The operation of the Proposed Development has the potential to be affected by the existing on-site flood risk and to change on-site flood risk due to changes in site usage and ground levels.
Change in offsite flood risk	In	The operation of the Proposed Development has the potential to affect offsite flood risk due to changes to existing ground levels or changes to the culverted ordinary watercourse passing through the Site.
Change in surface water runoff volume from the Site	In	The operation of the Proposed Development has the potential to affect the peak rate, and volume of surface water runoff from the Site due to changes in impermeable area.
Change in foul and trade flows from the Site	In	The operation of the Proposed Development has the potential to increase foul and trade flows form the Site.
Change in water supply	In	The operation of the Proposed Development has the potential to increase water supply demand
Change in potable water usage	Out	The operation of the Proposed Development has a negligible potential to increase potable water usage on account of the limited staff operating at the Site.

**As noted previously, water quality is to be considered within the Geology, Hydrogeology and Soils ES Chapter.*

13 Geology, Hydrogeology and Soils

13.1 Introduction

13.1.1 This Section of the EIA Scoping Report has been produced by Waterman Infrastructure & Environment Limited (Waterman) and provides an overview of the Proposed Development for the Geology, Hydrogeology and Soils ES Chapter which is proposed to be scoped into the EIA.

13.1.2 The Ground conditions EIA will be undertaken by members of the Waterman Land Quality team who are members of relevant professional institutions including Chartered Institution of Water and Environmental Management (CIWEM) Society of Brownfield Risk Assessment (SoBRA) or Institute of Environmental Assessment (IEMA). All inputs are approved by members of the team who are Chartered Members of CIWEM and or Chartered Environmentalists.

13.1.3 The Geology, Hydrogeology and Soils ES Chapter will present an assessment of the likely effects of the Proposed Development on the ground conditions asset within the Site and the wider study area(within 250m of the Site) as identified through desk-based research, a site walkover to identify any potential contamination sources at the Site, and include consultation with key stakeholders. The ES Chapter will assess the current condition of the Site in relation to its geology, hydrogeology and soils, alongside the level of impact and resultant magnitude of impacts.

13.2 Legislative or policy requirements and technical guidance

Legislative Context

13.2.1 Specific UK legislation on contaminated land is principally contained within Part IIA of the Environmental Protection Act (EPA), 1990, as inserted by Section 51 of the Environment Act 1995. The legislation endorses the principle of a 'Suitable for Use' approach to contaminated land, where remedial action is only required if there are unacceptable risks to defined Statutory Receptors which include human health and the receiving environment, taking into account the use of the land and its environmental setting.

13.2.2 The above legislation has been interpreted as statutory guidance in 'Environmental Protection Act 1900: Contaminated Land Statutory Guidance, 2012'. This statutory guidance outlines how Local Authorities should implement the legislation including how to determine whether the land in its area is defined as Contaminated' in the legal sense. The guidance explains the legal provisions of Part 2A and how regulators should ensure that remediation requirements are reasonable.

Planning Policy Context

13.2.3 Overarching National Policy Statement (NPS) for Energy EN-1 2024 outlines that applicants should identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into account any mitigation measures proposed. Paragraphs 5.11.3, 4,5,8, 14, 17 & 18 Section 5.11 – Land Use, Including Open Space, Green Infrastructure, and Green Belt of the NPS EN-1 relate to soil and water resources with reference to contaminated land.

13.2.4 The document confirms that through the planning policy previously developed land should be subject to the same assessment of risks in accordance with the contaminated land statutory guidance.

13.2.5 The statement also encourages the development of a Soil Management Plan which could help minimise potential land contamination. The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soils are surplus to requirements or are affected by contamination.

13.2.6 The statement notes a requirement for developments to enhance the natural and local environment by preventing new and existing developments from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil pollution.

13.2.7 Contamination is also managed via the planning regime, through the National Planning Policy Framework (NPPF) 2023. The NPPF sets out the government's planning policies and how they are expected to be applied. Paragraphs 119, 120, 121 of Section 11 – Making effective use of land and Paragraphs 174, 183, 184, 185, Section 15 – Conserving and enhancing the natural environment of the NPPF relate to contaminated land matters.

13.2.8 With regard to new developments the NPPF aims to prevent both new and existing development from contributing to, or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

13.2.9 In addition, the NPPF sets out that when considering a planning application, a site must be suitable for its new use taking account of ground conditions and land instability, including hazards from natural sources or former activities such as mining, or pollution arising from previous uses. This should be balanced against any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation.

13.2.10 The NPPF also outlines that post remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990.

13.2.11 The assessment will also take account of the policies within the Wakefield District Local Development Framework (as adopted January 2024).

Guidance and Best Practice

13.2.12 There is no specific ground conditions guidance or prescribed methodology for undertaking EIA. Relevant national guidance and codes of practice relevant for the assessment of land contamination (soils, hydrogeology and geology) will be considered including the following:

- LCRM Guidance. Land Contamination: Risk Management Guidance (LCRM: Environment Agency, 10 July 2023);
- Human Health Toxicological Assessment of Contaminants in Soil (SR2). Environment Agency, 2009;
- Updated Technical Background to the CLEA Model (SR3). Environment Agency, 2009;
- Contaminated Land Exposure Assessment (CLEA) Tool, Environment Agency, 2014;
- Land Contamination: Remedial Targets Methodology (RTM), Environment Agency, 2014;
- Investigation of Potentially Contaminated Sites. Code of Practice BS10175:2011+A2:2017;
- Code of Practice for Ground Investigations. BS5930:2015;
- Code of Practice for the Design of Protective measures for methane and carbon dioxide ground gases for new buildings. BS8485:2015+A1:2019;
- Assessing Risk posed by Hazardous Ground Gases to Buildings. CIRIA C665; ,
- Abandoned Mine Workings Manual. CIRIA C758D; and,
- A New Perspective on Land and Soil in Environmental Impact Assessment. IEMA, 2022.

13.3 Baseline

13.3.1 Based on the information gathered to date, a summary of the baseline environment is provided below. The full details of the baseline will be provided in due course in a Waterman Preliminary Risk Assessment to support the Environmental Statement. (. .

13.3.2 Consultation has been undertaken with WMDC Environmental Team and Wakefield Building Control Department on 14/09/2023 as part of the Preliminary Risk Assessment (PRA), with environmental search ordered on the 29/09/2023. The response was received on 31/10/2023, a full summary will be provided in the PRA report submitted with the ES. In summary, the response states that the Site is not registered as contaminated land by the Council under Part 2A of the Environmental Protection Act 1990. The Site is within the boundary of a larger area of land that is on the WMDC's list of potentially contaminative sites and is assigned the B risk category . No pollution or contamination incidents that have occurred at and near the Site are known by the council. The council supplied a site investigation report (Arup, February 2014) submitted with the DCO application for Ferrybridge Multifuel 2 th e findings of which will be summarised in PRA report. However, the results of chemical soil sample analysis, acquired as part of the intrusive works at that time, did not record any exceedances, no asbestos fibres were identified. No exceedances were recorded in a groundwater sample.

Baseline environment

Site History

13.3.3 In summary, from a review of the available historical mapping the Site originally comprised agricultural fields (1893), denoted as 'Endless Flat Plantation' in the north with Fryston Beck running across the south-western end of the Site. Little development is noted until 1950s when the northeastern area of the Site forms part of a sand and gravel pit, which is no-longer denoted by the 1960s, indicating infilling. The Fryston Beck is culverted by 1960s. The majority of the Site remained largely undeveloped until the construction of Ferrybridge 1 in 2014 and Ferrybridge 2 in 2019, however, Ferrybridge power station and works to the south and east of the Site were developed since 1960s with some structures and a conveyor encroaching the southeastern Site Boundary.

13.3.4 The Site is currently used by the active Ferrybridge 1&2 EfWs comprising offices and welfare facilities, visitor centre, bottom ash recycling and maturation facilities, access roads and weighbridge facilities, electrical compound, together with peripheral landscaping and security fencing.

Potential Sources of Contamination

13.3.5 Potential sources of contamination identified in the surrounding area include:

- Ferrybridge Power Station to the south and east of the Site which operated since 1960s with parts of it operating to the current day;
- BGS recorded landfill site 92m to the north;

13.3.6 There is a historical landfill located to the north of Ferrybridge 1 which operated since 1960s with last input date unknown. This portion of the Site now occupies the railway sidings. A site investigation report (Arup, February 2014) detailed two former landfill sites, used primarily during the operation of the historical Ferrybridge power stations, A and B to dispose of general solid waste, construction and demolition waste. Arup stated that anecdotal evidence suggests that Waste Disposal Area C (located to the south of the Site) may have received demolition wastes containing asbestos The thickness of historical landfill material is unknown, however, historical BGS borehole record from this area (Borehole ref: SE42NE296) drilled in 2004 suggests 0.3m thickness of fill material underlain by limestone. The deposited waste included inert, industrial, commercial and liquid sludge. This is also listed as a Registered Landfill the licence of which is currently surrendered.

13.3.7 A ground investigation was undertaken by Arup in September 2013 before the development of FM2. The investigation did not record any exceedances from chemical analysis of soil and groundwater samples. One leachate sample, taken from within the designated area of power station site 'C', recorded exceedances of the screening criteria of Fluorite and lead. No asbestos was recorded within the selected

soil samples. Ground gas monitoring programme was undertaken at the FM2 site. Based on the results FM2 site was assigned a CS2 characteristic situation with additional ground gas monitoring recommended.

13.3.8 A site walkover was undertaken on 19 September 2023 within accessible areas of the Site only. Current potentially contaminative site uses identified during the walkover include:

- Above ground storage tanks containing diesel, ammonia and white diesel at both Ferrybridge 1 & 2 sites, however these appeared to be in good condition, with no leaks or staining;
- Electrical sub-stations; and,
- Several interceptors at the Site. However, these are routinely monitored and emptied with no leaks reported.

13.3.9 Both Ferrybridge 1&2 involved very substantial excavation and site preparation, including remediation where required and under each Environmental Permit, there is a Site Condition Report detailing the ground conditions prior to operation of each facility. The EPs require the control of potentially contaminating substances and the protection of ground and surface water. In addition to this ground excavation for the CCS infrastructure is relatively limited, so it is considered unlikely that a material risk of the mobilisation of contamination is likely to arise.

Anticipated Geology

13.3.10 British Geological Survey (BGS) data, historical borehole records, previously undertaken ground investigations in the surrounding area of the Site and the ground investigation undertaken in the area of FM2 by Arup in September 2013, and Environment Agency (EA) hydrogeological information indicate the following geological and hydrogeological sequence below the Site (set out within Table 13.1). The Site is not in a groundwater Source Protection Zone (SPZ). The Landmark Envirocheck report states there is a Borehole A and Borehole B currently operational on-site, extracting water from the Magnesium Limestone for the Production of Energy. Additional boreholes are also operational within 500m for the Golf Course and Ferrybridge C.

Table 13.1: Anticipated site geology

Stratum	Area Covered	Estimated Thickness (m)	Typical Description	Hydrological Significance
Made Ground	Whole Site	0.2-8	Loose friable brown silty fine to medium Sand	Not Classified
Alluvium	South-west area	1.5-2.0	Medium dense brown silty fine to medium SAND and fine to medium coarse GRAVEL	Secondary A Aquifer
Glaciofluvial Deposits	Eastern and Southeastern	4.0-9.0	Firm brown silty CLAY with red brown silty fine sand. Gravel and Sand.	Secondary A Aquifer
Cadeby Formation	Whole Site	unproven	Sedimentary rock formed during the Permian Period. Typically described as grey dolostone.	Principal Aquifer
Pennine Middle Coal Measures	Whole Site	unproven	Interbedded layers of mudstone, siltstone, limestone and coal	Secondary A Aquifer

13.3.11 Superficial geological mapping information is absent for most of the Site area, with Alluvium and Glaciofluvial deposits mapped at the edges of the Site.

13.3.12 The Site comprises surface water features which are settlement ponds which then are discharged in to the culverted Fryston Beck further connecting with the River Aire situated approx. 450m to the east of

application Site. The nearest controlled waters receptor is Fryston Beck, which flows across the south of the Site.

Proposed approach to surveys and further baseline data collection

13.3.13 The PRA will form a Technical Appendix to the ES and will inform the assessment of likely effects. The soils, hydrogeology and geology ES Chapter will comprise the following:

- An explanation of the assessment methodology and significance criteria;
- A description of the baseline conditions, including a review of the Site history, geology, hydrogeology and previous environmental assessments for the Site;
- A description of the Site walkover undertaken to determine the environmental sensitivity and current potential for contamination at the Site and in the surrounding area;
- An evaluation of the potential for the historical use of the Site to present potentially contaminative uses and the likelihood of residual contamination being present in the ground or groundwater;
- A Preliminary Conceptual Site Model (CSM) to identify the potential for contaminant-pathway-receptor pollutant linkages to exist;
- An assessment of the potential effects (arising from both the Works and once the development is complete and operational). This will consider the potential impact of (and mitigation measures for) Site users, future Site users, off-site users, buildings, controlled waters and future soft landscaping; and,
- An assessment of residual effects during the works, and once the development is complete and operational, on a local basis, taking account of other potential nearby developments.

13.3.14 Recommendations for further mitigation will be outlined, if necessary. This is likely to include an intrusive ground investigation and detailed risk assessment to inform likely remedial measures and how these measures would break identified contamination receptor linkages, which would be undertaken post consent.

13.4 Approach to assessment

Assessment criteria

13.4.1 The following section provides an overview of the approach to EIA Assessment in relation to soils, geology and hydrogeology. It will largely follow the overarching EIA methodology defined earlier in this EIA Scoping Report, but differs in some respects with regard to defining the sensitivity of receptors. For the assessment of potential ground contamination risks, the risk assessment categories established by CIRIA guidance will be used to judge potential significance of effects.

Magnitude of impact

13.4.2 The magnitude of potential impacts of soils, geology and hydrogeology during both construction and operation of the Proposed Development will be described using the following terms in Table 13.2.

Table 13.2: Magnitude of Impacts

Magnitude of Impact	Examples of Impact
High	Loss of exposed designated geological feature. Very high risk of exposure of a sensitive receptor to potentially harmful levels of contamination via a confirmed pathway.
Medium	Quarrying of rock for imported fill, or substantial changes due to cuttings. Proven source – pathway – receptor pollutant linkage identified with elevated level of contamination recorded/or potential to be present.

Magnitude of Impact	Examples of Impact
Low	Superficial disturbance to geology / changes in geomorphology. Identified source – pathway – receptor pollutant linage identified but contamination likely to be low risk.
Very Low	Changes to Made Ground deposits. No source – pathway – receptor pollutant linkage identified.

Sensitivity of receptors

13.4.3 There are no published criteria for the assessment of effects on ground conditions for the purposes of EIA. Receptor sensitivity and significance criteria were therefore developed based on professional judgement and relevant experience using the criteria outlined in Section 4.

13.4.4 Table 13.3 present the sensitivity of potential receptors.

Table 13.3: Receptor Sensitivity

Receptor	Sensitivity
Principal Aquifer / Secondary Aquifer used for public water supply. Groundwater Source Protection Zone I. Highly sensitive ecosystem. Water body of high/very high quality. Human Health (Future users of the Proposed Development, off-site users and residents, Construction workers). Land used to grow crops/graze animals for human consumption.	High
Principal/Secondary Aquifer (not used for public water supply). Groundwater Source Protection Zone II / III. Moderately sensitive water body. Moderately sensitive ecosystem. Buildings and services. Public open spaces.	Medium
Unproductive Strata. Water body of poor quality. Industrial/commercial properties. Decorative vegetation.	Low

Significance of effect

13.4.5 The approach of land quality practitioners to assess the significance of effects of a development at a site on the Site's geology, soils and hydrogeology through changes to the ground conditions as a result of the development and the indirect effects of those changes on the proposed end-users is two-fold; a Development Impact Assessment and a Land Quality Assessment. A Conceptual Site Model is then prepared outlining the impacts on the receptors.

13.4.6 CIRIA C522 Contamination Land Risk Assessment – A Guide to Good Practice, 2001 presents a description of risk categories of the methodology and how significance of effect will be assessed as part of the ES Chapter.

Table 13.4: Significant of Risk Assessment Categories

Conceptual Site Model Risk Level	Description	Significant/Not significant
Very High Risk	There is a high probability that severe harm could arise or there is evidence that severe harm is currently happening. This risk, if realised, is likely to result in substantial liability. Urgent investigation (if not already undertaken) is required and remediation is likely to be required.	Would be classified as Category 1 or 2 Site according to Part 2A of EPA, 1990. Significant
High Risk	Harm is likely to arise and realisation of the risk is likely to present a substantial liability. Urgent investigation (if not already undertaken) is required and remediation may be necessary in the short term and is likely to be required over the longer term.	Category 1 or 2 Site Significant
Moderate Risk	It is possible that harm could arise. However, it is either relatively unlikely that harm would be severe or if harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarity the risk and determine the potential liability. Some remedial work may be required in the longer term.	Category 2 or 3 Site Significant
Low Risk	It is possible that harm could arise, but it is likely that this harm would at worst normally be mild.	Category 3 Site Not Significant
Very Low Risk	There is a low probability that harm could arise. In the event of such harm it is not likely to be severe.	Category 4 Site Not Significant

13.4.7 The resultant effects of the risk and receptor sensitivities results in an overall resultant effect, which will be assessed as outlined in Table 13.5. A Moderate or above effect would be classified as Significant in EIA Terms.

Table 13.5: Resultant Effects

Receptor Sensitivity	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Insignificant
Medium	Major	Moderate	Minor	Insignificant

Receptor Sensitivity	Magnitude of Impact			
	High	Medium	Low	Negligible
Low	Moderate	Minor	Insignificant	Insignificant

Geographical scope

13.4.8 A review of the site, in context to geology, hydrogeology and soils will be undertaken to encompass the Site Boundary. Relevant issues within 500m of the Site Boundary will also be considered: this may include potential sources of off-site ground contamination, off-site sources of ground gas, relevant controlled waters receptors and hydrogeology impacts such as source protection zones.

Temporal scope

13.4.9 An assessment of the potential effects arising from the construction phase of the works and once the development is complete and operational will be undertaken. This will consider the potential impact of (and mitigation measures for) Site users, future Site users, off-site users, buildings, controlled waters and future soft landscaping.

13.5 Embedded mitigation and enhancement measures

13.5.1 The process of EIA will identify the baseline at the Site with regard to soils, geology and hydrogeology. This will be established through the finalisation of a preliminary risk assessment and consultation with WMDC. A ground investigation is likely to be required post-consent during RIBA Stage 3 (preliminary design stage), prior to construction to confirm the ground conditions. The findings of the ground investigation would be used to inform a Remediation Strategy and additional mitigation measures necessary as part of the development, secured through DCO requirement.

13.5.2 Embedded mitigation measures are likely to include good practice measures during construction, best practice and adhering to industry standards, for example:

- e.g. treatment and attenuation of run off from construction working areas to ensure that this does not wash into watercourses and cause pollution downstream.
- Suitable materials management during construction to avoid cross contamination and appropriated material re-use; and,
- Appropriate piling techniques governed by specialist contractor method statements.

13.5.3 Additional mitigation may be required which can include soil remediation and ground improvement where necessary, to be detailed, where required, through a Remediation Strategy.

13.6 Scope of environmental impacts and effects

13.6.1 The Site is considered to be previously developed land with a significant thickness of Made Ground anticipated across the Site. Based on the low resource potential of the soil, it is proposed to be scoped out of the EIA. The impacts and effects section below therefore focuses of the hydrogeology and potential impacts of or on ground contamination.

Construction

13.6.2 The Construction of Ferrybridge CCS will involve the excavation of soils, construction of foundations and the construction of above ground structures. During the Construction Phase and the temporary works stage the likely effects will be to:

- The demolition, construction, and ground workers during the works arising from potentially contaminated soils and groundwater;
- On-site and off-site users during the works;
- Ground gas and vapour emissions to development from potentially contaminated soils and groundwater;
- On-site and off-site controlled waters, including underlying aquifers and surface waters during the Works; and,
- The existing mine shaft and the underlying worked Coal Measures during the works.

Operation

13.6.3 Once Constructed and Ferrybridge CCS is Operational the potential effects will be to:

- Future Site users (ingestion and inhalation of soils and dusts; dermal contact inhalation of vapours) from exposure to potentially contaminated soils beneath the Site;
- Future soft landscaping from potentially contaminated shallow soils; and
- Underground infrastructure from contaminated soils and groundwater.
- On-site and off-site users (ingestion and inhalation of soils and dusts; dermal contact inhalation of vapours); and
- On-site and off-site controlled waters, including underlying aquifers and surface waters.

13.7 Limitations and uncertainties

13.7.1 It is considered that there will not be significant limitations in the data available for the preliminary assessment or the impact assessment as part of the EIA. The assessment will be undertaken based on known existing Site conditions from historic ground investigation reports made available and on a review of risks from the Site's known historical and current land-uses.

13.7.2 The assessment will be considered as objective taking into account planning policy, legislation and published guidance in the assessment methodology and determination of significant effects. The assessment will use data from the PRA and third-party ground investigation data. The assessment results will be presented as value judgements using professional experience. And industry best practice.

13.7.3 With regard to any further intrusive investigation works that may be recommended pre-construction, the ground conditions information gained will relate to the point of excavation and cannot necessarily guarantee a continuation of the ground conditions throughout any non-inspected area of the Site. Whilst such exploratory holes would usually provide a reasonable indication as to the general ground conditions, these cannot be determined with complete certainty. These limitations would be considered and taken into account in the updated risk assessment and any Remediation Strategy to be approved at that time.

13.7.4 The walkover was limited to areas of the Site owned by enfinium, googles images and mapping will be used to provide baseline information for these areas in the interim.

13.8 Intra-related effects

13.8.1 Potential intra-related effects will be considered with respect to with soils, hydrogeology and geology and water resources. .

13.9 Cumulative effects

13.9.1 The potential for contamination and associated risks and effects at individual development sites would be identified by the applicants of all cumulative schemes to ensure that each development would be 'suitable for use' in accordance with the mandatory legislative requirements of Part IIA of the Environmental Protection Act, 1990, and DCO requirements.

13.9.2 It is assumed that all demolition and construction activities undertaken as part of the other development cumulative schemes would also be tightly controlled and managed via the implementation of both relevant legislative requirements and best practice guidance to minimise contamination risks and effects to the environment (including human receptors) to acceptable levels.

13.9.3 It is assumed that each of the cumulative schemes would be required to implement an Outline CEMP, where relevant, to avoid potential detrimental effects to ground and water from potential sources of contamination. Remediation would be undertaken on these schemes where necessary, thus leading to a potential betterment of ground conditions in the wider area. The Outline CEMP will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application

13.9.4 Individual sites in the immediate vicinity of the Site should be regulated by the above means and the likely cumulative effects on the Site soil, hydrogeology and geology are likely to be negligible and would not require further assessment through the EIA.

13.10 Summary of proposed EIA scope

13.10.1 The impacts scoped in for soils, hydrogeology and geology are as follows:

Table 13.6: Summary of ground conditions impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Potential Soil Contamination	In	Potential soil contamination is anticipated at the Site due to the former industrial nature of the Site. The development will affect and be affected by the soil contamination conditions. It may be necessary through further intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. It is anticipated that a DCO requirement for intrusive investigation will be applied and addressed in due course following the EIA process.
Hydrogeology	In	The construction of the Proposed Development has the potential to be affected and effect the underlying , hydrogeological conditions. It may be necessary through intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. It is anticipated that a DCO requirement for intrusive investigations will be

		applied and addressed in due course following the EIA process.
Soil resources and geology	Out	The low resource potential of the soils and geology (previously developed land site, significant thickness of Made Ground, absence of minerals resource area or other soils/geological land designations) indicates a justification to scope out of the assessment.
Operation		
Potential Soil Contamination	In	Potential soil contamination is anticipated at the Site due to the former industrial nature of the Site. The development will affect and be affected by the soil contamination conditions. It may be necessary through further intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. It is anticipated that a DCO requirement for intrusive investigation will be applied and addressed in due course post consent.
Hydrogeology	In	The construction of Ferrybridge 1&2 CCS has the potential to be affected and effect the underlying , hydrogeological and geological conditions. It will be necessary through intrusive ground investigation that due consideration should be given and appropriate mitigation included as part of the development. It is anticipated that a DCO requirement for intrusive investigations will be applied and addressed in due course post consent.
Soil resources and geology	Out	The low resource potential of the soils (previously developed land site, significant thickness of Made Ground, absence of minerals resource area or other soils/geological land designations) indicates a justification to scope out of the assessment.

14 Historic Environment

14.1 Introduction

14.2 This Section of the EIA Scoping Report has been produced by Savills Heritage and Townscape team and provides an overview of the proposed content for the Archaeology and Built Heritage ES Chapter which is proposed to be scoped in to the EIA. The Heritage and Archaeology EIA will be undertaken by a member of the Savills Heritage and Townscape team who is a member of the Chartered Institute for Archaeologists at the highest MCIfA level.

14.2.1 The Archaeology and Built Heritage ES Chapter of the EIA will present an assessment of the likely effects of the Proposed Development on the heritage assets within the Site and the wider study area, as identified through desk-based research, a site walkover to consider the historic environment context of the Site, and consultation with key stakeholders. The ES Chapter will assess the significance and setting of heritage assets, alongside the level of impact and resultant magnitude of impact.

14.2.2 The assessment will be undertaken by the members of the Savills Heritage and Townscape team who specialise in archaeology and built heritage. The Heritage and Townscape team are experienced in the assessment of similar development schemes and in the preparation of Environmental Statements and associated documentation.

14.2.3 This Section of the report sets out the consultation requirements; the legislation, policy, guidance and best practice; the approach taken to scoping the need for assessment; and the heritage baseline summary, giving a justification for scoping in both archaeology and built heritage into the ES.

14.3 Legislative or policy requirements and technical guidance

Legislative Context

14.3.1 Infrastructure Planning (Decision) Regulations 2010 sets out the legal requirements for the control of development that affects listed buildings and their settings, scheduled monuments and their settings and conservation areas.

National Planning Policy

14.3.2 Overarching National Policy Statement (NPS) for Energy EN-1 2024 sets out the Government's policy for delivery of major energy infrastructure and will be the primary basis for decision making.

14.3.3 NPS EN-1 sets out policy in relation to the historic environment above, at and below ground. Its requirements for the historic environment are broadly similar to those in the National Planning Policy Framework. It states that careful consideration in preparing the scheme will be required on whether the impacts on the historic environment will be direct or indirect, temporary, or permanent. It also states that representative visualisations may be necessary to explain potential impacts on the setting of a heritage asset as a result of a Proposed Development.

14.3.4 NPS EN-1 states that applicants are encouraged, where opportunities exist, to prepare proposals which can make a positive contribution to the historic environment.

14.3.5 Section 16 of the NPPF (December 2023) provides protection for the setting of scheduled monuments. It also provides consideration of non-designated heritage assets in relation to the effect of an application on their significance. Paragraph 194 requires that *"As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation."*

Wakefield District Local Development Framework January 2024

14.3.6 The assessment will also take account of the policies within the Wakefield District Local Development Framework (as adopted January 2024) pertaining to built heritage and archaeology.

14.3.7 The Selby District Local Plan (2005) will also be assessed for the relevant policies pertaining to built heritage and archaeology.

Guidance and Best Practice

14.3.8 There is no specific heritage guidance or prescribed heritage methodology for undertaking an EIA. Relevant national and local guidance on the assessment of the historic environment assets will be considered, including the following:

- Chartered Institute for Archaeologists (CIfA, updated 2020) *Standard and guidance for historic environment desk-based assessment*
- Chartered Institute for Archaeologists (CIfA, updated 2020) *Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment*
- Historic England (Historic England Advice Note 12, 2019) *Statements of Heritage Significance: Analysing Significance in Heritage Assets*
- Historic England (2015) *Managing Significance in Decision-Taking in the Historic Environment: Historic Environment Good Practice Advice in Planning 2*
- Historic England (2017) *The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning*
- Department for Levelling Up, Housing and Communities (DLUHC, revised 2019) *Planning Practice Guidance: Historic Environment (PPG)*
- Annex 2: Glossary of the NPPF (September 2023) includes a number of definitions for terms related to the historic environment. These definitions will be used in the assessment of both the baseline environment and the impact of the proposals.
- Guidelines for Landscape and Visual Impact Assessment. 3rd Edition 2013.

14.4 Baseline

Baseline environment

14.4.1 An overview assessment of the available heritage data, including historic OS maps and the Historic Environment Record (HER) data, has been undertaken for this scoping assessment.

14.4.2 There are no listed buildings, Scheduled Monuments, Registered Parks and Gardens, or Registered Battlefields within the Site Boundary of the Proposed Scheme.

14.4.3 There are no Registered Parks and Gardens or Registered Battlefields within a 1km study area of the Site. However, the HER for North and West Yorkshire show a total of 12 Listed Buildings within 1km of the Site, all of which are Grade II. There is one Scheduled Monument and Grade I Listed Building, Ferrybridge bridge; and there is one Scheduled Monument, Ferrybridge Henge [NHLE 1005789] within the 1km study area around the Site with the Henge being approximately 300m south of the Site Boundary.

14.4.4 It is clear from the existing records that the Ferrybridge landscape is a significant one through several historical periods. This is exemplified by the Scheduled Monument of Ferrybridge Henge [NHLE 1005789] which is recorded as *The buried remains of a henge, a prehistoric enclosure, and two round barrows located in fields between Stranglands Lane and the A1(M) road, near to the Holmfield Interchange and Ferrybridge Power Station.* These remains are scheduled for their rarity, time period, level of survival (confirmed by partial excavation), potential, documentation through non-intrusive survey methods, and their group value. In regard to the latter, they are described as *the henge, prehistoric enclosure and round barrows are a*

closely associated group of Neolithic to Bronze Age monuments, which will contribute valuable information regarding the continuity of land use and the evolution of prehistoric ritual, ceremonial and funerary practices.

14.4.5 There are numerous non-designated assets recorded on the HERs within the 1km study area, with some of them crossing into the Site Boundary. These are generally records of cropmarks, or fieldnames for example. The non-designated records span most historic time periods from prehistory, through the Iron Age, Roman, Early Medieval, Medieval, and Post-Medieval periods, with records from the Modern period pertaining to the power stations. Whilst the Site is heavily developed, there is the possibility that pockets of these assets may remain preserver in situ.

Proposed approach to surveys and further baseline data collection

14.4.6 An initial review of the Site in its historic environment context will be undertaken through the production of an Historic Environment Desk-Based Assessment (HEBDA). These will include, but not be limited to:

- a historic and archaeological background and historic development of the Site and its wider vicinity to understand the historic context of the Site;
- the identification and assessment of archaeological and built heritage assets (heritage receptors) including archaeological and palaeoenvironmental remains, structures, monuments, listed buildings, scheduled monuments, non-designated monuments and landscapes of heritage interest both within the Site and within a 1km wider study area. The study area would be refined in response to any comments from the Local Planning Authority the County Archaeologists for North and West Yorkshire, or Historic England;
- review of the National Heritage List for England (NHLE, maintained by Historic England), the Heritage Gateway, the Archaeology Data Service (ADS), relevant grey literature, aerial imagery, and LiDAR mapping;
- evaluation of archival, historic mapping and photography, and documentary research will be undertaken, as well as a review of any relevant planning history of the Site. This will include a review of resources held at the Historic England Archive and the National Archives where relevant;
- obtaining the data from the local Historic Environment Records (North Yorkshire HER and West Yorkshire HER, the latter being held by West Yorkshire Archaeological Archives Service WYAAS), including details of previous archaeological assessments, fieldwork or survey; and,
- a site walkover will be undertaken to include both the Site and the wider study area to understand the heritage assets, their setting, and their relationship with the Site.

14.5 Approach to assessment

Assessment criteria

14.5.1 The archaeological and built heritage baseline of the Proposed Development will be established in an HEBDA. The corresponding ES Chapter will subsequently assess the Sensitivity to Change of the receptors in relation to their heritage importance, the Magnitude of Impact of the Proposed Development on the affected receptors, and the subsequent Sensitivity of Effect.

14.5.2 The assessment would be undertaken in accordance with the requirements of the National Policy Statement for Energy (NPS EN-1) and NPPF as well as standards specified by the Chartered Institute for Archaeologists and Historic England.

Magnitude of impact

14.5.3 The potential impacts of the proposals will be defined as the Magnitude of Change, the criterion for which is set out in Table 14.1 below.

Table 14.1: Description of Magnitude of Change

Magnitude of Change	Description of Change
High	• Complete removal of the asset. • Changes such that the significance of the asset is totally altered or destroyed. • Comprehensive change to, or total loss of, elements of setting that would result in harm to the asset and out ability to understand and appreciate its significance. • The scale of change would be such that it could result in a designated asset being undesignated or having its level of designation lowered.
Medium	• Change such that the significance to the asset is significantly altered or modified. • Changes such that the setting of the asset is noticeably different, affecting significance and resulting in changes in our ability to understand and appreciate the significance of the asset.
Low	• Changes such that the significance of the asset is slightly affected. • Changes to the setting that have a slight impact on significance resulting in changes in our ability to understand and appreciate the significance of the asset.
Negligible	• Changes to the asset that hardly affect significance. • Changes to the setting of an asset that have little effect on significance an no real change in our ability to understand and appreciate the significance of the asset, its historical context or character.

Sensitivity of receptors

14.5.4 Following the characterisation of the baseline historic environment, the methodology used to assess the likely environment effects on potential heritage assets within the Site and the wider study area would include evaluation of the significance / importance of the heritage assets. This is based on existing designation and professional judgement where such resources have no formal designation, and considering historical, archaeological, architectural / artistic interest as outlined in the NPPF and Historic England's Guidance.

14.5.5 The NPPF defines significance as 'the value pf a heritage asset to this and future generations because of its heritage interest.' Such interest may be archaeological, architectural, artistic or historic and it may derive 'not only from a heritage asset's physical presence, but also from its setting.' The determination of the significance of a heritage asset is based on statutory designation and/or professional judgement against these values:

- **Historic Interest :** the ways in which the asset can illustrate the story of past events, people and aspects of life (illustrative vale or interest). It can be said to hold communal value when associated with the identity of a community. Historical interest considers whether the asset is the first, only, or best surviving example of an innovation of consequence, whether related to design, artistry, technology or social organisation. It also considers an asset's integrity (completeness), current use / original purpose, significance in place making, associative value with a notable person, event or movement.

- **Archaeological Interest :** the potential of the physical remains of an asset to yield evidence of past human activity that could be revealed through future archaeological investigation. This includes above-ground structures and landscapes, earthworks and buried or submerged remains, palaeoenvironmental deposits, and considers date, rarity, state of preservation, diversity / complexity, contribution to published priorities (research value), supporting documentation, collective value and comparative potential, and sensitivity to change.
- **Architectural and Artistic Interest :** derive from a contemporary appreciation of an asset's aesthetics. Architectural interest can include the design, construction, craftsmanship and decoration of buildings and structures. Artistic interest can include the use, representation or influence of historic places or buildings in artwork. It can also include the skill and emotional impact of works of art that are part of heritage assets or assets in their own right.

14.5.6 Criteria for assessing the importance of heritage significance / importance are set out in Table 14.2 below. the importance, or significance, then translates into the sensitivity to change of the receptor (heritage asset).

Table 14.1: Heritage Significance

Heritage Significance	Criteria
Very High: of International Importance	• World Heritage Sites and the individual attributes that convey their Outstanding Universal Value. • Areas associated with intangible historic activities as evidenced by the register and areas with associated with particular innovations, scientific development, movements or individuals of global importance.
High: of National Importance	• Scheduled Monuments. • Listed Buildings (Grade I, II*). • Registered Historic Parks and Gardens (Grade I, II*). • Grade II Listed Buildings which can be shown to have exceptional qualities in their fabric or historic associations. • Registered Battlefields. • Non-designated sites and monuments of schedulable quality and/or importance discovered through the course of assessment, evaluation or mitigation. • Unlisted assets that can be shown to have exceptional qualities or historic association and may be worthy of listing at Grade II* or above. • Designated and undesignated historic landscapes of outstanding interest, or high quality an importance and of demonstrable national value. • Well-preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factors.
Medium: of Regional Importance	• Conservation Areas. • Grade II Listed Buildings. • Grade II Registered Historic Parks and Gardens. • Historic townscapes and landscapes with reasonable coherence, time-depth and other critical factor(s). • Unlisted assets that can be shown to have exceptional qualities or historic association and may be worthy of Grade II listing. • Designat4ed special historic landscapes. • Undesignated historic landscapes that would justify special historic landscape designation, landscapes of region value. • Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factor(s). • Archaeological features and deposits of regional importance.
Low: of Local Importance	• Locally Listed Buildings. • Sites of Importance within a district level. • Heritage Assets with importance to local interest groups or that contributes to local research objectives. • Robust undesignated assets compromised by poor preservation and/or poor contextual associations. • Robust undesignated historic landscapes. • Historic landscapes with importance to local interest groups. • Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.
Negligible	• Assets with little or no archaeological, architectural or historical interest.

14.5.7 An advice note published in 2017 by Historic England provides guidance on managing change within the settings of heritage assets. It gives advice on understanding setting in relation to sensitivity to change and how views may contribute to setting. The advice note sets out a recommended approach, including:

- setting comprises the surroundings in which an asset is experienced and may therefore be more than its curtilage; that it may be affected by a range of factors beyond visual, including historic relationships between assets; it may extend beyond public rights of way;
- the extent of setting is not fixed and may change as the asset and its surroundings evolve; heritage assets within extensive landscapes may have nested or overlapping settings;
- where the setting of a heritage asset has been compromised, consideration needs to be given to whether additional change will further detract from, or can enhance the importance of the asset;
- importance of setting in relation to designed landscapes can extend beyond the designated area and may not necessarily be confined to land visible from the Site, but may have historic or other associations with the asset; and,
- the contribution of views to setting can be assessed in relation to static, dynamic, long, short or laterally spreading views, and include a variety of views of, from, across or including that asset.

14.5.8 In the context of the Environmental Impact Assessment, the heritage asset (either above or below ground) is the receptor of change and the term 'significance is interchangeable with the terms 'importance' and the 'sensitivity to change' of the receptor. It is proposed that any ES Chapter would utilise the term 'importance' in relation to the significance of the heritage asset (receptor) in question, while 'significance', will be associated with the 'significance of the environmental effect' evaluating the contribution of setting.

Significance of effect

14.5.9 The significance of the resultant environmental effect of the Proposed Development is determined by combining the assigned sensitivity to change of the receptor (dictated by the importance of the heritage asset) with the predicted magnitude of change on that receptor:

Sensitivity to Change (of receptor) + Magnitude of Change (impact) = Significance of Effect

14.5.10 Table 14.3 illustrates how information on the Sensitivity to Change of the receptor and the Magnitude of Change arising from the Proposed Development will be combined to arrive at an assessment of the Significance of Effect. The matrix is not intended to mechanise judgement of the Significance of Effect, but to act as a check to ensure that judgements regarding heritage importance and the asset's Sensitivity to Change and Magnitude of Change arrive at a level of significance of the effect that is reasonable and balanced. In terms of EIA, only the Moderate and Major effects would be considered significant and these are shaded grey in the table.

Table 14.3: Significance of Effect Criteria

		Magnitude of Change (impact of the Proposed Development)			
		High	**Medium**	**Low**	**Negligible**
Sensitivity to Change of the receptor (depending on its heritage significance)	**Very High**	Major	Major	Moderate	Minor
	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

14.5.11 The following terms are used to define the significance of effects identified:

Major Effect : where the Proposed Development could be expected to have a noticeable effect (either adverse or beneficial) on heritage receptors. For the historic environment, a Major effect, if adverse in nature, may equate to 'substantial harm' to, or total loss of, importance (or significance in terms of the NPPF) of an asset of very high, high or medium heritage significance, as a result of changes to its physical form or setting.

Moderate Effect : where the Proposed Development could be expected to have a noticeable effect (either adverse or beneficial) on heritage receptors. For the historic environment, a Moderate effect, if adverse in nature, may equate to 'less than substantial harm' in NPPF terms to the importance (or significance) of an asset of very high, high, medium or low heritage significance, as result of changes to its physical form or setting.

Minor Effect : where the Proposed Development could be expect to result in a small, barely noticeable effect (either adverse or beneficial) on heritage receptors. For the historic environment, if the effect is adverse in nature, this equates to a low degree of 'less than substantial harm' to the importance of an asset of very high, high, medium, low or negligible heritage significance, as a result of changes to its physical form or setting, or 'substantial harm' to, or the loss of, importance of an asset of low heritage significance.

Negligible Effect : where very minor or no discernible effect is expected as a result of the Proposed Development on heritage receptors, the effect is insignificant.

14.5.12 Once the significance of the effect has been established, the next step is to assess the nature (or direction) of the effect which can be 'beneficial' or 'adverse'. If the Proposed Development would enhance heritage values or the ability to appreciate them, as expressed in the first stage of the assessment, then the impact on heritage significance would be deemed to be positive, therefore the nature of the effect is attributed as 'beneficial'. However, if the Proposed Development would fail to preserve heritage values, or impairs their appreciation by affecting the receptor's heritage significance negatively, then the nature of the effect would be deemed to be 'adverse'.

Geographical scope

14.5.13 An initial review of the Site in its historic environment context would be undertaken to encompass the Site Boundary and a 1km area around it. The size of this study area has been deemed sufficient for the type of Proposed Development based on standard practice and professional judgement but can be adjusted at the HEBDA and ES Chapter stage of the process.

Temporal scope

14.5.14 There is potential for the proposals to result in significant effects either as a direct result on the receptors (such as through development of heritage assets, or changes to the form and character of heritage assets) or as a direct result through impact on the settings of heritage assets. This impact may result through increased activity, changes to the use of the setting of heritage assets, visual changes of or within settings of heritage assets, or views from, towards or encompassing heritage assets. The greater the sensitivity of the heritage receptors, the higher potential for significant effects in EIA terms to result. The demolition or otherwise loss of heritage assets might constitute significant effects, but it is not thought likely that this would be proposed.

14.5.15 Impacts and effects upon the sensitive archaeology assets during the construction phase could be as a direct result of the scheme design, or from construction factors such as temporary access roads, diversion of services, movement of heavy machinery etc.

14.5.16 It is not anticipated at this stage that there would be any operational impacts on archaeological assets.

14.6 Embedded mitigation and enhancement measures

14.6.1 The process of EIA will identify any archaeological and heritage potential. It will be determined through that process, in consultation with relevant third parties such as the LPA Archaeological Advisors and Historic England, whether any further archaeological or recording works are required. This may include geophysical survey, trial trenching, building survey or archaeological excavation.

14.7 Scope of environmental impacts and effects

Construction

14.7.1 The construction of the Proposed Scheme has the potential to impact buried archaeological remains that may survive below ground through the construction of foundations, temporary access routes, and other construction aspects that will interrupt the present ground surface.

14.7.2 It is not anticipated that the act of constructing the Proposed Development will impact any of the built heritage assets due to the fact that they all lie outside of the Site Boundary. However it will be necessary to confirm, through assessment, that there will be no construction impact (e.g. from heavy traffic or construction noise) on the Grade I Listed and Scheduled Monument, Ferrybridge bridge, approximately 750m to the south-east of the Site.

Operation

14.7.3 Once constructed it is possible that the setting of the heritage assets within the 1km study area, including Listed Buildings and Scheduled Monuments will be adversely affected, primarily due to the height of the additional stacks and potentially noise during operation. The operation of the Proposed Development is not anticipated to affect any buried archaeological remains present in the surrounding area.

14.8 Limitations and uncertainties

14.8.1 It is not anticipated that there will be any limitations or uncertainties at this time.

14.9 Intra-related effects

14.9.1 It is not anticipated that there will be intra-related effects with Heritage at this time. The ZTV mapping and representative viewpoints within the LVIA will assess in the assessment of intra-related effects in the ES Chapters, the Heritage chapter will consider noise and vibration impacts on heritage assets.

14.10 Cumulative effects

14.10.1 The cumulative effects of consented schemes in the wider area on the sensitive heritage receptors, taking into account the effects of the proposals for the Site and any consented schemes will be considered in the ES Chapters (information on schemes will be provided by the EIA team).

14.10.2 The assessment of cumulative effects on archaeology and built heritage will be based upon consideration of the effects of the Proposed Development on all affected heritage receptors, together with the likely effects of other developments that are under construction, those that are consented but not yet built and those that are currently at the application stage (and for which sufficient detail is available upon which to develop an assessment).

14.10.3 The assessment of cumulative effects will consider guidance including but not limited to Historic England's *The Setting of Heritage Assets* (GPA 3, second edition, 2017). The assessment will take into account the 1km study area as well as the ZTV and representative viewpoints within the LVIA.

14.10.4 The assessment will be completed through communication with the LVIA team and the County Archaeologist.

14.10.5 Confidence in any relevant mitigation measures will be established following the completion of the desk-based assessments for archaeology and built heritage and summarised in the ES Chapters.

14.10.6 Archaeology and built heritage warrant cumulative assessment, particularly in regard to the setting of designated assets.

14.11 Summary of proposed EIA scope

14.11.1 The impacts scoped in for further Heritage assessment are as follows:

Table 14.4: Summary of Heritage impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Archaeological Assets	In	The construction of the Proposed Development have the potential to impact buried archaeological remains that may survive below ground through the construction of foundations, temporary access routes, and other construction aspects that will interrupt the present ground surface.
Built Heritage Assets	In	It will be necessary to confirm, through assessment, that there will be no construction impact (e.g. from heavy traffic) on the Grade I Listed and Scheduled Monument Ferrybridge bridge to the east of the Site.
Operation		
Archaeological Assets	Out	The operation of the Proposed Development is not anticipated to affect any buried archaeological remains present in the surrounding area.
Built Heritage Assets	In	Once the Proposed Development is constructed it is possible that the setting of some heritage assets, including Listed Buildings and Scheduled Monuments will be adversely affected, primarily due to the height of the additional stacks.

15 Population and health

15.1 Introduction

15.1.1 This Section of the EIA Scoping Report has been produced by the Savills (UK) Health and Social Impact Assessment Team (HSIA) within the Environment & Infrastructure department. The Savills HSIA team is led by Dr Andrew Buroni who has designed, delivered and presented evidence at public inquiry and issue specific hearing for some of the most complex planning-focused examples of health and social impact assessment (both standalone and as part of EIA), and has an expansive catalogue of project experience ranging from local planning through to DCO and Hybrid Bill.

15.1.2 All members of the Savills HSIA team sit on the Institute of Environmental Management and Assessment (IEMA) health in EIA working group, and are acknowledged as co-authors of the recently published guidance on 'effective scoping for human health in EIA' and 'determining significance for human health in EIA'. In addition, members of the team have acted as technical advisers to the World Health Organisation, and are acknowledged as co-authors of a publication relating to 'assessing the health impacts of waste management in the context of the circular economy'.

15.1.3 It is proposed that the topic "population and health" is scoped in to the EIA. As such, this Section outlines the proposed scope for assessing the potential population and health impacts of the proposed installation of post-combustion CCS.

15.1.4 In addition to environmental determinants of health, the population and health ES Chapter will include analysis on socio-economic factors such as employment generation, access to PRoW and open space. However, the ultimate population and health effect analysis and application of significance criteria will focus on how these changes impact health and wellbeing.

15.1.5 While the potential hazards associated with Proposed Development are well known, understood and addressed through the regulatory planning and permitting process protective of health, there can remain residual perceptions of risk, which if left unaddressed can lead to unnecessary community stress and anxiety during the planning process.

15.1.6 The population and health ES Chapter will signpost to, and provide additional narrative on all of the health determinants already addressed and assessed within the ES through the various environmental impact pathways. The ES Chapter will be concise and public facing, offering both a proportionate assessment and means to more effectively respond to community and stakeholder population health concerns.

15.2 Legislative or policy requirements and technical guidance

15.2.1 This subsection summarises relevant national and local legislation and policy requirements that are directly pertinent to population and health issues.

National Policy Statement EN-1

15.2.2 The National Policy Statement for Energy (NPS EN-1) 2024 will be the primary decision making policy. An overarching objective of the NPS is the delivery of new low-carbon energy generation that does not lead to negative population and health outcomes. In particular, it states that where a proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate.

The National Planning Policy Framework

15.2.3 The National Planning Policy Framework (NPPF)[36] sets out the planning policies for England. Promoting healthy and safe communities is a central theme, whereby the NPPF states that planning policies and decisions should aim to achieve healthy, inclusive and safe places and beautiful buildings which promote social interaction (including opportunities for meetings between people who might not otherwise come into contact with each other), are safe and accessible, and enable and support healthy lifestyles (paragraph 96).

15.2.4 Furthermore, the NPPF (paragraph 97) states that to provide the social, recreational and cultural facilities and services that communities need, planning policies and decisions should:

- plan positively for the provision and use of shared spaces, community facilities and other local services;
- take into account and support the delivery of local strategies to improve health, social and cultural wellbeing;
- guard against the unnecessary loss of valued facilities and services;
- ensure that established shops, facilities and services are able to develop and modernise, and are retained for the benefit of the community; and
- ensure an integrated approach to considering the location of housing, economic uses and community facilities and services.

Design Principles for National Infrastructure

15.2.5 The National Infrastructure Commission's Design Group has identified four principles to guide the planning and delivery of major infrastructure projects. One of these principles, namely *"people"*, relates directly to the population and health topic. It states: *"Infrastructure should be designed for people, not for architects or engineers. It should be human scale, easy to navigate and instinctive to use, helping to improve the quality of life of everyone who comes into contact with it. This means reliable and inclusive services. It means accessible, enjoyable and safe spaces with clean air that improve health and wellbeing*."

Local Policy - Wakefield District Local Development Framework January 2024

15.2.6 As part of WMDC's Local Development Framework[37] provides a comprehensive set of policies which will provide the basis for determining detailed issues when dealing with planning applications.

15.2.7 Policy LP67 (Pollution Control) explains that in order to protect public health and the environment, and to encourage regeneration, the Council will require that development proposals which are likely to cause pollution or are likely to be exposed to potential sources of pollution will only be permitted if it can be demonstrated that measures can be implemented to minimise emissions to a satisfactory levels that protects health, environmental quality and amenity. In determining proposals particular consideration will be given to:

- the likelihood of emissions which may have an unacceptable effect on the amenity of the local area;
- where there is an identified risk that public health may be affected;
- where there is a possibility that any Proposed Development will lead to a breach of national air quality objectives or lead to a deterioration of local air quality;
- there would be no adverse impact on water bodies and groundwater resources, in terms of their quantity, quality and the important ecological features that they support;

[36] Department for Levelling Up, Housing & Communities (2023). National Planning Policy Framework. Retrieved from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf

[37] Wakefield Metropolitan District Council (2024). Development Strategy, Strategic and Local Policies. Retrieved from: https://www.wakefield.gov.uk/media/b0bdq35b/volume-1-development-strategy-strategic-and-local-policies.pdf

- an appropriate impact assessment is submitted with the planning application; and
- approved mitigation measures are carried out prior to occupation or operation of the development commencing.

15.2.8 Policy LP68 (Protection from Hazardous Operations) states that development proposals which involve either notifiable quantities of hazardous substances or which are in the vicinity of notified sites or other known hazards; or sensitive development which is likely to be exposed to hazardous processes or other potentially hazardous activities will only be permitted if it can be demonstrated that measures can be implemented to protect public health and safety.

Guidance and Best Practice

15.2.9 The following guidance is proposed to be followed for the assessment of population and health.

- National Planning Practice Guidance;
- IEMA Guide to Effective Scoping of Human Health in EIA; and
- IEMA Guide to Determining Significance or Human Health in EIA.

15.2.10 The National Planning Practice Guidance (NPPG) outlines the general approach to considering healthy and safe communities robustly, whereby planning and health need to be considered firstly in terms of creating environments that support and encourage healthy lifestyles, and secondly in terms of healthcare capacity. Furthermore, engagement with individuals and/or organisations is encouraged to help ensure local public health strategies and any inequalities are considered appropriately (i.e. that local public health priorities and needs are explored and supported through health conscientious planning and development).

15.2.11 The IEMA guidance on 'Effective Scoping of Human Health in EIA'[38] defines the approach for scoping wider determinants of health in or out of an EIA, and is derived from EU EIA Directive 2014/52/EU.

15.2.12 Furthermore, the IEMA guidance on 'Determining Significance for Human Health in EIA'[39] responds to gaps and inconsistencies across existing guidance as to how health, particularly regarding significance (including sensitivity and magnitude classifications), is assessed in EIA. This promotes greater consistency in the assessment process; particularly in how EIA health conclusions are reached, interpreted, defended and applied to the greatest positive effect.

15.3 Baseline

Baseline environment

15.3.1 Different communities have varying circumstance and sensitivity to population and health changes (both adverse and beneficial) as a result of social and demographic structure, behaviour and relative economic circumstances.

15.3.2 For the purpose of informing this scoping exercise, a high-level baseline has been created and presented in Table 15.1. The ward study area comprises the Metropolitan District Ward of Knottingley and the Airedale and Ferry Fryston ward, as outlined in Section 15.4 'Geographical scope'.

15.3.3 As shown, health status in the ward study area is typically worse than the national average for the majority of indicators. The burden of poor health within the population living within the study area is therefore

[38] IEMA. (2022, November). Effective Scoping of Human Health in Environmental Impact Assessment. Retrieved from IEMA: https://www.iema.net/resources/blog/2022/11/17/launch-of-the-eia-guidance-for-considering-impacts-on-human-health

[39] IEMA. (2022, November). Determining Significance For Human Health In Environmental Impact Assessment. Retrieved from IEMA: https://www.iema.net/resources/blog/2022/11/17/launch-of-the-eia-guidance-for-considering-impacts-on-human-health

considered to be high compared to the national average, and thus more sensitive to changes in environmental and socio-economic conditions.

Table 15.1: Health baseline for the ward study area

Indicator	Date	Knottingley	Airedale and Ferry Fryston	Ward study area average	Wakefield	Yorkshire and the Humber	England average
Life expectancy							
Life expectancy at birth for males (years)	2016-20	74.7	78.1	76.4	77.7	79.0	79.5
Life expectancy at birth for females (years)	2016-20	79.9	80.5	80.2	81.6	82.8	83.2
Healthy life expectancy for males (years)	2018-20	n/a	n/a	n/a	58.0	61.1	63.1
Healthy life expectancy for females (years)	2018-20	n/a	n/a	n/a	56.7	62.1	63.9
Physical health							
Emergency hospital admissions for all causes (SAR)	2015-16 to 2019-20	116.2	113.6	114.9	105.9	102.7	100
Emergency hospital admissions for coronary heart disease (SAR)	2015-16 to 2019-20	108.9	116.0	112.5	104.1	117.6	100
Emergency hospital admissions for stroke (SAR)	2015-16 to 2019-20	103.2	116.7	110.0	106.7	105.9	100
Emergency hospital admissions for Myocardial Infarction (heart attack) (SAR)	2015-16 to 2019-20	135.7	139.6	137.7	123.2	119.9	100
Emergency hospital admissions for Chronic Obstructive Pulmonary Disease (COPD) (SAR)	2015-16 to 2019-20	211.7	150.5	181.1	136.2	118.2	100
Incidence of all cancer (SIR per 100)	2015-19	111.0	110.7	110.9	105.6	102.2	100
Deaths from all causes all ages (Standardised mortality ratio (SMR))	2016-20	133.9	109.7	121.8	114.1	108.1	100
Deaths from all cancer all ages (Standardised mortality ratio (SMR))	2016-20	129.2	116.7	123.0	110.5	105.8	100
Deaths from circulatory disease all ages (Standardised mortality ratio (SMR))	2016-20	119.9	111.1	115.5	108.6	110.7	100

Indicator	Date	Knottingley	Airedale and Ferry Fryston	Ward study area average	Wakefield	Yorkshire and the Humber	England average
Deaths from coronary heart disease all ages (Standardised mortality ratio (SMR))	2016-20	158.3	143.5	150.9	123.5	117.7	100
Deaths from stroke all ages (Standardised mortality ratio (SMR))	2016-20	113.9	82.0	98.0	108.2	112.1	100
Deaths from respiratory diseases all ages (Standardised mortality ratio (SMR))	2016-20	155.5	126.7	141.1	117.7	109	100
Deaths from causes considered preventable under 75 years (Standardised mortality ratio (SMR))	2016-20	193.6	141.3	145.5	130.1	113.5	100
Mental health and behavioural risk factors							
Emergency hospital admissions for intentional self harm (SAR)	2016-17 to 2020-21	123.6	97.3	110.5	111.1	103.1	100
Hospital admissions for alcohol attributable conditions (Narrow definition) (SAR)	2016-17 to 2020-21	132.6	135.5	134.1	122.9	109.9	100
Smoking prevalence at 15 years Regular (%)	2014	3.8	4.8	8.6	5.5	6.2	5.4
Reception: Prevalence of overweight (including obesity) (%)	2017-18 to 2019-20	30.4	26.7	28.6	25.1	23.8	22.6
Reception: Prevalence of obesity (including severe obesity) (%)	2017-18 to 2019-20	15.2	13.3	14.3	11.1	10.2	9.9
Year 6: Prevalence of overweight (including obesity) (%)	2017-18 to 2019-20	41.2	47.5	44.4	38.2	35.4	35.8
Year 6: Prevalence of obesity (including severe obesity) (%)	2017-18 to 2019-20	26.8	32.5	29.7	23.7	21.4	21.6
Deprivation and socio-economic circumstance							
Index of Multiple Deprivation (IMD) Score	2019	36.6	42.2	39.4	27.3	22.9	21.7
Income deprivation (%)	2019	18.9	22.3	20.6	14.7	14.6	12.9

Indicator	Date	Knottingley	Airedale and Ferry Fryston	Ward study area average	Wakefield	Yorkshire and the Humber	England average
Child Poverty Income Deprivation Affecting Children (%)	2019	28.8	30.3	30.0	19.7	19.6	17.1
Older People in poverty Income deprivation affecting older people (%)	2019	15.4	20.2	17.8	14.5	15	14.2
Households in fuel poverty (%)	2020	18.7	20.9	19.8	17.3	17.5	13.2
Unemployment (%)	2021-22	5.8	5.8	5.8	4.8	4.5	5
Long term unemployment (Crude rate per 1000)	2021-22	2.6	3.5	3.1	2.9	2.0	1.9
Key							
	Better than the England average						
	Worse than the England average						

Proposed approach to surveys and further baseline data collection

15.3.4 Building on the above information, a desktop study will be undertaken to establish the local population and health context for the ES. This will involve the collection and interpretation of published demographic, socio-economic data, contrasted against regional and national data. The following open-source websites and datasets are anticipated to be used to develop the population and health baseline:

- Office for Health Improvement and Disparities (OHID) Local Health tool (OHID, n.d.);
- OHID Fingertips public health data (OHID, n.d.);
- Office for National Statistics; and
- NOMIS.

15.4 Approach to assessment

Assessment criteria

15.4.1 The significance of an effect is typically determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied to characterise the sensitivity of receptors and the magnitude of potential impacts for the proposed assessment of health-related effects.

Sensitivity of receptors

15.4.2 Within a defined population, individuals will range in level of sensitivity due to a series of factors such as age, socio-economic deprivation and the prevalence of any pre-existing health conditions which could become exacerbated. These individuals can be considered particularly vulnerable to changes in environmental and socio-economic factors (both adversely and beneficially), whereby they could experience disproportionate effects when compared to the general population.

15.4.3 As an example, the elderly, young children and individuals with chronic pre-existing respiratory conditions would be more sensitive to adverse changes to air quality, with the potential for emergency admission to hospital more likely than for someone of working age who has good respiratory health. On the other hand, an individual who has been unemployed for a long period of time would benefit more from employment opportunities generated by the Proposed Development in comparison to an individual who is already employed.

15.4.4 The health sensitivity methodology criteria shown in Table 15.2 are proposed to be used to inform the assessment of significance.

Table 15.2: Health sensitivity methodology criteria

Category/level	Indicative criteria
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily

Category/level	Indicative criteria
	activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very low	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.

Magnitude of impact

15.4.5 The health magnitude methodology criteria shown in Table 15.3 are proposed to be used to inform the assessment of significance.

Table 15.3: Health magnitude methodology criteria

Category/level	Indicative criteria
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Very low	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Significance of effect

15.4.6 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. The method employed for this assessment is presented in Table 15.4. Where a range of significance levels are presented, the final assessment for each effect is based upon evidence based expert judgment.

15.4.7 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect will be informed by professional judgment and underpinned by a narrative to explain the conclusions reached.

Table 15.4: Significance matrix

		Sensitivity			
		High	Medium	Low	Very Low
Magnitude	High	Major	Major/moderate	Moderate/minor	Minor/negligible
	Medium	Major/moderate	Moderate	Minor	Minor/negligible
	Low	Moderate/minor	Minor	Minor	Negligible
	Negligible	Minor/negligible	Minor/negligible	Negligible	Negligible

15.4.8 Table 15.5 provides a description of each significance level. For this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 15.5: Significance conclusion and reasoning related to public health

Category/level	Indicative criteria
Major (significant)	The narrative explains that this is significant for public health because: Changes, due to the project, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the effect. Change, due to the project, could result in a regulatory threshold or statutory standard being crossed (if applicable). There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that would result from the project and changes to health outcomes. In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or population group affected by the project.
Moderate (significant)	The narrative explains that this is significant for public health because: Changes, due to the project, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views. Change, due to the project, could result in a regulatory threshold or statutory standard being approached (if applicable). There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from the project and changes to health outcomes. In addition, health priorities for the relevant study area are of general relevance to the determinant of health or population group affected by the project.
Minor (not significant)	The narrative explains that this is not significant for public health because: Changes, due to the project, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders. Change, due to the project, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive

Category/level	Indicative criteria
	relationship between changes that would result from the project and changes to health outcomes. In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the project.
Negligible (not significant)	The narrative explains that this is not significant for public health because: Changes, due to the project, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders. Change, due to the project, would not affect a regulatory threshold, statutory standard or guideline (if applicable). There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from the project and changes to health outcomes. In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the project.

Geographical scope

15.4.9 The Proposed Development would be within the Metropolitan District Ward of Knottingley, but is bordered to the west by the Airedale and Ferry Fryston ward.

15.4.10 The geographical scope for the population and health ES chapter is two-fold: firstly in relation to baseline data collection; and secondly in relation to identification of sensitive receptors.

15.4.11 In relation to baseline data collection, environmental health determinants (such as changes to air quality and noise exposure) are likely to have a local impact where the potential change in hazard exposure is limited by physical dispersion characteristics. As a result, the study area for health-specific baseline data is proposed to focus on the Metropolitan District wards of Knottingley and Airedale and Ferry Fryston, using the district (Wakefield), regional (Yorkshire and the Humber) and national (England) average as a comparator.

15.4.12 Wider socio-economic health determinants (such as employment and related income generation) have a wider geographic scope of influence than environmental health determinants, due to the willingness to commute significant distances to work. While data is presented at lower geographic levels for context, the socio-economic baseline data is proposed to have a wider focus on regional statistics (Yorkshire and the Humber), using the national average as a relevant comparator.

15.4.13 The study area defining the relevant sensitive receptors identified for assessment purposes is proposed to remain consistent with the inter-related technical disciplines assessed within the ES, which the population and health topic relies upon such as air quality, noise and traffic.

Temporal scope

15.4.14 The ES Chapter will assess potential effects across a range of health determinants during both the construction and operation phases of the Proposed Development.

15.5 Embedded mitigation and enhancement measures

15.5.1 Public health is by definition preventative in nature. Therefore, mitigation measures adopted as part of the construction and operation of the project will focus on precursors to health and wellbeing outcomes, thereby providing an opportunity for intervention to prevent any adverse health outcome.

15.5.2 During construction, best practice measures detailed within a dedicated Outline Construction Environmental Management Plan (CEMP) which will be drafted in advance of works commencing in substantial accordance with an outline submitted with the DCO application. It will control the generation or release of environmental pollutants with the potential to cause adverse health and wellbeing outcomes. During operation, mitigation measures protective of population and health would be embedded within the design of the facility itself e.g. through the application of specific abatement technology and will be controlled by the Environmental Permit.

15.5.3 Socio-economic impacts associated with the Proposed Development are anticipated to be beneficial in nature, and enhancement measures will be explored during the ES process.

15.6 Scope of environmental impacts and effects

Potential Environmental Impacts and Effects

15.6.1 The aim of the assessment stage of the ES Chapter is to draw from and build upon appropriate technical topic areas within the EIA and will seek to establish the distribution, significance and likelihood of worst-case potential health outcomes in a concise matter. Hazards with the potential to impact population and human health (physical, social and mental) directly attributable to the Proposed Development include:

- changes in local air quality;
- changes in noise exposure;
- changes in transport nature and flow rate;
- changes in access to opportunities for recreation and physical activity; and
- changes in socio-economic factors (income and employment).

15.6.2 The scoping in or out of these specific health determinants during the construction and operational phases are discussed in more detail below.

15.6.3 An additional section on “risk perception” is proposed to be included outside of the main assessment to address specific areas of community concern that may be raised during the consultation process. At this stage it is anticipated that the carbon capture technology and how the process works (e.g. use of amine scrubbers and the pumping of CO_2 for export) might give rise to perceptions of risk which can be explored in the EIA.

Construction

Changes in local air quality

15.6.4 Construction of the Proposed Development is anticipated to contribute to local and temporary changes in air quality (dust, particulate matter and nitrogen dioxide) due to on-site construction activities and additional traffic movements required for the delivery of construction materials and worker travel to/from the Site.

15.6.5 While it is expected that embedded mitigation measures would be implemented in order to reduce the generation of dust and release of air pollutants, this topic will be scoped into the ES to further communicate how potential changes in air quality would be addressed to prevent any material risk to population and human health.

15.6.6 The assessment would draw from and build upon key outputs from the air quality technical discipline to reach a conclusion regarding the significance of effect. At this stage, it is expected that the assessment relating to the population and health effects of changes in local air quality during construction would be qualitative in nature.

Changes in noise exposure

15.6.7 Similar to the above, construction of the Proposed Development is anticipated to contribute to local and temporary changes in noise exposure due to on-site construction activities and additional traffic movements required for the delivery of construction materials and worker travel to/from the Site.

15.6.8 It is also expected that embedded mitigation measures would be implemented to reduce the magnitude of noise impacts. This topic will be scoped into the ES to further communicate the magnitude and distribution of potential changes in noise exposure, and the resultant significance of effect on population and health, if any.

15.6.9 The assessment would draw from and build upon key outputs from the noise and vibration technical discipline to reach a conclusion regarding the significance of effect.

15.6.10 While the change in noise at noise sensitive receptors would be presented within and analysed as part of the population and health assessment, it is expected that the assessment relating to the population and health effects of changes in noise exposure during construction would be qualitative in nature.

Changes in transport nature and flow rate

15.6.11 Construction of the Proposed Development would generate changes in transport flow rate on local road links associated with the delivery of construction materials and worker travel to/from the Site, which could have resultant effects on community severance, pedestrian amenity and risk of road traffic accidents/injury.

15.6.12 As such, changes in transport nature and flow rate during the construction phase would be scoped into the ES to more effectively communicate any resultant impact on population and health.

15.6.13 The assessment would draw from and build upon key outputs from the transport technical discipline to reach a conclusion regarding the significance of effect.

15.6.14 While the change in transport nature and flow rate would be presented within and analysed as part of the population and health assessment, it is expected that the assessment relating to the population and health effects of changes in transport nature and flow rate during construction would be qualitative in nature.

Changes in access to opportunities for recreation and physical activity

15.6.15 On the basis that the Proposed Development is located on land already owned by the Applicant, no impact on resources used for recreation and physical activity during construction is anticipated. No significant effects on population and health are therefore likely, and this pathway is proposed to the scoped of the population and health ES Chapter.

Changes in socio-economic factors

15.6.16 Construction of the Proposed Development would generate temporary direct employment opportunities (primarily for construction workers), with associated indirect employment opportunities from supply chain activity (indirect) and local spending on goods and services by employees (induced).

15.6.17 Having a consistent income and being in long-term employment are two of the most important wider determinants of health. As a result, an assessment of socio-economic factors during the construction phase would be scoped in and would be twofold. Firstly, to understand the magnitude and distribution of socio-economic benefits; and secondly, to understand the population and health benefits associated with the reported changes in socio-economic factors.

15.6.18 The significance of effects conclusion will focus on the resultant population and health effects of any socio-economic changes.

15.6.19 The assessment would draw from and build upon key project information in order reach a conclusion regarding the significance of effect. At this stage, it is expected that the assessment relating to the population and health effects of changes in socio-economic factors during construction would be qualitative in nature.

Operation

Changes in local air quality

15.6.20 The operational phase would influence existing infrastructure, modifying existing emissions to air and their associated dispersion. However, embedded mitigation measures would be implemented to control emissions and be protective of the environment and health, including determining an appropriate stack height as required by the regulatory Environmental Permitting regime.

15.6.21 Population and health effects associated with changes to air quality during the operation phase would be scoped into the ES to assess these changes and the resultant significance of effect.

15.6.22 The assessment would draw from and build upon key outputs from the air quality technical discipline in order to reach a conclusion regarding the significance of effect. At this stage, it is expected that the assessment relating to the population and health effects of changes in local air quality during operation would be quantitative in nature.

Changes in noise exposure

15.6.23 Similar to the above, the operational phase would alter existing infrastructure, with the potential to change the distribution of noise impacts.

15.6.24 Population and health effects associated with changes in noise exposure during the operational phase would be scoped into the ES to assess these changes and the resultant significance of effect.

15.6.25 The assessment would draw from and build upon key outputs from the noise and vibration technical discipline in order to reach a conclusion regarding the significance of effect.

15.6.26 While the change in noise at noise sensitive receptors would be presented within and analysed as part of the population and health assessment, it is expected that the assessment relating to the population and health effects of changes in noise exposure during operation would be qualitative in nature.

Changes in transport nature and flow rate

15.6.27 Changes in operational traffic flows to the Site with operation of the CCS plant are expected to be minor and are proposed to be scoped out of the transport ES Chapter. No significant effects on population and health are therefore likely, and this pathway is proposed to the scoped of the Population, Health and Socio-economics ES Chapter.

Changes in access to opportunities for recreation and physical activity

15.6.28 On the basis that the Proposed Development is located on land already owned by the Applicant, no impact on resources used for recreation and physical activity during operation is anticipated. No significant effects on population and health are therefore likely, and this pathway is proposed to the scoped of the Population, and Health ES Chapter.

Changes in socio-economic factors

15.6.29 Operation of the Proposed Development has the potential to generate additional long-term employment opportunities at the Site.

15.6.30 The net increase in direct operational jobs at the Site would be explored, along with any indirect and induced effects. As a result, an assessment of socio-economic factors during the operational phase would be scoped in. As described above, the assessment of socio-economic effects would be twofold and the significance conclusion will focus on the resultant population and health effects of any socio-economic changes.

15.6.31 The assessment would draw from and build upon key project information in order to reach a conclusion regarding the significance of effect.

Risk perception

15.6.32 Amine scrubbing has been used to separate CO_2 from natural gas and hydrogen since 1930, and is a robust technology. The use of amine scrubbers as part of the carbon capture process has the potential to release trace quantities of amines into the atmosphere as part of the decarbonised exhaust gas flow. While these amines by themselves are not very harmful at typical concentrations that might occur, they can take part in chemical reactions to form new compounds such as nitrosamines and nitramines, which could affect health and the environment.

15.6.33 However, applying the source-pathway-receptor concept, any resultant health risk is dependent firstly upon the concentration of any emissions released, and secondly upon the magnitude of any exposure to humans.

15.6.34 As set out in the Air Quality Section 7 of this report, amine emissions, dispersion and the magnitude of any potential human or ecological exposure will be assessed as part of the air pollutant modelling. This will include determination of emissions controls, where required, and guidelines or thresholds for exposure that are protective of health and the environment. This will be referenced as part of the consideration of changes in local air quality in the population and health ES Chapter.

15.6.35 It is anticipated that the use of such technology might be an area of risk perception and community concern. As a result, a risk perception section is proposed to further explain how and why amine emissions, their effects, and why the magnitude of exposure would not result in any credible risk to health.

15.6.36 Any other specific population and health concerns raised during the consultation process would also be included within this risk perception section.

15.7 Limitations and uncertainties

15.7.1 The technical assessments above are reliant on key outputs of the intra-related topics in the EIA. As a consequence, the limitations and uncertainties of those assessments also apply to any information used in the population and health ES Chapter (e.g. for modelling work undertaken). It is, however, considered that the information available will provide a suitable basis for the assessment of population and health.

15.8 Intra-related effects

15.8.1 As outlined in the above sections, the population and health topic has a number of intra-relations with regards to air quality, noise and transport. The combination of these effects on any one receptor will be summarise in the intra-related effects section.

15.9 Cumulative effects

15.9.1 The cumulative assessment would consider all relevant developments in the wider area that either introduces new receptors and/or contribute to environmental and socio-economic impact pathways relevant to the assessment of population and health.

15.10 Summary of proposed EIA scope

15.10.1 The effects proposed to be scoped in or out for population and health assessment in the EIA are as follows:

Table 15.6: Summary of population and health impacts proposed to be scoped in and out of the EIA

Impacts	Scoped in or out?	Justification
Construction		
Health effects of changes in air quality	In	The assessment will be completed in a concise manner to communicate how health has been addressed in each of the respective disciplines.
Health effects of changes in noise exposure		
Health effects of changes in transport nature and flow rate		
Changes in socio-economic factors (income and employment)		
Changes in opportunities for recreation and physical activity	Out	Due to being located on land already owned by the Applicant, no impact on resources used for recreation and physical activity during operation is anticipated.
Operation		
Health effects of changes in air quality	In	The assessment will be completed in a concise manner to communicate how health has been addressed in each of the respective disciplines.
Health effects of changes in noise exposure		
Changes in socio-economic factors (income and employment)		
Changes in opportunities for recreation and physical activity	Out	Due to being located on land already owned by the Applicant, no impact on resources used for recreation and physical activity during operation is anticipated.
Health effects of changes in transport nature and flow rate	Out	Changes in operational traffic are expected to be minor, with no potential for significant population and health effects.

16 Other environmental impacts

16.1 Introduction

16.1.1 The aim of the scoping process is to focus the EIA on those environmental aspects that may be significantly affected by the Proposed Development. In so doing, the significance of impacts associated with each environmental aspect becomes more clearly defined, resulting in certain aspects being considered 'non-significant'. The following sections provide a summary of those issues, which have been considered as part of the scoping process, but which are not considered key to the EIA and will therefore not be considered in detail in the ES.

16.2 Major Accidents and Disasters

16.2.1 This section determines that the control measures in place in the construction and operational phases of the Proposed Development ensure that the Proposed Development's vulnerability to accidents and disasters results in the risk of potential significant effects being As Low As Reasonably Practicable (ALARP). ALARP in EIA terms, can also be defined as not-significant.

16.2.2 This assessment has been completed in accordance with best practice and guidance on the assessment of accidents and disasters is set out in the Major Accidents and Disasters in EIA: A Primer, published by the Institute of Environmental Management and Assessment[40].

Construction Impacts and Effects

16.2.3 The Proposed Development includes provisions for temporary construction access via the B6136 and Fryston Lane to the south of the Site. Access routes will be subject to existing Site management protocols and the risk of accidents is ALARP.

16.2.4 With the understanding that protocols will be in accordance with industry standard best practice techniques and they will ensure that all legislative requirements are met it can be concluded that the risk of potential significant effects associated with the construction of the Proposed Scheme are ALARP.

Operational Impacts and Effects

Industrial hazards and risks

16.2.5 The Applicant plans to arrange discussions with HSE for them to understand any emerging technologies or specific risks of the enfinium project which could have an HSE regulatory impact. It is be noted that the existing EfW Site is not a known COMAH site. COMAH status of the Proposed Scheme will be confirmed as detail emerges from Feasibility and other studies.

16.2.6 It is anticipated that the project does not create any new or novel HSE risks without precedence in industry HSE.

16.2.7 The Applicant will ensure that all hazards are managed through and risk management protocols and appropriate design, to the eventuality that the risks associated with any change in hazards are ALARP.

16.2.8 Hazards associated with the use of amine solvents are well known and addressed such that the project does not present any significant risk to health. In any event, this would be dealt with through the population, human health and socio-economics and air quality topics.

[40] Institute of Environmental Management and Assessment. September 2020. *Major Accidents and Disasters in EIA: A Primer*. Available online: https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer

16.2.9 The Applicant is committed to ensuring the overall system remains in accordance with National Fire Protection Association (NFPA) standards and that the volume of water produced in the CCS is appropriately managed. In addition, where relevant emergency response plans and contingency measures will be dealt with in the Environmental Permit, which is regulated by the EA. Health and Safety requirements will be managed through the relevant industry controls.

16.2.10 Due to the commitment to designing the technology to ensure that all risks are ALARP, it can be concluded that the risk of potential significant effects associated with the operation of CCS is ALARP.

Third Party Industrial hazards and risks

16.2.11 SSE plans to construct and operate a battery energy storage system within 150m of the Site Boundary. SSE submitted a Planning Phase Battery Management Safety Plan as part of their application[41]. This plan identifies key entities that could potentially be impacted by a fire incident at the project, including primarily those working on or around the site, the local environment (including contamination or habitat destruction), local property, and means of protecting these entities, including the Project itself and nearby businesses against the impact of fire.

16.2.12 The plan accords to the following UK Statutory Instruments:

- Health and Safety at Work etc. Act 1974;
- Management of Health and Safety at Work Regulations 1999 Regulation 3;
- Electricity Safety, Quality and Continuity Regulations 2002;
- The Workplace (Health, Safety and Welfare) Regulations 1992
- Fire and Rescue Services Act (2004);
- Regulatory Reform (Fire Safety) Order 2005 for the fire safety management in buildings compliance;
- Construction, Design Management Regulations 2015 (CDM);
- IEC 62619:2022 Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications;
- IFC 2021 International Fire Code (IFC)

16.2.13 The conclusion of the plan is that the project can be executed at a minimal risk and that plans will be developed further in consultation with relevant stakeholders and consultees and shall be approved by the LPA prior to the construction of the proposed development. The final design will be approved by a fire engineer.

16.2.14 Due to these conclusions, for the purposes of EIA, it can be concluded that the risk of potential significant effects associated with the operation of this third party project is ALARP.

16.2.15 The SSE project and plans will be assessed in the cumulative effects assessment, refer to Section 17 for further information.

Transport accidents

16.2.16 Suitable safety measures will be in place to ensure safe transportation of CO_2 via rail and HGV transportation of chemicals, spent solvent and effluent where required.

16.2.17 Possible permanent road access is via the current Site access off the B6136 and Fryston Lane to the south of the Site. It is anticipated that the existing staff and contractor car parks will be used.

[41] https://planning.wakefield.gov.uk/online-applications/files/FE37EEA5472B3BD84A94B14FDF98E973/pdf/24_00394_FUL-PLANNING_PHASE_BATTERY_MANAGEMENT_SAFETY_PLAN-2446920.pdf

16.2.18 The CCS may necessitate alterations to the on-site access arrangements, this will be confirmed as designs progress. All designs are subject to existing Site management protocols and the risk of accidents is ALARP.

16.2.19 Section 6 of this EIA Scoping Report provides a proposed assessment methodology for the Proposed Development transport effects.

16.2.20 It can be concluded that the risk of potential significant effects associated with transport accidents is ALARP.

Cumulative Effects

16.2.21 It is considered unlikely for there to be any input from accidents and disasters to cumulative effects.

Summary

16.2.22 Through review of the control measures in place in during construction and operational phases of the Proposed Development, it is confirmed that the Proposed Development's vulnerability to accidents and disasters results in the risk of potential significant effects being ALARP and therefore Major Accidents and Disasters will not be considered in detail in the ES.

16.2.23 With respect to human health, Section 15 provides a proposed assessment methodology for the Proposed Development population and human health effects.

16.3 Materials and Waste

16.3.1 Materials are substances used in each lifecycle stage of a development, with a particular focus on the construction, operation and maintenance phases. The consumption of materials is generally considered to have potential environmental impacts and effects.

16.3.2 Waste is defined by the Waste Framework Directive (Directive 2008/98/EC) as 'any substance or object which the holder discards or intends or is required to discard.

16.3.3 The embodied carbon of construction materials and associated GHG emissions are considered within the Climate Change assessment, Section 8. Therefore, no further assessment is considered.

16.3.4 Standard measures, such as, a site waste management and outline CEMP will be secured through DCO requirements and will be repeated as mitigation in the ES. Potential Sources of Contamination are assessed in Section 13, Geology, Hydrogeology and Soils. In operation, the Proposed Scheme will not be creating waste, except low quantities of spent solvent. Therefore, as potential construction effects can be mitigated, no further assessment is proposed.

16.4 Aviation

16.4.1 The proposed new stacks and the Site's location do not warrant the inclusion of an assessment of the potential impacts of the Proposed Development on the operating procedures at the nearest airfield. This is Church Fenton airfield, located 15 km north east of the Site, which at this time is non-operational.

16.4.2 It is therefore intended that Aviation impact is scoped out of the EIA.

16.5 Electromagnetic Interference

16.5.1 Due to its high frequency and reliance on static aerials, television and radio reception is the most vulnerable of electronic signals to interference from tall structures.

16.5.2 The Proposed Development will not have a significant impact upon electrical interference given its location adjacent to existing structures of equivalent heights and distance from existing transmitters, and as such it is recommended that electrical interference is scoped out of the EIA.

17 Cumulative

17.1 Introduction

17.1.1 An initial search has been made for other developments and proposals that may be of relevance for the Cumulative Effects Assessment (CEA) to be undertaken in the EIA. The search will be updated during the carrying out the EIA process, in engagement with stakeholders.

17.1.2 The results of the initial search are included here to request comment about the status of the other developments listed and about any further developments (including those likely to be forthcoming during the EIA process but may not yet be listed on the planning register) that the relevant planning authorities would suggest for consideration in the CEA. Relevant planning authorities will also be contacted during production of the ES to reconfirm the bounds of assessment.

17.2 Overarching criteria

17.2.1 There are broadly two categories of development with the potential to give rise to likely significant cumulative effects:

- those that, due to their scale, location and/or nature of impact pathways, have the potential to add to the impacts of the Proposed Development such as to cause a likely significant effect at sensitive receptors; and
- those that introduce new sensitive receptors at a location where they have the potential to experience a greater impact from the Proposed Development (and if applicable the combined impact with another development) than existing representative sensitive receptors assessed in the EIA.

17.2.2 These overarching criteria generally exclude minor householder applications and business applications (such as building extensions or changes of use), of which there are very large numbers at any given time, unless these introduce new receptors or new construction/land-uses outside existing developed areas that could be affected by the Proposed Development.

17.2.3 Examples of other developments with a potentially-significant combined effect might be those requiring large-scale construction with noise or traffic impact pathways, in sufficient proximity to the Proposed Development so as to affect the same sensitive receptors. Construction, operation and demolition phases of other developments have been considered as there may be combined effects with the Proposed Development from different phases, for example an impact that is extended over time or a combined impact at one time, at a given sensitive receptor.

17.2.4 Examples of new sensitive receptors might be new residential properties or other landuses likely to be regarded as a sensitive for one or more EIA topics, that lie in closer proximity to the Proposed Development than existing receptors or in an area where no existing receptors would have been assessed in the EIA, or which significantly increase the number of sensitive receptors affected at that location. This would not include every potential new sensitive receptor individually, as representative receptors are typically used to determine the greatest impacts at a given location or in a given direction from the Proposed Development. For example, the nearest residence in a north-westerly direction from particular noise sources in the Proposed Development would be representative of the greatest noise impact at all residential receptors in that direction, and a new residence in the same direction but lying further away would not usually require additional cumulative effects assessment; but a new housing estate where there was previously only a single property or small number of residences might be included due to the substantial increase in number of residents affected.

17.3 Search area and data sources

17.3.1 The search area for potential cumulative developments is based on the Zones of Influence (ZoIs) predicted at this stage for the EIA topic areas. The largest ZoI at this stage is approximately 10 km from the main development Site for landscape and visual. Potential smaller ZoIs for other topics such as construction dust and noise at other areas of activity within the proposed Site Boundary have also been considered, as have likely road access routes for construction and operational traffic.

17.3.2 Cumulative developments have been categorised as Tier 1, Tier 2 or Tier 3 to describe their level of maturity, certainty over delivery, and detail of information available. These tiers are taken from the Planning Inspectorate's Advice Note 17 for nationally-significant infrastructure developments in England, which provides a helpful framework albeit not being required guidance for the proposed CCS developments.

17.3.3 Tier 1 developments are those with submitted applications, consents, or that are already under construction. Tier 2 developments are those at scoping stage for EIA. Tier 3 developments are those otherwise indicated as a possibility, e.g. through pre-application discussion with a local planning authority or at sites allocated for development in relevant local development plans. At tiers 2 and 3 there is typically only limited information available concerning a Proposed Development's design and potential environmental effects. Assessment of specific cumulative effects is therefore not always possible, but in such cases possible effects that are foreseeable will be discussed to the extent feasible in the CEA.

17.3.4 The following data sources have been searched:

- Savills' database of development proposals;
- development projects listed on the WMDC planning website: https://www.wakefield.gov.uk/planning/
- development projects listed on the North Yorkshire Council's planning website: https://www.northyorks.gov.uk/planning-and-conservation/view-and-comment-planning-applications
- developments projects listed on the Planning Inspectorate website (https://infrastructure.planninginspectorate.gov.uk/);
- sites allocated for development in the Wakefield District Local Plan 2036 (http://mapping.wakefield.gov.uk/localplan/DistrictMap.aspx?mapType=LDFadopted)

17.3.5 The search of local authority planning applications has focused on those with a live application (at any stage of the process, including EIA screening and pre-application discussions) or with permission granted within the last three years, as this is the typical period for expiry of a planning consent if not implemented. Earlier consented developments would be expected to be under construction or completed and to be identified through baseline studies, or their planning permission is likely to have lapsed. However, where evidence such as condition discharge, variation applications or appeals within the time period searched suggests a development applied for or consented earlier is still 'live' but not yet constructed, this has also been included in the initial long-list.

Shortlisting

17.3.6 The initial search within the ZoI returned a large number of developments. The longlist was screened using the overarching criteria set out above and then further reviewed against the following criteria to provide an initial shortlist for CEA. These criteria were not exhaustive or wholly prescriptive: professional judgement by the EIA co-ordinator advised by topic specialists has also been applied throughout.

17.3.7 Shortlist inclusion criteria were as follows:

- EIA developments or those where an EIA screening or scoping request indicated the possibility of significant environmental effects was foreseen;
- 'major developments' where identified as such in planning application or decision;

- developments whose scale, nature or location suggests potential for particular cumulative impacts – e.g. minerals and waste projects, an industrial or combustion process as a source of air or water pollutant or noise emissions, a potential large traffic generator such as distribution warehouse or retail park, or a development in proximity to designated site or other protected asset;
- completed developments with potential operational impacts that may not be captured in baseline studies (e.g. due to very recent start of operation); and/or
- developments that introduce sensitive receptors for which the assessment of effects on existing sensitive receptors identified through baseline study and included in the assessment of a particular environmental impact would not be representative.

17.3.8 Shortlist exclusion criteria were as follows.

- evidence such as aerial photography indicates that the development is completed and forms part of the existing baseline and receptors;
- an application that was refused (with no appeal pending);
- developments for which existing sensitive receptors are adequately representative for determining likely significant effects; and/or
- judgement that due to factors including distance, scale or existing context of the development that no impact pathway with the potential for significant cumulative effects with the proposed development exists.

17.3.9 From this EIA-wide shortlist (to be updated at EIA stage, including in response to any comment from the planning authority at the scoping stage) the individual ZoIs and details of impact pathways will used by each topic author to determine a shortlist applicable to that topic for the CEA.

17.3.10 Table 17.1, overleaf, shows the shortlist at this stage, in no particular order. The developments are mapped in Figure 5.1. Comments on any additional known or forthcoming developments, proposals or allocations that should be considered would be welcomed.

Table 17.1: Shortlisted cumulative developments

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
1	24/00394/FUL	Scheme comprises construction of and operation of battery energy storage system together with all associated works, equipment, necessary infrastructure, including sustainable urban drainage system and landscaping.	Ferrybridge Powerstation, Stranglands Lane, Ferrybridge, Knottingley, West Yorkshire, WF11 8TB	11/03/2024	Awaiting approval	0.14	No	Development in close proximity to the Proposed Development, potential for cumulative effects.	1
2	23/00100/HYB	Mountpark. Scheme comprises full permission sought for site infrastructure works including alterations to existing rail infrastructure, construction of an estate road, highways improvements to Kirkhaw Lane, the Kirkhaw Lane/B6136 junction, works to the Old Great North Road/B6136/A162 north-bound slip road junction, and a new all-movement traffic light junction on the A162, with associated landscaping, drainage, infrastructure and engineering works, and the demolition of existing buildings. PID 21013674 - 6 Employment Units	Ferrybridge C Power Station, Kirkhaw Lane, Ferrybridge, Knottingley, West Yorkshire, WF11 8RD	17/11/2023	Awaiting approval	0.16	Yes	Development in close proximity to the Proposed Development, potential for cumulative effects.	1
3	2023/0018/GOV	Scheme comprises application for Development Consent Order (DCO) under the Planning Act 2008 - Yorkshire Green Energy Enablement Project.	Sub Station, Rawfield Lane, Fairburn, Knottingley, West Yorkshire, WF11	04/01/2023	Approved	2.79	Yes	Nationally Significant Infrastructure within the 10km ZOI. Potential for	1

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
								cumulative effects.	
4	24/00263/FUL	Alterations to existing manufacturing buildings, and erection of new warehouse building; new decorations building and staff amenity block; creation of new car park and landscaping	Stoelzle Flaconnage Limited, Weeland Road, Knottingley, West Yorkshire, WF11 8AQ	12/02/2024	Awaiting approval	2.80	No	Development in close proximity to the Proposed Development, potential for cumulative effects.	1
5	23/00929/FUL	Scheme comprises the construction of a tyre recycling facility for the recovery of raw materials (steel, pyrolysis oil and recovered carbon black) to be used to create second generation products. This project also includes associated infrastructure works and access roads.	Tradebe, Weeland Road, Knottingley, West Yorkshire, WF11 8DZ	23/05/2023	Awaiting approval	3.70	Yes	EIA development in proximity to the Proposed Development. Potential for cumulative effects.	1
6	ZG2023/0938/FULM	Scheme comprises installation of a battery storage facility.	Glebedale, Stocking Lane, West Yorkshire, Knottingley, West Yorkshire, WF11 8DL	16/09/2023	Awaiting approval	4.63	No	Development in close proximity to the Proposed Development, potential for cumulative effects.	1
7	ZG2023/1293/FULM	Erection of 12no units for uses within Class E(g)(iii), B2, B8 and F2 uses with ancillary offices, Class E and F1 ancillary amenity space, an EV charging station, parking provision, a new access road from Weeland	Former Kellingley Colliery, Turvers Lane, Knottingley,	22/12/2023	Awaiting approval	4.93	No	Development in close proximity to the Proposed Development, potential for	1

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
		Road, internal access roads, associated infrastructure, and landscaping	West Yorkshire, WF11 8DT					cumulative effects.	
8	23/00322/FUL	Scheme comprises residential development (up to 408 residential units) comprising of market housing - 43 two, 167 three, 133 four bedroom houses, 24 two bedroom flats, affordable housing - 20 two, 21 three bedroom houses, and associated works including demolition of existing farmhouse and associated buildings with SUDS. This project also includes associated infrastructure works and access roads.	Station Road, Normanton, West Yorkshire, WF6 2NB	20/02/2023	Awaiting approval	9.15	No	Large residential potentially introducing additional sensitive receptors.	1
9	EN010081	The construction and operation of a new CCGT generating station with a capacity of up to 2,500 megawatts, new gas pipeline to the NTS and other associated development.	Eggborough CCGT - on land at and in the vicinity of the existing Eggborough coal-fired power station, near Selby, North Yorkshire.	07/12/2018	This development was granted consent in 2018	10.00	No	Nationally Significant Infrastructure within the 10km ZOI. Potential for cumulative effects.	1
10	21/02797/EIASC	Scheme comprises EIA scoping opinion (under regulation 15, town and country planning (environmental impact assessment) regulations 2017, as amended) for the development of approx 450,000	Land To The South-East Of, Junction 33, M62, Knottingley, West Yorkshire, WF11	10/11/2021	Scoping opinion received	3.77	Yes	EIA development in proximity to the Proposed Development. Potential for	2

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
		square metre (4.8 metres square feet) of industrial development to include new landscaping, drainage infrastructure. This project also includes associated infrastructure works and access roads. Proposals are for a hybrid application for up to 465,000 sqm (5m sqft) of logistics (B8) and manufacturing (B2, E(g)(ii) and E(g)(iii)) development, involving the demolition of existing structures, preparatory ground modelling, a new highway access on the A162 and associated infrastructure, including internal roads, drainage, lighting, external works, landscaping and ecological works						cumulative effects.	
11	16/03105/EIASC	Scheme comprises demolition of site buildings and/or structures and the redevelopment of the site for residential development of up to 4,500 houses including1420 houses are affordable (30%) (use class C3), extra care provision (use class C2) and a local centre (use classes A1 to A4, C1 and D1) with access from Wheldon Road, public open space and associated remediation, site levelling and flood alleviation scheme with all other matters reserved including	Wheldon Road, Castleford Riverside, Castleford, West Yorkshire, WF10 2PP	15/12/2016	Scoping opinion issued	3.79	Yes	EIA development in proximity to the Proposed Development. Potential for cumulative effects.	2

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
		SUDS. The associated works include sewer systems, landscaping, cable laying, infrastructure, enabling works and access roads.							
12	ZG2023/1037/EIA	Scheme comprises outline application (some matters reserved) for residential development, extra-care facility, local centre, primary school landscaping works. This project also includes associated infrastructure and access roads.	Eggborough, Weeland Road, Eggborough, East Yorkshire, Goole, Humberside, DN14	13/10/2023	Awaiting approval	7.88	Yes	EIA development in proximity to the Proposed Development. Potential for cumulative effects.	2
13	23/01426/EIASO	Scheme comprises request for screening opinion under regulation 6 of the town and country planning (environmental impact assessment) regulations 2017 (as amended). Construction of and operation of a battery energy storage facility for the storage of up to 100 megawatts electricity together with associated infrastructure, substation, security fencing, cctv, security lighting and landscaping.	Oakland Hill Estate, Oakwood Close, Airedale Ferrybridge, Knottingley, West Yorkshire, WF11 8AE	25/07/2023 00:00	Decision issued	0.34	No	Development in close proximity to the Proposed Development, potential for cumulative effects.	3
14	N/A	Scheme comprises change of use from agriculture land to proposed residential development for 328 units.	Field View, Byram, Knottingley, West Yorkshire, WF11	N/A	N/A	0.87	N/A	Large residential potentially introducing additional sensitive receptors	3

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
								within the LVIA ZOI.	
15	N/A	Scheme comprises change of use from agricultural land to a proposed residential development for 250 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Byram Park Road, Byram, Knottingley, West Yorkshire, WF11 9	N/A	N/A	1.06	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
16	N/A	Scheme comprises of a proposed residential development for 549 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Former Prince of Wales Collier, Pontefract, West Yorkshire, WF8 1	N/A	N/A	1.43	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
17	N/A	Scheme comprises of a proposed residential development for 487 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Hall Farm, Castleford, West Yorkshire, WF10	N/A	N/A	1.58	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
18	N/A	Scheme comprises of a proposed residential development for 573 units. Associated works include access roads, sewer systems,	Shilling Hill, Knottingley, West Yorkshire, WF11 0	N/A	N/A	2.04	N/A	Large residential potentially introducing additional sensitive	3

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
		infrastructure, enabling and landscaping works.						receptors within the LVIA ZOI.	
19	N/A	Scheme comprises of a proposed residential development for 871 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Wheldale Farm, Wheldale Road, Castleford, West Yorkshire, WF10	N/A	N/A	2.21	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
20	N/A	Scheme comprises of a proposed residential development for 698 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Former A1-M62 Interchange, Knottingley, West Yorkshire, WF11	N/A	N/A	2.32	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
21	N/A	Scheme comprises of a proposed residential development for 615 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	New Holywell Farm, Holywell Lane, Castleford, West Yorkshire, WF10	N/A	N/A	2.37	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
22	N/A	Scheme comprises of a proposed residential development for 544 units. Associated works include access roads, sewer systems,	Former Prince of WalesCollier, Monk Hill Triangle Site, Pontefract,	N/A	N/A	2.44	N/A	Large residential potentially introducing additional	3

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
		infrastructure, enabling and landscaping works.	West Yorkshire, WF8 1					sensitive receptors within the LVIA ZOI.	
23	N/A	Scheme comprises of a proposed residential development for 493 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Park Road, Pontefract, West Yorkshire, WF8 4	N/A	NA	2.75	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
24	N/A	Scheme comprises of a proposed residential development for 785 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Trinity Farm, Ferrybridge, Knottingley, West Yorkshire, WF11 0	N/A	N/A	2.83	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
25	N/A	Scheme comprises of a proposed residential development for 498 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Grove Hall, Knottingley, West Yorkshire, WF11 0	N/A	N/A	3.11	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
26	N/A	Scheme comprises of a proposed residential development for 4122 units. Associated works include	Pontefract, Knottingley,	N/A	N/A	3.13	N/A	Large residential potentially introducing	3

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
		access roads, sewer systems, infrastructure, enabling and landscaping works.	West Yorkshire, WF11 0					additional sensitive receptors within the LVIA ZOI.	
27	N/A	Scheme comprises of a proposed residential development for 414 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Park Lane, Pontefract, West Yorkshire, WF8 4QR	N/A	N/A	3.42	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
28	N/A	Scheme comprises of a proposed residential development for 1074 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Former C6 Solutions Centre, Castleford, West Yorkshire, WF10	N/A	N/A	3.73	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
29	N/A	Scheme comprises of a proposed residential development for 407 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Relief Road, Associated Land, Knottingley, West Yorkshire, WF11 0	N/A	N/A	4.06	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
30	N/A	Scheme comprises of a proposed residential development for 4000 units.	Darringfield Eco Town, Pontefract,	N/A	N/A	4.20	N/A	Large residential potentially	3

ID	Planning ref.	Description	Address	App. date	Approval	Dist. red line (km)	EIA?	Shortlist reason	Tier
		Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	West Yorkshire, WF8					introducing additional sensitive receptors within the LVIA ZOI.	
31	N/A	Scheme comprises of a proposed residential development for 1383 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Fairleigh Farm, Pontefract, West Yorkshire, WF8	N/A	N/A	4.78	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
32	N/A	Scheme comprises of a proposed residential development for 840 units. Associated works include access roads, sewer systems, infrastructure, enabling and landscaping works.	Pontefract Road, Featherstone, Pontefract, West Yorkshire, WF7 5AE	N/A	N/A	5.43	N/A	Large residential potentially introducing additional sensitive receptors within the LVIA ZOI.	3
33	NY/2023/0169/SCR	Scheme comprises request for a formal screening opinion for a anaerobic digestion plant.	Land at Northfield Farm, Cridling Stubbs, Knottingley, West Yorkshire, WF11 0AU	28/09/2023	Screening opinion issued	6.42	Unknown	Development in close proximity to the Proposed Development, potential for cumulative effects.	3

Figures

FERRYBRIDGE 1&2 CARBON CAPTURE STORAGE

Date:	19-04-2024
Paper size:	A3
Scale:	1:25,000

0 250 500 750 1,000 m

Key:

Site Boundary

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Site Location Plan (OS Base)

Figure 1.1

Status:	FINAL
Revision:	V2
Drawn by:	Rhys Williams
Approved by:	Tom McClure

FERRYBRIDGE 1&2 CARBON CAPTURE STORAGE

Date:	19-04-2024
Paper size:	A3
Scale:	1:25,000

0 250 500 750 1,000 m

Key:

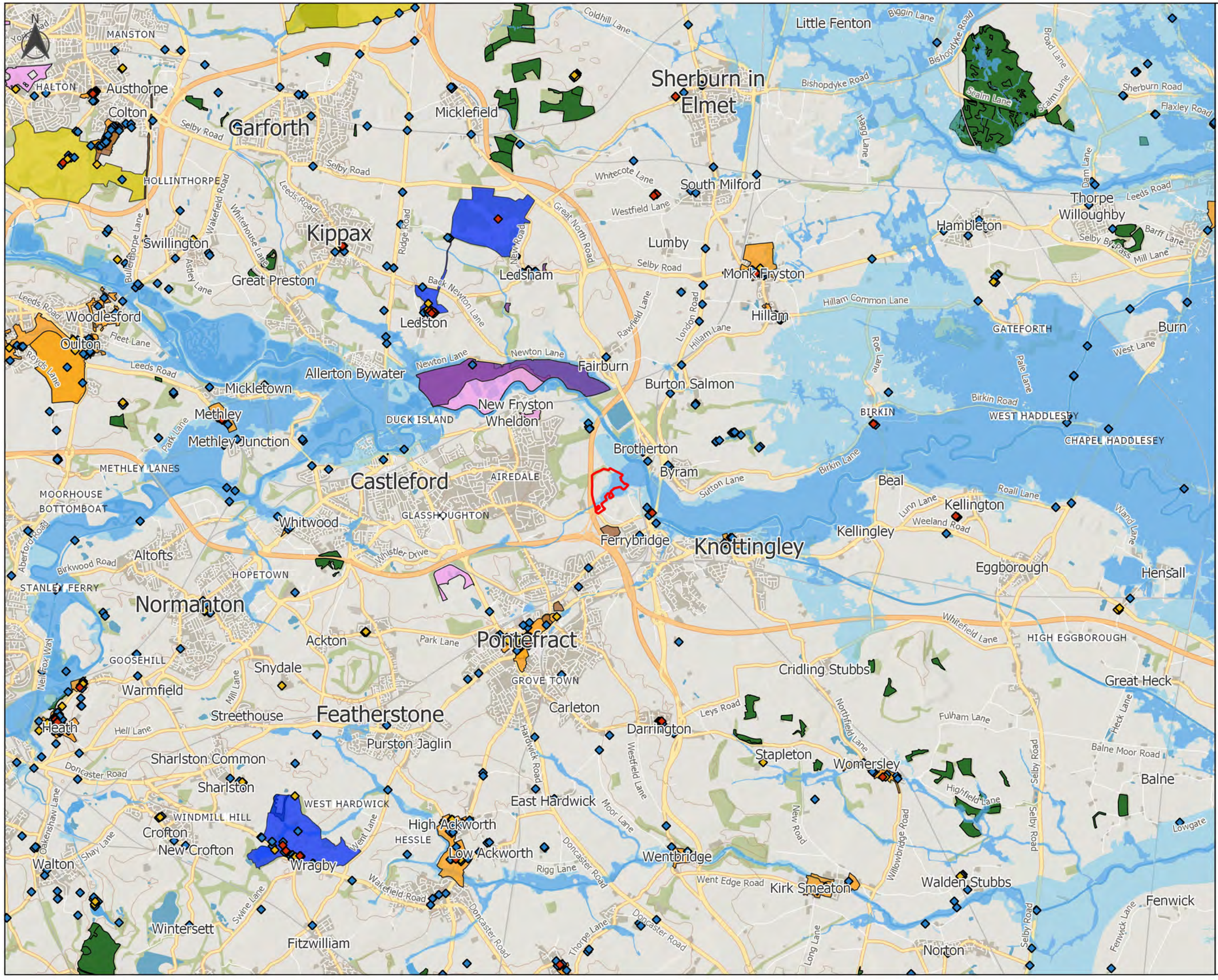
Site Boundary

enfinium

Site Location Plan (Satellite)

Figure 1.2

Status:	FINAL
Revision:	V2
Drawn by:	Rhys Williams
Approved by:	Tom McClure



FERRYBRIDGE 1&2 CARBON CAPTURE STORAGE

Date:	19-04-2024
Paper size:	A3
Scale:	1:75,000

0 800 1,600 2,400 3,200 m

Key:

- Site Boundary
- Sites of Special Scientific Interest
- Local Nature Reserves
- Flood Zone 2
- Flood Zone 3
- Ancient Woodland
- Scheduled Monuments
- Conservation Areas

Registered Parks and Gardens

- II*
- II

Listed Buildings

- I / A
- II* / B
- II / C

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Environmental Constraints (1:75,000)

Figure 2.1

Status:	FINAL
Revision:	V2
Drawn by:	Rhys Williams
Approved by:	Tom McClure

FERRYBRIDGE 1&2 CARBON CAPTURE STORAGE

Date:	19-04-2024
Paper size:	A3
Scale:	1:25,000

0 200 400 600 800 m

Key:

- Site Boundary
- Sites of Special Scientific Interest
- Local Nature Reserves
- Flood Zone 2
- Flood Zone 3
- Scheduled Monuments
- Conservation Areas

Registered Parks and Gardens

- II

Listed Buildings

- I / A
- II* / B
- II / C

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Environmental Constraints (1:25,000)

Figure 2.2

Status:	FINAL
Revision:	V2
Drawn by:	Rhys Williams
Approved by:	Tom McClure

FERRYBRIDGE 1&2 CARBON CAPTURE STORAGE

Date:	19-04-2024
Paper size:	A3
Scale:	1:4,000

0 40 80 120 160 m

Key:

- Site Boundary
- CO2 exporting plant
- Flue gas pre-treatment and carbon capture plant
- Laydown and welfare
- Onsite CO2 gathering network (liquefaction and storage)
- Supporting plant

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Indicative Site Layout

Figure 3.1

Status:	FINAL
Revision:	V2
Drawn by:	Rhys Williams
Approved by:	Tom McClure

FERRYBRIDGE 1&2 CARBON CAPTURE STORAGE

Date:	29/09/2023
Paper size:	A3
Scale:	1:45,000

0 500 1,000 2,000 m

Key:

- Site Boundary
- Study Area (5km)
- Stack 1 (indicative location and height of 119m, for the purpose of Scoping)
- Stack 2 (indicative location and height of 119m, for the purpose of Scoping)
- Proposed Viewpoints

Zone of Theoretical Visibility (ZTV) (computer generated) - based on proposed stack height of 119m

Stack 1 Stack 2

This drawing is based upon computer generated Zone of Theoretical Visibility (ZTV) studies produced using the viewshed routine in the ESRI ArcGIS Suite. The areas shown are the maximum theoretical visibility, taking into account topography, vegetation and buildings which have been included in the model with the heights obtained from a LiDAR digital surface model.

Due to its resolution, the surface model does not take into account every localised feature such as walls, small hedgerows or small trees and therefore only gives an impression of the extent of visibility.

The ZTV includes an adjustment that allows for Earth's curvature and light refraction. It is based on LiDAR terrain data with a 2m^2 resolution.

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Zone of Theoretical Visibility (ZTV) Mapping and Viewpoints

Figure 11.1

Status:	FINAL
Revision:	V1
Drawn By:	SG / BF
Approved By:	OW/RK

FERRYBRIDGE 1&2 CARBON CAPTURE STORAGE

Date:	19-04-2024
Paper size:	A3
Scale:	1:1

0 0.75 1.5 km

Key:

- Application Site Boundary
- 10 km Zone of Influence
- Cumulative Developments

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Cumulative Developments Plan

Figure 17.1

Status:	FINAL
Revision:	V1
Drawn by:	MRC
Approved by:	TM