

Castle Cement Limited

Carbon Capture and Storage Project – Padeswood, North Wales

Volume 1, Draft Non-Technical Summary

DNS CAS-02009-W1R1Z7

663575

JUNE 2024



RSK

CONTENTS

1 INTRODUCTION	2
1.1 What is the context of the document?	2
1.2 What is the purpose of this document?	2
2 THE PROPOSED DEVELOPMENT	4
2.1 What is the Proposed Development?	4
2.2 What is the existing use of the Site?	5
2.3 Are there any environmental designations within the Site?	6
2.4 Why is the Proposed Development needed?	7
2.5 What alternatives have been considered?.....	7
2.6 How will the Proposed Development be built?	9
2.7 How has the design considered environmental constraints and opportunities?	10
3 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS	12
3.1 What is the Environmental Impact Assessment process?	12
4 ASSESSMENT FINDINGS	13
4.2 Biodiversity	13
4.3 Air quality	14
4.4 Climate	15
4.5 Cultural heritage.....	16
4.6 Landscape and visual	16
4.7 Noise and vibration	18
4.8 Traffic and transport.....	19
4.9 Land and soils.....	20
4.10 Major accidents and disasters.....	21
4.11 Material assets and waste.....	22
4.12 Cumulative effects	22
5 WHAT HAPPENS NEXT?	24
REFERENCES	25
APPENDIX A PROCESS FLOW DIAGRAM	26
APPENDIX B PROPOSED MASTERPLAN	27
APPENDIX C SITE LOCATION	28
APPENDIX D ENVIRONMENTAL CONSTRAINTS PLAN	29
TABLES	
Table 2.1 Description of the key Proposed Development components.....	4
Table 2.2 Alternatives Assessment	8
Table 2.3 Key design elements in response to environmental constraints and opportunities	10

1 INTRODUCTION

1.1 What is the context of the document?

- 1.1.1 Castle Cement Limited (referred to as ‘the Applicant’ in this document) is seeking to obtain planning permission for the construction and operation of a Carbon Capture and Storage facility (referred to as the ‘Proposed Development’ in this document) at Padeswood Cement Works, Flintshire, North Wales.
- 1.1.2 The Proposed Development is classified as a Development of National Significance and a planning application is being submitted to the Welsh Government (administrated by Planning and Environment Decisions Wales). The decision as to whether or not to grant planning permission will be made by Welsh Ministers.
- 1.1.3 As part of the planning process, an Environmental Impact Assessment has been undertaken to understand the likely significant effects of the Proposed Development on the environment and to identify measures to avoid, reduce or compensate adverse effects. The findings of the Environmental Impact Assessment are reported in an Environmental Statement.
- 1.1.4 Currently all documents, including this Non-Technical Summary and the Environmental Statement, are in draft for statutory pre-application consultation purposes only. Once statutory pre-application consultation is complete, all of the draft planning application documents will take into account feedback from all consultees and will be finalised ready for the planning application submission.

1.2 What is the purpose of this document?

- 1.2.1 The findings of the Environmental Impact Assessment are presented in an Environmental Statement. An Environmental Statement sets out assessment methodologies, existing data on the surrounding environment and the results/recommendations of the environmental assessments. The environmental assessment process forms a key part of the decision as to whether to grant planning permission.
- 1.2.2 This draft Environmental Statement is split into four volumes:
- Volume 1: Non-Technical Summary;
 - Volume 2: Environmental Statement;
 - Volume 3: Figures; and
 - Volume 4: Technical Appendices.

- 1.2.3 The Environmental Statement is one of a series of documents submitted to Planning and Environment Decisions Wales in support of a planning application. Other documents include design drawings, a series of standalone technical reports and a planning, design and access statement.
- 1.2.4 This document provides a non-technical summary of the main findings of Volumes 2 to 4 of the draft Environmental Statement.

DRAFT

2 THE PROPOSED DEVELOPMENT

2.1 What is the Proposed Development?

- 2.1.1 Padeswood Cement Works is located to the south of Buckley, near Mold, Flintshire, Wales. The cement works is owned by Castle Cement Limited, part of Heidelberg Materials, and trades under the name Heidelberg Materials UK. Heidelberg Materials UK is a leading supplier of low carbon building materials to the UK.
- 2.1.2 The cement produced at Padeswood Cement Works is primarily used in bulk for ready mix concrete, bagged cement and other concrete products sold through builders' merchants. The plant currently employs 161 staff.
- 2.1.3 The Proposed Development aims to capture up to 800,000t of carbon dioxide (CO₂) per year from the current cement works and will require the construction of a Carbon Capture Plant; comprising of the following components:
- A Combined Heat and Power plant with 15MWe (minimum) and 83MW (minimum) thermal of installed capacity, to produce electricity and heat to power the carbon capture equipment; and
 - A Post Combustion Carbon Capture and Compression plant, to extract CO₂ from waste gases and compress it for transport and storage.
- 2.1.4 A flow diagram of the carbon capture and storage process is provided in **Appendix A**.
- 2.1.5 The key components of the Proposed Development are detailed in **Table 2.1**.

Table 2.1 Description of the key Proposed Development components

Proposed Development Component	Component Description
Temporary Enabling Works (for construction phase works only)	<ul style="list-style-type: none"> • Material and equipment laydown storage areas; • Contractor welfare facilities; • Construction-phase vehicle parking and offices; and • Temporary works area to utilise during shutdowns of the existing operational kiln.
Permanent Enabling Works (for construction phase and operational phase of)	<ul style="list-style-type: none"> • Bunding will be implemented to screen the Proposed Development from key viewpoints. Bunding will be created using soil stripped during construction which will be stabilised with native planting; • Demolition of Padeswood Hall, Padeswood Hall Farm and all outbuildings;

Proposed Development Component	Component Description
Proposed Development)	<ul style="list-style-type: none"> • Construction of a new permanent access road to the Carbon Capture Plant from the A5118 and improvements to the existing site entrance; and • Diversion of the footpath (301/56/20) that crosses the Site from north west to south east across the area for the Carbon Capture Plant.
Carbon Capture Plant	<p>The construction of:</p> <ul style="list-style-type: none"> • Two heat exchanges to harvest waste heat to use in the Carbon Capture Plant; • A Combined Heat and Power plant to power a steam turbine generator and to produce low pressure steam; • An integrated quencher tower to cool the gas stream and remove particles and aerosols to optimise CO₂ absorption; • A gas-gas heater to lower the flue-gas temperature; • An absorber tower where CO₂ is captured through a reaction with an amine solution; • A wash tower where liquid droplets from the gas steam is collected to improve CO₂ capture; • A compressor house which will store a multistage CO₂ compression to increase the pressure of the CO₂ pipeline; • A flue gas stack which will release residual emissions; • Hybrid cooling towers; • Substation; • A new joint office and control centre; and, • Supporting infrastructure (i.e., process pipework and air coolers).

2.1.6 The proposed masterplan for the Proposed Development is provided in **Appendix B**.

2.1.7 The Proposed Development will connect to the HyNet North West network for the transportation and storage of CO₂ to the Liverpool Bay depleted gas fields off the coast of North Wales, where it will be securely and permanently geologically stored. The development of the proposed pipeline network, connection points, above ground infrastructure and storage facilities will be led by Liverpool Bay CCS Limited, a member of the Eni SpA group, and does not form part of this planning application.

2.2 What is the existing use of the Site?

2.2.1 The Proposed Development is located approximately 2.1 kilometres south east of Buckley. The 'Site', as shown in **Appendix C**, covers an area of approximately 70.9 hectares. The existing operation is located within the central belt of the Site and

consists of cement kilns, grinding mills, silos and supporting infrastructure such as office buildings, workshops and vehicle parking.

2.2.2 Padeswood Hall Farm and 12 semi-detached residential dwellings are located within the Site boundary. These properties are owned by the Applicant and are leased to private tenants. Padeswood Hall is also owned by the Applicant, and within the Site boundary, but has been vacant for the last ten years and is currently semi-derelict. Padeswood Hall, Padeswood Hall Farm and all of its outbuildings will be demolished as part of the Proposed Development.

2.2.3 The land surrounding the Padeswood Cement Works is predominantly agricultural, used for both arable and pastoral farming. The A5118 runs parallel to the northern boundary of the Site, the Borderlands railway runs along the eastern boundary, a dismantled railway runs parallel the southern boundary and along the western boundary is an outgrown field hedgerow.

2.3 Are there any environmental designations within the Site?

2.3.1 As illustrated in **Appendix D**; there are no statutory environmental or heritage designated sites within the Site.

2.3.2 There are two statutory designated sites within 2 kilometres of the Site boundary: the Buckley Claypits and Commons Site of Special Scientific Interest and Deeside and Buckley Newt Sites Special Areas of Conservation (SAC). These areas are located 900 metres from the Site and are designated due to their breeding populations of the great crested newt.

2.3.3 There are an additional five SACs and two Ramsar sites within 6km of the Site boundary; these are:

- River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC;
- Dee Estuary/Aber Dyfrdwy SAC;
- Alyn Valley Woods/Coedwigoedd Dyffryn Alun SAC;
- Berwyn a Mynyddoedd De Clwyd/Berwyn and South Clwyd Mountains SAC;
- Halkyn Mountain/Mynydd Helygain SAC;
- Midland Meres & Mosses Phase 2 Wetlands of International Importance designated under the Ramsar Convention (Ramsar); and
- The Dee Estuary Ramsar.

2.4 Why is the Proposed Development needed?

- 2.4.1 The UK Government is a signatory of the [2015 Paris Agreement \(UNFCCC, 2018\)](https://unfccc.int/documents/184656)¹ which commits the UK to measures aimed at keeping global temperature rise to well below 2°C compared with pre-industrial levels and to pursue best efforts to limit the increase to 1.5°C. As part of these targets, in June 2019, the UK became the first major economy in the world to commit to a 'net zero' CO₂ emission target, pledging to end the UK's contribution to global climate change by 2050 ([HM Government, 2019](https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law))².
- 2.4.2 Cement is a fundamental construction material, required to build new schools, homes and hospitals, as well as the development of infrastructure required for the UK to decarbonise such as onshore and offshore wind farms, clean transport infrastructure, and electricity grid upgrades. However, the production of cement currently emits substantial amounts of carbon dioxide (CO₂). A large proportion of the CO₂ produced by cement manufacture is derived from the raw materials and associated chemical processes and cannot be reduced by using renewable fuel or energy sources. There is also no viable alternative to concrete (of which cement is the main component) in the construction industry.
- 2.4.3 The Applicant, and its parent company Heidelberg Materials, are global leaders in the race to decarbonise the cement process with the world's first full scale cement carbon capture and storage project, currently being built in Brevik, Norway. The Applicant's vision is now to develop the UK's first net zero carbon cement facility at Padeswood.
- 2.4.4 The Proposed Development will act as an exemplar for sustainable cement production across the UK and will contribute to the transition of the construction industry and UK economy to net zero.

2.5 What alternatives have been considered?

- 2.5.1 The cement process has two sources of CO₂ emissions:
- CO₂ from combustion processes involved in cement manufacture which contributes approximately 30-35% of the emissions; and
 - The calcination of the limestone, which involves the conversion of calcium carbonate to calcium oxide and CO₂, contributes to the remaining 65-70% of emissions.
- 2.5.2 As such, cement production cannot be fully decarbonised by switching to a decarbonised fuel (i.e., hydrogen or carbon neutral biomass fuel), as that would only assist with the first bullet point above (reducing emissions in the combustion process).

¹ <https://unfccc.int/documents/184656>

² <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>

Currently, carbon capture and storage is the only means of fully decarbonising the production of cement.

2.5.3 There are a number of potential carbon capture technologies being developed which are at low technology readiness levels. At present, post combustion carbon capture using amine, is the only carbon capture technology proven at an industrial scale. This carbon capture technology is currently being installed at the Heidelberg Materials Brevik Plant, Norway which will be operational in 2025. Utilising other technology at the scale required at Padeswood would require at least five to ten years of further development.

2.5.4 The Applicant has assessed multiple alternatives, which are summarised in **Table 2.2**.

Table 2.2 Alternatives Assessment

Option	Reason for Rejection
Business as usual	Continued operation of Padeswood Cement Works without carbon capture and storage would not assist in the achievement of the Applicant's net zero ambitions. This would result in the continuation of the annual emission of approximately 800,000t of CO ₂ .
Leilac carbon capture and storage (low emission intensity lime and cement) technology	The Leilac process is under development by Calix and is a direct capture technology, however at present it can only be applied to the calcination process and therefore would not achieve full decarbonisation of the cement production process.
Oxyfuel technology	Oxyfuel carbon capture and storage has not yet been demonstrated at a large industrial scale and would require a number of years further development before being applied at the scale required at Padeswood.
Non-pipeline CO ₂ transport	Road (or rail) transport from Padeswood Cement Works to the HyNet network would require CO ₂ liquefaction at Padeswood Cement Works which would require additional electrical energy and a loading facility. It is estimated that an additional 28,500 vehicle movements would be required each year. This option is considered not feasible due to constraints in the local highways network and due to the increased diesel consumption required, which

Option	Reason for Rejection
	would be contradictory to the overall objective of net zero carbon production.

2.6 How will the Proposed Development be built?

- 2.6.1 The Applicant intends to start construction in 2025 and the Proposed Development is estimated to be operational by 2029. Site set up works are proposed to take seven months and will include earthworks, civil works and the construction of access tracks and parking areas. Construction of the Carbon Capture Plant is expected to take around 30 months. The total construction phase (site set up works plus the construction of the Carbon Capture Plant) will last for 37 months.
- 2.6.2 Following the grant of planning permission and discharge of pre-commencement planning conditions, construction will commence with site preparation works which will include the construction of access ways, contractor carparking, construction fencing and the demolition of Padeswood Hall, Padeswood Hall Farm and the outbuildings. Where required, topsoil will be stripped and vegetation removed. Topsoil will be stored in earth bunds to the south of Padeswood Drive and in an adjacent storage area (as illustrated in **Appendix B**).
- 2.6.3 Earthworks are required for the Carbon Capture Plant platform which will be located 5 metres below the current ground level. Soil excavated from the northern end of the platform will be reused at the southern end. Surplus soil will be removed from Site.
- 2.6.4 To maximise construction efficiency, sections of the Carbon Capture Plant will be pre-fabricated off-site and transported to the Site. These components will be stored and assembled in the materials laydown and contractors storage area (illustrated in **Appendix B**). Temporary storage buildings and cranes will be installed. It is anticipated that sections of the flue gas stack, absorber tower and integrated quencher tower will be pre-fabricated in the materials laydown and contractors storage area and will be transported and then erected using a crane within the Carbon Capture Plant area.
- 2.6.5 Construction will be undertaken in accordance with a construction environmental management plan. This will be a live document and will be updated during each phase of the project.
- 2.6.6 The construction environmental management plan sets out how construction works will be managed to ensure adverse effects are avoided, reduced and mitigated. This

plan will outline measures to minimise the effects of matters such as (but not limited to) noise, traffic, dust and silt.

2.7 How has the design considered environmental constraints and opportunities?

2.7.1 From the outset, the design process has sought to reduce environmental impacts and provide enhancements where practical. Key design elements in response to environmental constraints and opportunities are summarised in **Table 2.3**.

Table 2.3 Key design elements in response to environmental constraints and opportunities

Environmental constraint or opportunity	Design Response
Biodiversity	<ul style="list-style-type: none"> The Proposed Development will result in the need for some vegetation clearance, both from the area of the Carbon Capture Plant and the construction and access areas. New areas of habitat creation and planting are proposed as part of the Proposed Development to mitigate this loss.
Air quality	<ul style="list-style-type: none"> Modelling of emissions from a number of scenarios was undertaken to inform the final design of the Carbon Capture Plant.
Climate	<ul style="list-style-type: none"> The cement works energy consumption and fuel mix has been optimised to minimise CO₂ emissions from the cement production. Waste heat from the existing cement works will be utilised in the post combustion carbon capture process to reduce natural gas consumption. Kiln gases will be utilised as a source of oxygen for combustion rather than fresh air. This will reduce the diameter of the absorber tower which in turn will reduce the volume of materials and energy required.
Cultural heritage	<ul style="list-style-type: none"> Access will be sited to avoid non-designated heritage assets. The appearance of the new structures will be sympathetic to the existing structures within the existing cement works.
Landscape and visual	<ul style="list-style-type: none"> Bunding will be constructed to act as a visual screen. Native plants will be used to ensure the bunding is sympathetic to the surrounding area.

Environmental constraint or opportunity	Design Response
	<ul style="list-style-type: none"> Landscaping across the Site including car parking areas is provided as part of the Proposed Development.
Noise and vibration	<ul style="list-style-type: none"> Several rounds of noise modelling have been completed to inform the noise reduction proposals which form part of the Proposed Development.
Water	<ul style="list-style-type: none"> Surface water treatment devices have been incorporated into the drainage network. The Carbon Capture Plant has been designed to ensure any process discharges into water have been eliminated. The Proposed Development includes a new storm water holding pond to store and discharge rainwater run-off to reduce the risk of flooding.
Public access	<ul style="list-style-type: none"> The affected footpath will be diverted and remain open during construction and operation.

3 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

3.1 What is the Environmental Impact Assessment process?

3.1.1 The Environmental Impact Assessment process has run alongside and influenced the design process. This has involved several key steps including:

- **Identify baseline conditions** - a number of environmental surveys and desk-based studies have been undertaken. These have informed the design process and the later Environmental Impact Assessment;
- **Environmental Impact Assessment Screening** – screening is the process of deciding whether an Environmental Impact Assessment is needed. Due to the scale and nature of the Proposed Development, it was determined that an Environmental Impact Assessment was required without prior screening;
- **Environmental Impact Assessment Scoping** – scoping is the process of determining the scope and content of the Environmental Impact Assessment. An Environmental Impact Assessment Scoping Report was prepared and submitted to Planning and Environment Decisions Wales to agree the scope of the Environmental Impact Assessment. Planning and Environment Decisions Wales subsequently issued a Scoping Direction in response to the Scoping Report. This draft Environmental Statement has been prepared in accordance with the Scoping Direction;
- **Assess effects** – an assessment of the environmental effects of the Proposed Development has been undertaken;
- **Develop mitigation** – where required, mitigation measures have been developed to avoid, manage and minimise adverse environmental effects;
- **Assess residual effects** – an assessment of the likely environmental effects after the proposed mitigation measures are implemented has been undertaken; and,
- **Environmental Statement** – the Environmental Statement reports the outcomes of the Environmental Impact Assessment process. This is submitted with the planning application to Planning and Environment Decisions Wales.

4 ASSESSMENT FINDINGS

4.1.1 This section summarises the key findings from the draft Environmental Statement.

4.2 Biodiversity

Will the Proposed Development affect habitats or protected/notable species?

- 4.2.1 The Site and surrounding area comprises of the following habitats: broadleaved plantation woodland, mixed plantation woodland, scrub, scattered broadleaved trees, grassland, tall ruderal species, ditches, streams and hedgerows. Ecological surveys confirmed that these habitats are of mostly low value.
- 4.2.2 There are 14 ponds within the Site, with great crested newts being recorded in 12 of these ponds. As part of the Proposed Development, two ponds located within the south western corner of the Site will be decommissioned. These will be replaced with four new ponds especially designed for great crested newts.
- 4.2.3 One active badger sett was found within the Site during surveys, with several additional disused setts identified in the surrounding area. Generally, habitats suitable for badgers are limited to woodlands, rough grassland and scrub; and given that there are only small pockets of these habitats present on Site, it is considered the Site is likely to only support low number of badgers.
- 4.2.4 Three bat roosts were confirmed in Padeswood Hall and an outbuilding on site. These buildings are to be demolished however as the roosts were in use by single common pipistrelles, it is considered that the loss of these buildings will not affect the conservation status of the common pipistrelles in the local area. There was no evidence observed of bats or roosts in any of the trees on site. The Site only supports low numbers of roosting bats.
- 4.2.5 The Proposed Development will be constructed over existing areas of broadleaved semi natural woodland, scrub, ruderal plants and farmed grassland. This will result in the permanent loss of vegetation and the potential for some of the species found on site to be displaced and or their habitats fragmented.
- 4.2.6 A biodiversity mitigation area is proposed as part of the project. This area will contain broadleaved woodland, grassland, enhanced hedgerows and the four new ponds to replace the equivalent habitats lost by the Proposed Development.
- 4.2.7 A habitat creation and management plan has been prepared to minimise the impacts of the Proposed Development and describes how the mitigation area and works more generally will be managed to enhance biodiversity at the Site. The management plan provides for the translocation of great created newts into the new ponds, phased vegetation clearance to make habitats less suitable before any areas are cleared, the installation of exclusion fences to stop species entering into the construction site, site supervision in respect of avoiding impacts on species and habitats where possible and the creation and management of the biodiversity mitigation area. Post construction monitoring of the biodiversity mitigation area is also proposed which will ensure plant establishment and that ongoing maintenance is undertaken. The habitat

creation and management plan will also detail mitigation measures for when the Proposed Development is operating including fencing plans and lighting plans (i.e. to limit light spill).

- 4.2.8 The translocation of great crested newts will require a licence from Natural Resources Wales, which will be applied for either in parallel, or subsequent to, the grant of planning permission. Although the badger sett is located outside of the Proposed Development footprint, monitoring prior to works commencing will be undertaken to determine whether the sett is active or not. If the sett is found to be inactive, it will be closed. If active, a licence from Natural Resources Wales will be obtained which will detail mitigation and monitoring measures for badgers.
- 4.2.9 Mitigation measures for roosting bats will also be confirmed through the licence process with Natural Resources Wales. Demolition and construction will be supervised by a qualified ecologist to ensure there will be no physical harm to bats.
- 4.2.10 The mitigation measures proposed will ensure that the effects on biodiversity will not be significant.

4.3 Air quality

Will dust and emissions generated during construction affect the local area?

- 4.3.1 Demolition, earthworks, vehicle movements and construction activities have the potential to generate dust and particulate matter (PM10). Measures will be taken to control dust which may include (but not limited to): water sprays, temporary screens/barriers and water assisted dust sweepers. With the implementation of these measures outlined in the construction environmental management plan, it is considered that the effects of dust on the surrounding area during construction will be negligible and not significant.

Will air quality in the local area worsen because of the Proposed Development?

- 4.3.2 The carbon capture process will produce the discharge of pollutants into the air, in addition to the existing cement works. The key pollutants will be nitrogen oxides, particulate matter, sulphur dioxide, carbon monoxide, and amine and nitrosamine compounds. Detailed dispersion modelling was undertaken which assessed the changes to pollutant concentrations on the local area as a result of the Proposed Development. The modelling concluded that the additional emissions from the carbon capture process will result in negligible changes to key pollutant concentrations. The effects on human health as a result of the additional emissions have been considered to be 'not significant'.
- 4.3.3 The potential effects of the proposed emissions on the local habitats was also undertaken. Dust generated by construction activities can coat nearby foliage but operational emissions can also have indirect impacts such as changing the deposition of nitrogen in soils. Modelling of key pollutants including nitrogen deposition rates

was undertaken on key ecological sites (i.e. special areas of conservations and Ramsar sites). The modelling concluded that there will be an increase in pollutant concentrations however this will not have a significant effect on key ecological sites.

4.4 Climate

What will the impacts of the Proposed Development be on greenhouse gas emissions?

- 4.4.1 An assessment of the likely effects of the Proposed Development on the climate has been undertaken. This assessment identified and quantified key emission sources associated with the construction and operation of the Proposed Development. These sources include embodied carbon of construction materials (i.e. the emissions generated during the production of construction materials), transport of construction materials and staff, fuel consumption by the Carbon Capture Plant, process emissions from the existing cement manufacturing and emission savings from the proposed carbon capture and storage process.
- 4.4.2 To minimise greenhouse gas emissions, the appropriateness of raw materials and conserving energy throughout the construction and operation of the Proposed Development has been prioritised. The construction environmental management plan will detail these mitigation measures and will include approaches such as maximising low carbon and locally sourced materials, promoting recycling of materials and decreasing fuel/diesel use where possible. It is estimated that the construction emissions associated with the Proposed Development will equate to 0.004% of the UK's national carbon budget and therefore will not have a significant impact on the climate, particularly when the operational savings of the Proposed Development are taken into account.
- 4.4.3 Once operational, the Proposed Development will capture and send for storage CO₂ which would have been emitted by the cement works. The Proposed Development will capture up to 95% of CO₂ produced by the cement works. This represents an 8% reduction in annual UK emissions from the manufacture of cement (based on 2020

annual emissions data). It will therefore have a significant benefit in reducing carbon emissions and on climate change.

4.5 Cultural heritage

Will local heritage be affected during construction?

- 4.5.1 Desktop studies and field surveys confirmed that there are no designated sites (i.e. world heritage sites, scheduled monuments, Grade I or Grade II listed buildings or historic landscapes) within the Site boundary.
- 4.5.2 There are 14 undesignated sites within the Site; which are locally listed historic assets including an area of medieval ridge and farrow, Padeswood Hall and its associated buildings and a post-Medieval coal shaft at Bannel Farm.
- 4.5.3 Through consultation with Flintshire County Council Conservation Officer, Clwyd Powys Archaeological Trust and Cadw, it was determined that cultural heritage assessment would focus on any non-designated assets within one kilometre and any designated assets within five kilometres of the Site boundary. This resulted in the assessment of 15 non-designated assets and six scheduled sites.
- 4.5.4 Many of the non-designated assets are located within the Proposed Development footprint and may be impacted by intrusive works. There is high potential for below ground archaeological remains to be present within the footprint of the Proposed Development from the Medieval period onwards, with any finds likely to be of local importance only. Photographic surveys will be undertaken prior to commencement of works, and earthworks will be supervised by qualified archaeologists. Due to the distance between the scheduled sites and the Proposed Development and the local importance of the non-designated assets on site, it has been assessed that the effects of the Proposed Development on cultural heritage will not be significant.
- 4.5.5 Padeswood Hall, Padeswood Hall Farm and associated outbuildings are located within the footprint of the Proposed Development and will be demolished. These assets have been classified as being of local importance, therefore it has been assessed that the overall effect of their demolition will not be significant.

4.6 Landscape and visual

Will there be a change to landscape character in the local area?

- 4.6.1 The Site is located within National Landscape Character Area (NCLA) 13: Wreccsam a Glannau Dyfrdwy/Deeside and Wrexham. NCLA 13 is characterised as lowlands and foothills with the Dee River transversing the area. This NLCA has been heavily industrialised and is an economic hub of the Welsh and regional English economy.
- 4.6.2 The Proposed Development will result in the construction of a flue gas stack structure, which will have a maximum height of approximately 117.9 metres (which is no taller than the existing kiln stack) and additional tall structures of industrial appearance.

Due to these additions, a landscape and visual impact assessment has been undertaken.

- 4.6.3 The Proposed Development will result in the removal of grassland, scrub and woodland. New areas of deciduous woodland, grassland and four new ponds in the northeast and north west of the Site is proposed.
- 4.6.4 Given the scale of the Proposed Development, the effect on landscape character has been assessed as significant at the Site level during the first ten years of operation.

Will the Proposed Development be visible from the surrounding areas?

- 4.6.5 Computer modelling was undertaken to determine the likely visibility of the Proposed Development. Field studies were also undertaken to ground truth the modelling. Potential visibility of the Proposed Development is limited to up to 3 kilometres from the south, west and south east of the Site. Generally, there would be limited views of the Proposed Development from within the surrounding towns and villages.
- 4.6.6 In conjunction with Flintshire County Council and Planning and Environment Decisions Wales, 14 viewpoints were selected. These viewpoints represent the most exposed views of the Proposed Development from the surrounding area. The primary structures visible will be the new flue gas stack and the proposed regenerator building.
- 4.6.7 The change in views from Padeswood Drive West is assessed as being significant. The Proposed Development will appear as an extension to the existing operations and the built form will appear to approximately double in size. The new flue gas stack will be prominent however it must be viewed in the context of the current cement works and therefore it is considered it will be in keeping with the existing industrial appearance of the immediate landscape.
- 4.6.8 The view of the Proposed Development from Pen-yr-allt will be screened partially by the existing vegetation, however the proposed regenerator building and flue gas stack will still be visible.
- 4.6.9 Existing vegetation will partially screen the Proposed Development from Bannel Lane, however the Proposed Development will appear as an extension of the existing cement works. The new flue gas stack will be prominent.
- 4.6.10 The Proposed Development will be visible from Spon Green. The new flue gas stack will be prominent.

Will any views from Public Rights of Ways (PRoW) be affected by the Proposed Development?

- 4.6.11 The PRoW Buckley 301/56/20 is located along the south western boundary of the Site. The view from the PRoW currently comprises scrub grassland, a lagoon and trees. The existing kiln stack and industrial buildings are visible. Some of the grassland and trees will be removed as part of the Proposed Development and will be replaced with industrial buildings. PRoW Buckley 301/56/20 currently crosses the area proposed for the Carbon Capture Plant and therefore will need to be diverted

with continuance of the existing footpath to the north and south along the western Site boundary.

- 4.6.12 PRow Leeswood 408/73 and 408/75 (incorporating Wat's Dyke Way) are located adjacent to the southern boundary of the Site. The Proposed Development will predominately be screened by the existing woodland located along the southern boundary of the Site except for the flue gas stack and proposed regenerator building.

4.7 Noise and vibration

How has noise and vibration been considered within the planning application?

- 4.7.1 A noise and vibration impact assessment has been undertaken to understand the potential effects from the Proposed Development that may be generated and how these effects may potentially impact on chosen nearby sensitive locations.
- 4.7.2 The study area for the assessment considers the nearest and most exposed noise sensitive locations surrounding the Proposed Development, including residential properties located at Padeswood Drive, Plas Yn Rhos, Lake Road and isolated properties to the south west of the Site boundary.

How do you know what the impacts of the Proposed Development will be on the chosen nearby sensitive locations?

- 4.7.3 To inform the assessment, background noise measurements have been recorded using specialist monitoring equipment to understand the current day time and night time noise levels at the chosen nearby sensitive locations. This collected data has subsequently been used to understand the potential effects from the Proposed Development and their potential impact on the identified locations.

Will any noise be generated by the Proposed Development when it is being built?

- 4.7.4 When considering the potential impact from construction noise, the following was assessed:
- The construction phase programme and the timings of construction phase activity; and
 - The proposed construction techniques across the Site to build the Proposed Development.
- 4.7.5 The noise and vibration assessment considered the noise generated by these construction phase activities and mitigation is proposed to limit the impact on nearby sensitive locations. The best techniques, technology and methods that are available and feasible at the time of construction will be implemented. The proposed mitigation measures include (but are not limited to):
- The installation of noise barriers (such as solid fencing or specialist noise barriers) surrounding the perimeter of construction and laydown areas across the Site;

- All plant, equipment and noise control measures applied to plant will be regularly maintained in good and efficient working order;
- Machines that are only used intermittently will be shut down during periods between works;
- Plant and equipment will be orientated away from nearby sensitive locations, as far as is reasonably practicable; and
- All site personnel will undergo site specific inductions where they will be briefed on noise and vibration control measures.

Will any noise be generated by the Proposed Development when it is operational?

- 4.7.6 For the operational phase, the noise and vibration assessment has identified where the noise is being generated by the Proposed Development. Computer software has been used to create a noise model to reflect the anticipated operations of the Proposed Development and spreadsheet calculations have been undertaken to quantify the potential noise and vibration impacts at chosen nearby sensitive locations.
- 4.7.7 The outputs from the computer noise model have been used to determine noise impacts at the chosen nearby sensitive locations. The computer noise model has run several times and has undergone a number of iterations to refine and mitigate the noise impacts to inform the design of the Proposed Development. The proposed mitigation measures include (but are not limited to):
- Building enclosures around the dominant noise generating plant or equipment; and
 - Enhanced building fabric to reduce noise being emitted from the Proposed Development.
- 4.7.8 The specific design of the noise mitigation for the Proposed Development will continue to evolve as the project develops.

4.8 Traffic and transport

How will local roads be affected during construction?

- 4.8.1 There will be an increase in traffic from the construction of the Proposed Development; with workers arriving/leaving the Site, the supply of construction materials, movement of plant, removal of waste, and services vehicles.
- 4.8.2 Modelling of the proposed traffic movements and assessment of the surrounding road network has been undertaken to determine whether the increase in traffic during construction will cause delays, impact road users and pedestrian safety, and the overall pleasantness of a journey.
- 4.8.3 Predicted construction traffic movements of heavy goods vehicles and light goods vehicles were compared against baseline conditions and the percentage change

calculated. As per industry guidance, if traffic flows are predicted to increase by more than 30%, it is considered there will be a significant impact on the road network, whereas if the percentage change is less than 10%, it is considered that there will be no discernible impact on the road network. Increases in traffic flows of over 10% can lead to significant effects depending on the sensitivity of the highway link impacted.

- 4.8.4 A construction traffic management plan will be prepared which will detail measures to mitigate the impacts associated with the increase in traffic movements such as detailing suitable routes for heavy goods vehicles and the avoidance of peak periods (i.e. between 08:00 to 09:00 and 17:00 to 18:00).
- 4.8.5 A travel plan will also be implemented which will detail measures to reduce private car travel and carbon emissions by promoting active travel, public transport use and car sharing.
- 4.8.6 Through the implementation of the construction traffic management plan and travel plan; it is expected that the proposed construction traffic will not increase more than 30% and therefore there will not be any long standing significant effects on the local road network.

Will the local roads be affected by operational traffic?

- 4.8.7 Once the Proposed Development is operational, 54 more employees will be required, which has been calculated to generate an additional 92 vehicle movements a day. The Proposed Development will however be a 24 hours a day, 7 days a week operation, with most employees doing shift work. Employee arrivals and departures are not expected to be significant on the local road network, as most vehicle movements will be outside of peak times, staff numbers are relatively low in the context of the road network, and employee traffic movements will be substantially lower than traffic movements associated with construction, which do not give rise to any significant effects.

4.9 Land and soils

Will the Proposed Development affect any underlying mineral resources or geological units?

- 4.9.1 Geological records show that there are coal seams present underneath the northern and central sections of the Site. A coal mining risk assessment was undertaken, which indicated that there are no recorded plans for future underground coal mining. Through the Site selection process, areas of coal reserves have been avoided, therefore any effects on mineral resources have been assessed as being not significant.
- 4.9.2 The Site is underlain by superficial deposits of Devensian Till (clay, sand, gravel and boulders) across most of the Site, with small areas of Head Deposits (clays, silt, sand and gravel), and bedrock. These deposits are widespread across Wales and England. All excavations will be required to be undertaken in accordance with the

mitigation measures detailed in the construction environmental management plan. Given the underlying geology of the Site is common throughout the UK and the proposed mitigation measures, the effects of the Proposed Development on the underlying geology are considered to be not significant.

Will the Proposed Development lead to any soil contamination?

- 4.9.3 There is potential for the soil within the Site to be contaminated due to the previous uses. Earthworks will be required to be undertaken in accordance with mitigation measures outlined in the construction environmental management plan and a soil management plan. Any contaminated soil/groundwater will be separated, treated (if practicable) or disposed of at a soil treatment facility or an appropriately permitted landfill.
- 4.9.4 The Proposed Development itself is not anticipated to lead to additional risks of land contamination, as the Site will be managed in accordance with existing regulatory requirements and will be subject to the conditions of an Environmental Permit to be issued by Natural Resources Wales. The effects of contamination on land and soils has therefore been assessed as not significant.

How will topsoil be managed?

- 4.9.5 Where practicable, topsoil will be reused on site. The movement, stockpiling and reuse of soil will be undertaken in accordance with a soil management plan to ensure soil resources are protected.

4.10 Major accidents and disasters

How will the Proposed Development manage major accidents or disasters?

- 4.10.1 A Hazard Identification study has been prepared for the Proposed Development which has identified the following as the potential to cause a major accident or disaster:
- Loss of containment of CO₂;
 - Fire;
 - A major structural failure; and
 - A major pollution incident.
- 4.10.2 In response to the findings of this study, further safety plans and processes are being prepared, in accordance with which the plant will be operated. These plans will address each of the hazards identified above.
- 4.10.3 Existing health, safety and environmental management systems will be updated/amended to include the Proposed Development. These systems will outline approaches to safety and environmental management during operation including spill

response, emergency response and safe evacuation plans, including (but not limited to):

- The development of an emergency plan in the case of a large release of CO₂; including the installation of a gas detection system and the construction of an impounding basin which will direct any CO₂ leak to a low point to be retained;
- A fire risk assessment will be conducted at each design stage to ensure appropriate safeguarding and firefighting measures are implemented;
- Safeguards to be embedded into the design (i.e., materials used and structural design); and
- Spill response plans to be updated and the introduction of additional spill kits.

4.11 Material assets and waste

How will materials and waste be managed?

- 4.11.1 Waste generated on site will be managed in an appropriate and sustainable manner. An outline site waste management plan has been prepared for the Proposed Development. The outline site waste management plan aims to reduce, reuse, recycle and recover waste generated during construction and operation phases.
- 4.11.2 Minimising waste will be considered at each stage of the detailed design phase including the use of prefabricated and standardised materials, prioritising recycled or reclaimed materials and provision of accurate design specifications.
- 4.11.3 The outline site waste management plan outlines key principles to minimise the generation of waste during demolition, site preparation, construction and operational phases. It includes
- The reuse of materials (where practicable);
 - Segregation of waste to minimise cross-contamination;
 - Calculating quantities of construction waste generated and setting minimisation/recycling targets; and
 - Development of registers, audits and monitoring programmes.
- 4.11.4 Waste generated by the Proposed Development once operational will be either reused on site or disposed of via an appropriate waste contractor to a suitable waste facility. Waste storage areas will be appropriately located and designed to ensure any potential risk on the environment is minimised.

4.12 Cumulative effects

Have the environmental effects from the Proposed Development been considered together?

- 4.12.1 Yes. Different environmental effects associated with the Proposed Development will be occurring simultaneously during the construction and operational phases. An

assessment of the combined effect of these different environmental effects has been undertaken.

Have the environmental effects of the Proposed Development been considered in combination with other projects in the area?

- 4.12.2 Yes. An assessment of the cumulative effects of the Proposed Development in combination with other approved developments located within 5 kilometres has been undertaken. The assessment examined significant environmental effects from more than one project on different receptors/resources.
- 4.12.3 Through a shortlist process, 11 projects were identified and were assessed in combination with the Proposed Development. These projects included residential developments, the construction of solar farms and the construction of an advanced gasification plant. In light of Planning and Environment Decisions Wales Scoping Direction, an assessment of the connecting CO₂ pipeline from Padeswood Cement Works to the main HyNet North West CO₂ pipeline has also been undertaken. Each environmental factor (i.e. biodiversity, traffic, air quality etc) was assessed in conjunction with the 11 projects. Each environmental factor assessment concluded that it is anticipated that no significant cumulative effects will arise from the Proposed Development and the other projects.

5 WHAT HAPPENS NEXT?

- 5.1.1 The draft Environmental Statement has been submitted to Planning and Environment Decisions Wales and to Flintshire County Council for statutory pre-application consultation. During this period, Planning and Environment Decisions Wales will continue to contact government bodies and agencies for advice on the information presented in the draft Environmental Statement.
- 5.1.2 Additional relevant documents can be accessed free of charge electronically via the Welsh Government's planning casework service (under CAS-02009-W1R1Z7-Padeswood CCS) at <https://planningcasework.service.gov.wales>.
- 5.1.3 Statutory pre-application consultation will begin on 02 July 2024 and will end at 23:59 on 12 August 2024. For public consultation event dates, please visit <https://www.padeswoodccs.co.uk/en>.
- 5.1.4 Comments in relation to this planning application can be provided by post, email or online:
- Post: FREEPOST PADESWOOD CCS;
 - Email: padeswoodccs@uk.heidelbergmaterials.com; and
 - Online: <https://www.padeswoodccs.co.uk/en>.
- 5.1.5 All feedback from statutory pre-application consultation will be taken into consideration in the final planning application. The planning application will then be submitted to Planning and Environment Decisions Wales and Flintshire County Council for determination.

REFERENCES

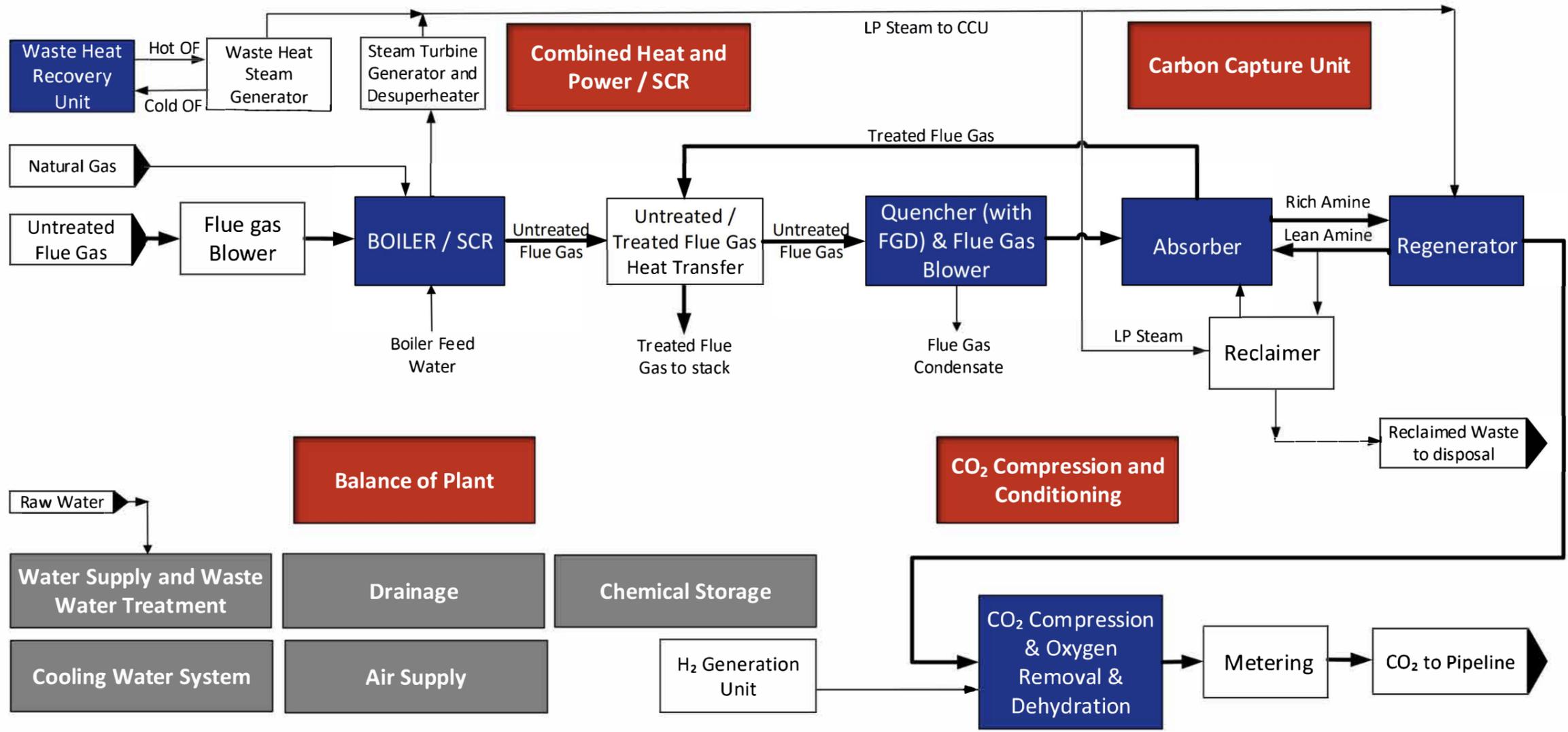
Department for Business, Energy & Industrial Strategy (2019). *UK becomes first major economy to pass net zero emissions law*. Available at: <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>

United Nations Framework Convention on Climate Change (2018). *2015 Paris Agreement*. Available at: <https://unfccc.int/documents/184656>

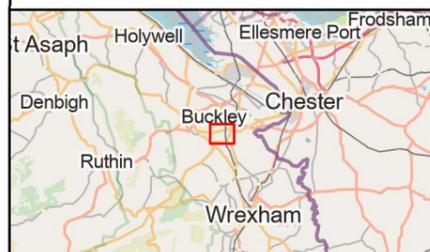
DRAFT

APPENDIX A PROCESS FLOW DIAGRAM

DRAFT



Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



Rev	Date	Description	Drn	Chk	App
00	25/03/2024	First Draft	CJ	HC	HC

Padeswood Carbon Capture and Storage Project



TITLE: Volume 1, Appendix A:
 Carbon Capture and Storage block
 flow diagram

ID: Volume 3, Figure 1.3 - Carbon Capture and Storage Block Flow Diagram



Scale: N/A

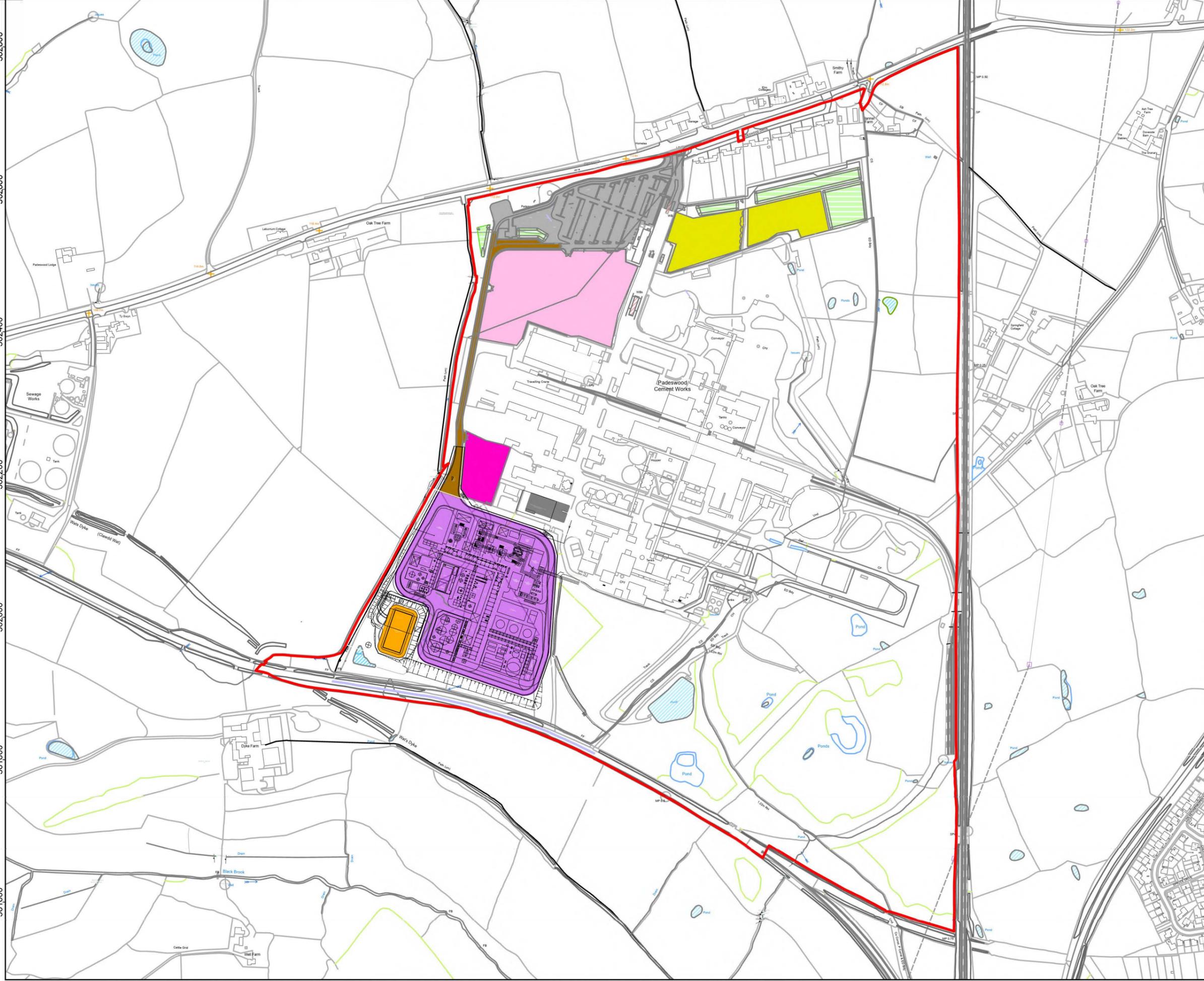
REV 00

APPENDIX B PROPOSED MASTERPLAN

DRAFT

328200 328400 328600 328800 329000 329200 329400 329600 329800

362800
362600
362400
362200
362000
361800
361600



- Legend:**
- Planning Application Boundary
 - *Land Ownership Boundary is coincident with Planning Application Boundary and therefore not separately shown.
 - Carbon Capture Plant (including CHP and CCS areas)
 - Carbon Capture Plant site access road
 - Carbon Capture Plant contractor village and welfare
 - Indicative landscape bunding
 - General car park
 - Carbon Capture Plant materials laydown and contractors storage area
 - Offices and joint control centre
 - Stormwater holding pond
 - Carbon Capture Plant laydown and construction offices

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter



10	24/06/2024	Stormwater Holding Pond Adjustment	CJ	HC	HC
09	20/06/2024	Updated Legend	CJ	MB	HC
08	03/05/2024	Updated Legend	CJ	MB	HC
Rev	Date	Description	Drn	Chk	App

Padeswood Carbon Capture and Storage Project

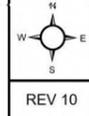


TITLE: Volume 1, Appendix B:
Site Masterplan

ID: Volume 3, Figure 1.2 - Site Masterplan



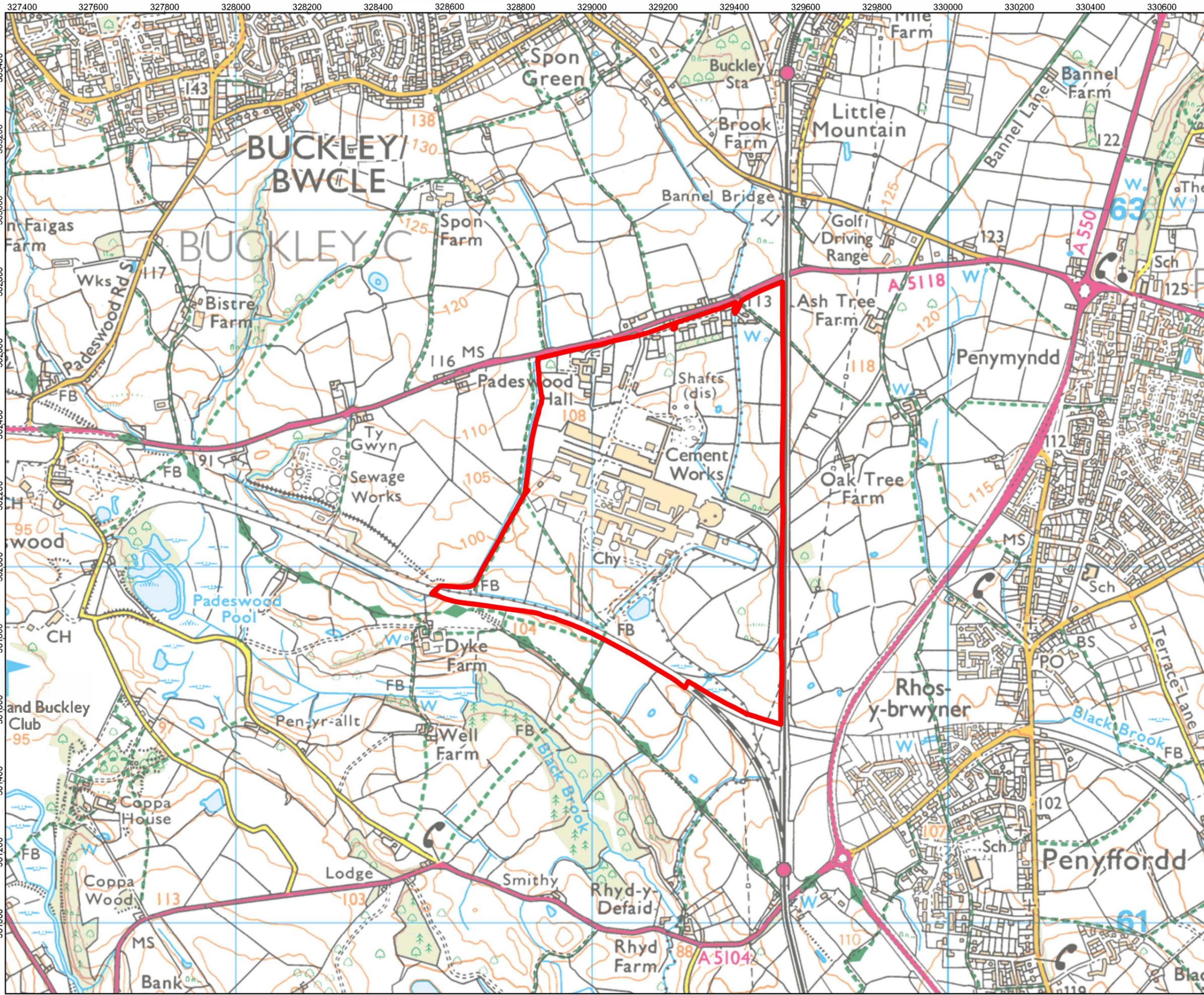
Scale: 1:5,000 @ A3



REV 10

APPENDIX C SITE LOCATION

DRAFT



Legend:
 Planning Application Boundary

*Land Ownership Boundary is coincident with Planning Application Boundary and therefore not separately shown.

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



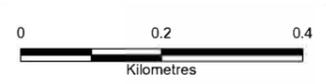
Rev	Date	Description	Drn	Chk	App
04	03/05/2024	Increased RLB Width	CJ	MB	HC
03	17/04/2024	Updated Legend	CJ	MB	HC
02	16/04/2024	OS Base Mapping	CJ	MB	HC

Padeswood Carbon Capture and Storage Project



TITLE: Volume 1, Appendix C: Project Location Plan

ID: Volume 3, Figure 1.1 - Project Location Plan



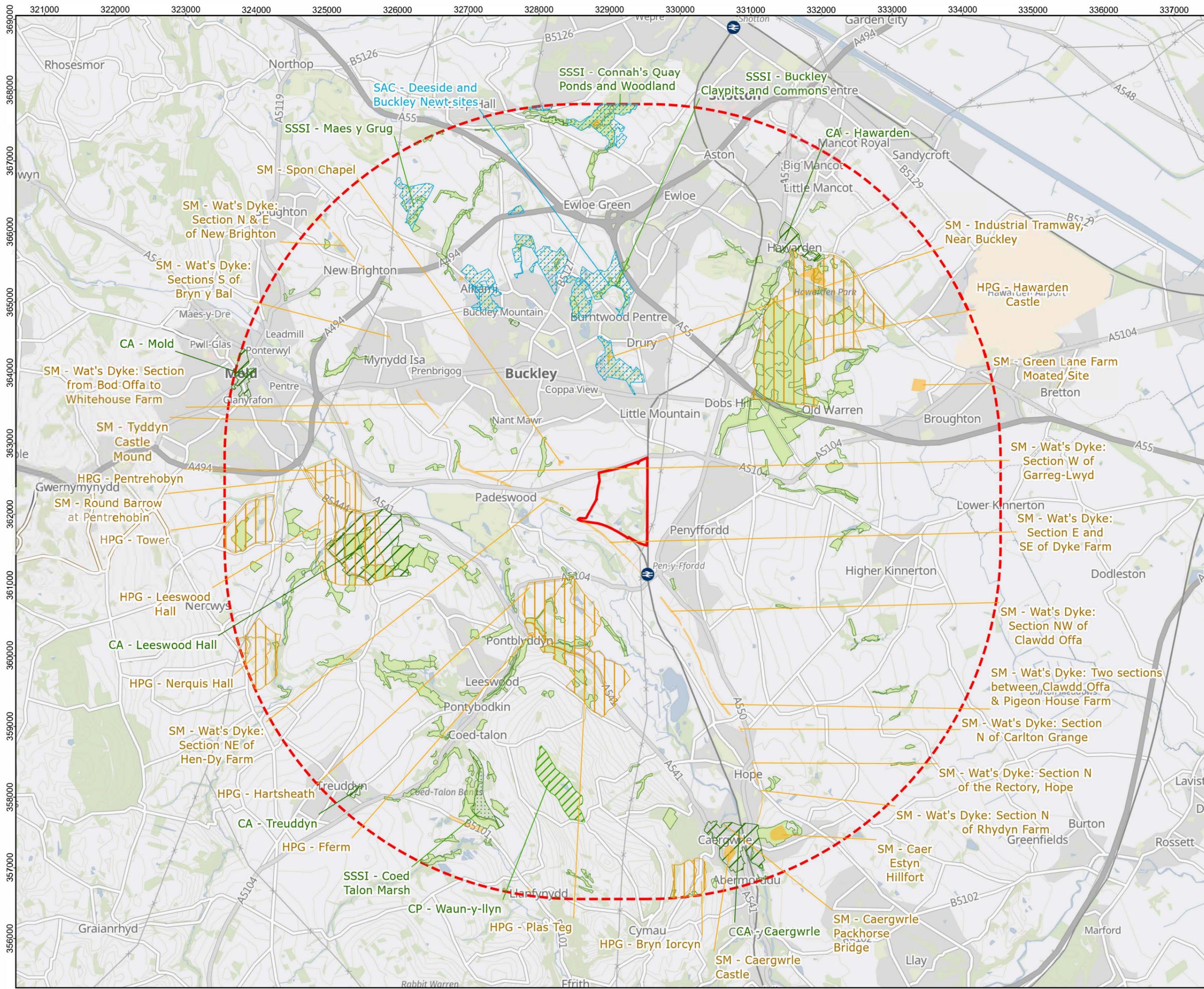
Scale: 1:10,000 @ A3



REV 04

APPENDIX D ENVIRONMENTAL CONSTRAINTS PLAN

DRAFT



- Legend:**
- Planning Application Boundary
 - Zone of Influence
 - International Constraints**
 - Special Area of Conservation (SAC)
 - Historical Constraints**
 - Historic Parks and Gardens (HPG)
 - Scheduled Monuments (SM)
 - National Constraints**
 - Site of Special Scientific Interest (SSSI)
 - Conservation Areas (CA)
 - Country Park (CP)
 - Ancient Woodland

Note: Labels for Ancient Woodland are excluded from the figure.

Coordinate System: British National Grid
 Projection: Transverse Mercator
 Datum: OSGB 1936
 Units: Meter



Rev	Date	Description	Drn	Chk	App
03	29/04/2024	Updated Legend	CJ	HC	HC
02	25/03/2024	Updated Figure Title	CJ	HC	HC
01	29/04/2024	Updated Figure Title & Layer Name	CJ	MB	HC

Padeswood Carbon Capture and Storage Project



TITLE: Volume 1, Appendix D:
 Environmental Features
 Plan

ID: Volume 3, Figure 1.4 - Environmental Features Plan

