VikingCCS

Viking CCS Pipeline

6.7.1 Initial Biodiversity Net Gain Assessment

Document Reference: EN070008/APP/6.7.1

Applicant: Chrysaor Production (U.K.) Limited,
a Harbour Energy Company
PINS Reference: EN070008
Planning Act 2008 (as amended)
The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)
Date: October 2023

Harbour Energy | AECOM

PINS Reference	Document Reference	Document Revision	Date
EN070008	EN070008/APP/6.7.1	Revision 1	October 2023

Prepared by		Verified by		Approved by
LCD		LD		NP
Senior Consultant		Ecology Technical Director		EIA Technical Director

Prepared by:

AECOM Limited
Exchange Station
Tithebarn Street
Liverpool
Merseyside
L2 2QP

Table of Contents

1. Introduction

1.1.1 AECOM Ltd was commissioned by Chrysaor Production (U.K.) Limited, a Harbour Energy company (hereafter referred to as the 'Applicant') to undertake a Biodiversity Net Gain (BNG) assessment of an approximately 55.5 km pipeline proposal in the Yorkshire and Humber and East Midlands regions of England, spanning from Immingham to Theddlethorpe (hereafter referred to as the 'Proposed Development'). The assessment is intended to inform the Development Consent Order (DCO) application for the Viking CCS Pipeline project. The Ordnance Survey National Grid reference of the eastern and western extents of the Proposed Development are TA 16996 17183 and TF 50202 87564 respectively.

1.1.2 This document details the methodologies and outputs of the baseline and post-development BNG assessment for the Proposed Development.

1.1.3 An indicative layout within the Order Limits has been used to undertake this assessment and is hereafter referred to as 'the Site'. The BNG assessment has been undertaken to quantify the overall effect of the permanent loss of habitat relating to the above ground installations on the biodiversity value of the Site. This is achieved by comparing the Site's baseline habitat value with that of the constructed Proposed Development. Calculations consider the level of proposed habitat loss, retention, enhancement and/or creation delivered by the Proposed Development. Guidance has been taken from Natural England's Biodiversity Metric 4.0[1] and associated guidance documents[2] and best practice principles[3] though adjusted for the Applicant's proposed approach to BNG. The report sets out the results of the BNG assessment including the methodology in Section 2, the results in Section 3, the recommendations in Section 4, and the conclusions in Section 5.

1.2 Site Description

1.2.1 The Proposed Development, indicated by the Order Limits, is detailed on the 'Baseline Habitat Plan' (Appendix A). The Site largely comprises bare ground, arable fields, both cropland and grazed parcels. The Northern end of the Site incorporates the current Immingham industrial area. At this time the final design for the Southern end of the Proposed Development at Theddlethorpe has yet to be finalised, with facilities to be located either on the site of the former Theddlethorpe gas terminal (Option 1) or on agricultural land immediately to the west of this site (Option 2). As Option 2 represents the more impactful in terms of loss of habitat, this assessment has assumed that Option 2 will be developed. The Theddlethorpe end of the Site is adjacent to Saltfleetby – Theddlethorpe Dunes which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC), Gibraltar Point SAC and the Humber Estuary which is designated as a Ramsar Site and a Special Protection Area (SPA). All designated areas have been avoided and will not be directly impacted by the works.

[1] Natural England (2023). The Biodiversity Metric 4.0.
[2] Natural England (2023). The Biodiversity Metric 4.0 – User Guide, Technical Annex 1 & Technical Annex 2.
[3] CIEEM, IEMA & Ciria (2019). Biodiversity Net Gain: Good Practice Principles for Development, A Practical Guide

1.3 Proposed Development

1.3.1 The Viking CCS Pipeline ('the Proposed Development') comprises a new 24 ” (609 mm) diameter onshore pipeline of approximately 55.5 km in length, which will transport Carbon Dioxide (CO_2) from the Immingham industrial area to the Theddlethorpe area on the Lincolnshire coast, where it will connect into the existing 36 ” (921 mm) diameter offshore LOGGS pipeline.

1.3.2 The Proposed Development is an integral part of the overall Viking CCS Project, which intends to transport compressed and conditioned CO_2 received at a facility at Immingham to store in depleted gas reservoirs under the Southern North Sea. The offshore elements of the Viking CCS Project, including the transport of CO_2 through the LOGGS pipeline to the Viking gas fields under the North Sea, are subject to a separate consenting process.

1.3.3 The key components of the Proposed Development comprise:

- Immingham Facility;
- Approximately 55.5 km 24 inch (”) onshore steel pipeline (including cathodic protection);
- Three Block Valve Stations;
- Theddlethorpe Facility (as noted above there are two potential sites for this part of the development, this assessment has assumed Option 2 would be used);
- Existing LOGGS pipeline and isolation valve to the extent of the Order Limits at Mean Low Water Springs (MLWS);
- Permanent access to facilities;
- Mitigation and landscaping works;

1.3.4 Further details of each element of the Proposed Development are set out in *Environmental Statement Volume II Chapter 3 Description of the Proposed Development* (*Application Document 6.2.3*).

2. Policy context

2.1 National Legislation and Policy

2.1.1 The Environment Act[4] includes provisions to make BNG a requirement for developments consented via the Town and Country Planning Act 1990. It is currently anticipated these requirements will be introduced from January 2024.

2.1.2 The Environment Act also includes provisions that would make BNG a requirement for Nationally Significant Infrastructure Projects (NSIP) (such as the Proposed Development), however there is no fixed timeline for these to be brought into force and it is not expected to apply to NSIP applications until at least November 2025. As such, there is no legal obligation under the Environmental Act 2021 or otherwise on the Proposed Development to provide BNG as part of this development.

[4] UK Government (2021). The Environment Act

2.1.3 It is government policy that *"planning decisions should minimise impacts on and provide net gain for biodiversity",* as stated within the NPPF[5].

2.1.4 The Overarching National Policy Statement for Energy (EN-1)[6] states the following regarding habitat losses and biodiversity:

- 'The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests';
- 'As a general principle, and subject to the specific policies below, development should aim to avoid significant harm to biodiversity and geological conservation interests, including through mitigation and consideration of reasonable alternatives (as set out in Section 4.4 above); where significant harm cannot be avoided, then appropriate compensation measures should be sought.'; and
- The applicant should include appropriate mitigation measures as an integral part of the proposed development. In particular, the applicant should demonstrate that:
  - During construction, they will seek to ensure that activities will be confined to the minimum areas required for the works;
  - During construction and operation best practice will be followed to ensure that risk of disturbance or damage to species or habitats is minimised, including as a consequence of transport access arrangements;
  - Habitats will, where practicable, be restored after construction works have finished; and
  - Opportunities will be taken to enhance existing habitats and, where practicable, to create new habitats of value within the site landscaping proposals.'

2.1.5 The NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)7 states the following regarding biodiversity:

- 'The ES should include an assessment of the biodiversity and landscape and visual effects of the proposed route and of the main alternative routes considered (see Section 5.9 of EN-1). The application should also include proposals for reinstatement of the pipeline route as close to its original state as possible and consider any requirements for agreements with the landowner to access areas for aftercare and management work. Where it is unlikely to be possible to restore landscape to its original state, the applicant should set out measures to avoid, mitigate, or employ other landscape measures to compensate for, any adverse effect on the landscape'.

2.2 Local Planning Policy

2.2.1 For planning context, the following local planning policies consider biodiversity net gain.

[5] UK Government (2023). National Planning Policy Framework
[6] Overarching NPS for Energy (EN-1)
[7] NPS for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)

2.2.2 The Central Lincolnshire Local Plan[8] includes the following policies relating to BNG:

- **Policy S60:** Protecting Biodiversity and Geodiversity: "All development should: protect, manage, enhance and extend the ecological network of habitats, species and sites of international, national and local importance (statutory and non-statutory), including sites that meet the criteria for selection as a Local Site;"; and
- **Policy S61**: Biodiversity Opportunity and Delivering Measurable Net Gains: "The following part of the policy applies unless, and until, subsequently superseded, in whole or part, by national regulations or Government policy associated with the delivery of mandatory biodiversity net gain arising from the Environment Act 2021. Where conflict between the policy below and the provisions of Government regulations or national policy arises, then the latter should prevail. All qualifying development proposals must deliver at least a 10% measurable biodiversity net gain attributable to the development. The net gain for biodiversity should be calculated using Natural England's Biodiversity Metric."

2.2.3 The North Lincolnshire Core Strategy includes the following policy relating to BNG:

- **Policy CS17: Biodiversity: "**The council will promote effective stewardship of North Lincolnshire's wildlife through: Ensuring development seeks to produce a net gain in biodiversity by designing in wildlife, and ensuring any unavoidable impacts are appropriately mitigated for".

2.2.4 North-East Lincolnshire Local Plan[9] includes the following policies relating to BNG:

- **Policy SO6: Built, historic and natural environment: "**Direct development to locations of least environmental value and proactively manage development to deliver net gains in biodiversity overall." ; and
- **Policy 41: Biodiversity and Geodiversity: "**C. Protect manage and enhance international, national and local sites of biological and geological conservation importance, having regard to the hierarchy of designated sites, and the need for appropriate buffer zones; D. Minimise the loss of biodiversity features, or where loss is unavoidable and justified ensure appropriate mitigation and compensation measures are provided; E. Create opportunities to retain, protect, restore and enhance features of biodiversity value, including priority habitats and species".

2.2.5 The East Lindsey Core Strategy[10] includes the following policy relating to BNG:

- **Strategic Policy 24 (SP24) – Biodiversity and Geodiversity:** "Development proposals should seek to protect and enhance the biodiversity and geodiversity value of land and buildings and minimise fragmentation and maximise opportunities for connection between natural habitats."

[8] Central Lincolnshire Local Plan
[9] North East Lincolnshire Local Plan
[10] East Lindsey Local Plan Core Strategy

2.3 Harbour Energy's Biodiversity Net Gain Position

2.3.1 Although delivery of BNG is not a legal or national policy requirement for NSIPs, the Applicant recognises the importance of BNG and is committed to delivering BNG that is proportionate to a project of this type. As delivery of BNG is not currently mandatory for NSIPs, it is not possible for the Applicant to take rights over land compulsorily for the purpose of delivering BNG, and opportunities to deliver BNG on site, as part of a buried pipeline project, are understandably limited.

2.3.2 The majority of the pipeline crosses through arable land and delivering 10% net gain on this temporary habitat loss, which will be fully reinstated and back in use for arable production in less than two years, is not considered to be a proportionate response. Furthermore, throughout the extensive pre-application consultation undertaken by the Applicant, the feedback received was that having the pipeline route restored for agricultural use post-construction was a priority for landowners. This also has the effect of limiting the practical ability to deliver BNG on the pipeline route, which can only be done through voluntary agreement. Notwithstanding that, the Applicant is continuing to explore BNG opportunities with landowners through voluntary negotiation.

2.3.3 However, the Applicant considers that where there will be a permanent loss of habitat at the above ground facilities, including their associated permanent access points and access tracks, it is proportionate to commit to delivering BNG. As such the Applicant has made a voluntary commitment to deliver a 10% net gain in biodiversity relating to the permanent habitat losses at the Immingham Facility, Theddlethorpe Facility, and Block Valve Stations. This strategy sets out further detail on the opportunities that have been identified to achieve this aim and the practical steps that the Applicant will take to deliver this.

2.3.4 It is recognised that there will be some small areas of habitat along the pipeline route that will not be fully restored within 2 years, for example hedgerows, grassland, woodland and ditches. Further assessment of these losses is proposed to be undertaken once the Front End Engineering Design (FEED) has been completed, and a more accurate understanding of potential losses can be gained.

2.3.5 The Applicant intends for this strategy to remain a live document. Opportunities for enhancement beyond the current target will remain under review and be developed further with relevant stakeholders post-consent.

3. Methodology

3.1 Biodiversity Metric 4.0

3.1.1 The BNG assessment involves making a comparison between the biodiversity value of habitats present within the Site prior to development (i.e., the 'baseline') and the predicted biodiversity value of habitats following the completion of the development (i.e., 'post-development'). The comparison is

made in terms of 'biodiversity units', with a 'biodiversity metric' providing the mechanism to allow biodiversity values to be calculated and compared.

3.1.2 Biodiversity Metric 4.0[1] calculates the overall loss or gain of biodiversity of development projects by assessing the distinctiveness (i.e., type of habitat and its value), condition, extent, and strategic significance of habitats on site pre- and post-development. To achieve BNG, the biodiversity unit score must have a post-development score higher than the baseline score.

3.1.3 When calculating the post-development biodiversity units, the Biodiversity Metric 4.0[1] includes a series of standard 'risk multipliers' to account for the inherent risk of creating and restoring habitats, the time taken to establish habitats and the location of the mitigation in relation to the habitats lost on site. The risk multipliers have the effect of reducing the value of the proposed habitats, which means larger areas, habitats of higher distinctiveness, and/or condition are required to mitigate for losses and achieve net gain.

3.1.4 The Biodiversity Metric 4.0[1] assesses and generates separate outputs for area-based habitats (measured in habitat units) and linear based habitats, including hedgerows (measured in hedgerow units) and watercourses (measured in watercourse units). To claim a net gain in biodiversity, there must be an increase across all habitats, hedgerow and river units, the units cannot be summed to give an overall biodiversity unit value i.e., an increase in habitat and hedgerow units cannot be used to offset a loss in watercourse units.

3.1.5 The information required to undertake the calculation is described below.

3.2 Baseline Data

3.2.1 Phase 1 habitat data (hereafter referred to as the 'baseline') were collected between March 2022 and May 2023 (see *ES Volume IV Appendix 6.1 Phase 1 Habitat Survey Report (Application Document 6.4.6.1)*. This information has been used to determine the Site's baseline area-based habitats, hedgerow habitats (which includes lines of trees) and watercourse habitats. The baseline habitats were assessed where possible within the Site. Habitats were converted from standard Phase 1 Habitat types[11] to UK Habitat (UKHab) Classification categories[12] (Appendix C.1) before being digitised in a Geographic Information System (GIS) to provide area and length measurements of each habitat type.

3.2.2 The land at Immingham was not accessed during the Phase 1 surveys however data have been shared by the applicant for the Humber Zero project[13].

3.2.3 All baseline habitats defined within the Site were assigned a condition using the condition assessment criteria outlined in the Biodiversity Metric 4.0 guidance document[s], by a suitably qualified ecologist. The data were aggregated and entered into the Biodiversity Metric 4.0. Each habitat is assigned a 'Distinctiveness' within the metric which is pre-set dependant on habitat type. The Biodiversity Metric 4.0 is then informed by the UK Habitat type, area, distinctiveness, condition and strategic significance (defined in Section 3.3.3) to calculate the baseline biodiversity units.

[11] JNCC (2016). Handbook for Phase 1 habitat survey - a technique for environmental audit.
[12] UKHab Classification
[13] Ecological Services Ltd (2023). Ecology and Nature Conservation Baseline Description. Lincoln.

3.2.4 With watercourse habitat categories, associated distinctiveness, and condition scores are approached differently to area-based habitats. In line with current guidance, a desk study was undertaken to identify all watercourse habitats present within the areas of permanent habitat loss at above ground facilities, using the web based 'Discovering Priority Habitat in England' river data map. River habitats were assigned a habitat category and distinctiveness using a combination of The Natural Environment and Rural Communities (NERC) Section 41 Priority Habitat descriptions, and River Naturalness Assessment class scores.

3.2.5 The only watercourse features to be affected by permanent habitat loss relating to the above ground installations are 'Ditches' and 'Culvert', therefore the Ditch Condition Assessment methodology was undertaken, in line with Natural England Metric 4.0 Guidance[1].

3.3 Post-Development Data

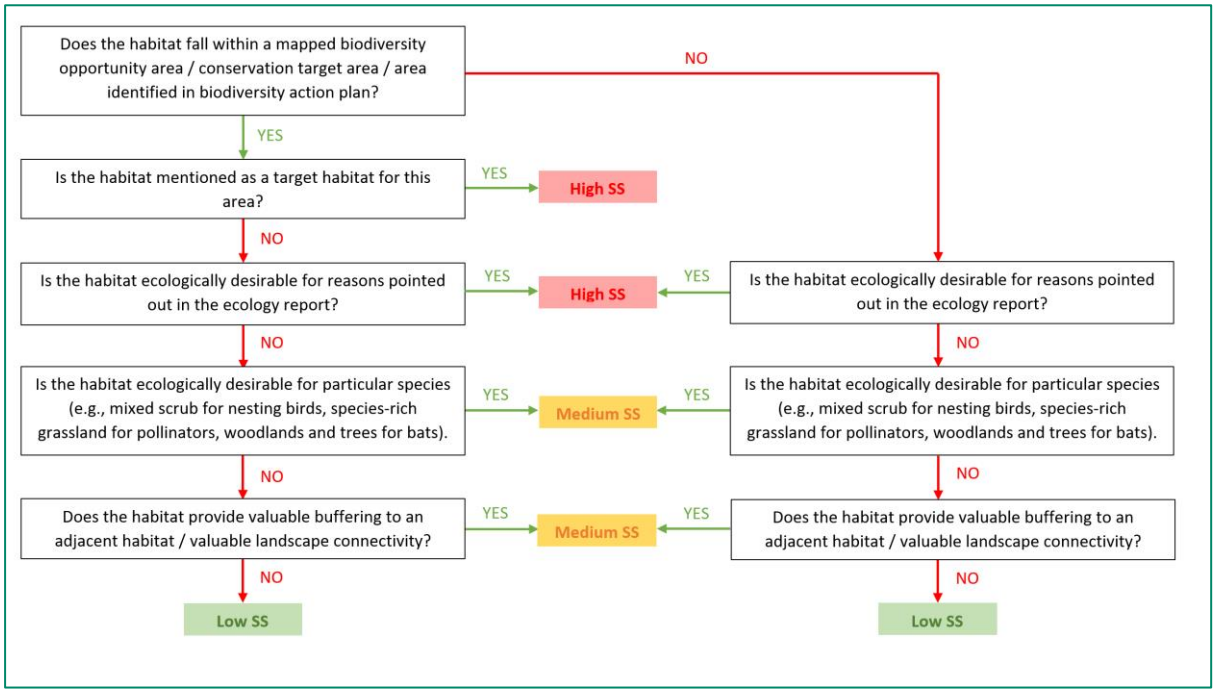
3.3.1 Landscape Plans (*Application Document 4.21*) have been used to determine the extent and type of habitats to be retained and created post-development. Habitats in the Landscape Plans were converted to UKHab Classification categories[12] (Appendix C.2) before being digitised into GIS to produce the 'Post-Development Plan' (Appendix B). Target condition scores for the proposed habitats were selected in accordance with Biodiversity Metric 4.0 guidance documents using professional judgement to ensure the condition scores selected were realistic. The data were used to predict the post development biodiversity units.

3.3.2 Areas of permanent habitat loss and associated landscaping include Washingdales Lane Block Valve Station, Throughfare Block Valve Station, Louth Road Block Valve Station and the Theddlethorpe Facility. Habitats proposed in these areas include native hedgerows with trees (some lengths are to be without trees where planting is over pipeline), mixed scrub, modified grassland, other neutral grassland and individual rural trees.

Strategic Significance

3.3.3 Biodiversity Metric 4.0 requires that the strategic significance (hereafter referred to as 'SS') of all baseline and post-development habitats be defined. SS refers to strategic locations for local biodiversity and nature improvements, identified within local planning policies. The process of how the SS of a habitat is assessed is shown in Figure 1.

Figure 1. Strategic Significance Guidance



3.3.4 As part of this assessment, the following relevant documents were reviewed to determine the SS of the habitats on the Site:

- Lincolnshire Biodiversity Action Plan (LBAP)[14]
- North East Lincolnshire Local Plan 2018[9]
- North East Lincolnshire Natural Assets Plan[15]
- North Lincolnshire Core Strategy[16]
- North Lincolnshire Council – Planning for Renewable Energy Development[17]
- East Lindsey District Council Core Strategy[10]
- Central Lincolnshire Local Plan[8]
- Phase 1 Habitat Survey
- Magic maps[18]
- River Basin Management Plans[19]

3.3.5 Please see detailed information in Appendix D on how SS has been assigned.

3.4 BNG Best Practice Principles

3.4.1 Justification for how the BNG Principles have been applied during this BNG assessment is provided in Appendix E.

[14] Lincolnshire Biodiversity Action Plan
[15] North East Lincolnshire Natural Assets Plan
[16] North Lincolnshire Core Strategy
[17] North Lincolnshire Planning for Renewable Energy Development SPD Adopted
[18] DEFRA Magic Maps
[19] River Basin Management Plans (2022)

Assumptions

3.4.2 In undertaking the calculation, the following assumptions have been made:

- The assessment assumes that habitats created as part of the Proposed Development will be subject to ongoing appropriate management to ensure that they reach the allocated target condition within the required timeframe; the prescriptions to achieve this will need to be provided at the Front-end Engineering Design (FEED) stage; and
- All baseline habitats of the same type and condition have been aggregated within Biodiversity Metric 4.0[1] due to the relative uniformity within habitat types.
- The assessment approach is in line with the applicants approach to BNG, which is to target 10% net gain relating to the permanent loss of habitats at the above ground installations, including all access points.

Constraints or limitations

3.4.3 The following constraints and limitations apply:

- All habitat areas and lengths have been measured using ArcGIS based on the Phase 1 Habitat Plan and the Landscape Plans (*Application Document 4.21*) as such habitat areas are approximations only.

4. Results

4.1 Biodiversity Metric 4.0 Calculation Tool Output

Baseline Habitats

4.1.1 The Site covers a total area of 3.95 ha (as defined in Section 1.1.3). The habitats identified on Site vary in ecological value, ranging from ‘Very Low’ to ‘High’ distinctiveness. The most dominant habitat on site is ‘Cropland – Cereal crops’. The most dominant hedgerow type present on Site is ‘Native hedgerow with trees’. The watercourse habitats that are present on Site are ‘Ditches’ and ‘Culverts ‘The ‘Baseline Habitat Plan’ is provided in Appendix A.

4.1.2 As outlined in Section 2.1.3, SS has been assigned to all baseline habitats present within the Site. ‘Grassland – Floodplain wetland mosaic and CFGM has been assigned ‘High’ SS. ‘Medium’ SS has been assigned to ‘Grassland – Modified grassland. ‘Low’ SS has been assigned to ‘Cropland – Cereal crops’, ‘Urban – Bare Ground’ and ‘Urban – Developed land; sealed surface’ as they hold minimal ecological value. Baseline Habitat Units

4.1.3 The baseline biodiversity value was calculated as 8.53 units for area-based habitats (Table 1), 0.10 units for hedgerow habitats (Table 2) and 0.18 for river habitats (Table 3).

Table 1. Baseline Area-Based Habitats

Habitat type (UKHab)	Area (ha)	Distinctiveness	Condition	SS	Habitat Units
Cropland – Cereal crops	2.831	Low	Condition Assessment N/A	Low	5.66
Grassland – Floodplain wetland mosaic and CFGM	0.035	High	Good	High	0.72
Grassland – Modified grassland	0.003	Low	Good	Medium	0.02
Grassland – Modified grassland	0.029	Low	Poor	Medium	0.06
Urban- Bare ground	1.03	Low	Poor	Low	2.06
Urban – Developed land; sealed surface	0.005	V. Low	N/A – Other	Low	0.00
Urban – Developed land; sealed surface	0.015	V. Low	N/A – Other	Low	0.00
Total	3.95	**-**	**-**	**-**	**8.53**

Table 2. Baseline Hedgerow Habitats

Habitat type (UKHab)	Length (km)	Distinctiveness	Condition	SS	Hedgerow Units
Line of trees	0.004	Low	Poor	Medium	0.01
Native hedgerow with trees	0.006	Medium	Moderate	High	0.06
Native hedgerow with trees – associated with bank or ditch	0.005	High	Poor	High	0.03
Total	**0.02**	**-**	**-**	**-**	**0.10**

Table 3. Baseline Watercourse Habitats

Habitat type (UKHab)	Length (km)	Distinctiveness	Condition	SS	Watercourse Units
Ditches	0.024	Medium	Moderate	Low	0.17
Culvert	0.007	Low	Poor	Low	0.01
Total	**0.03**	**-**	**-**	**-**	**0.18**

Post-Development Habitats

4.1.4 The Landscape Plans (*Application Document 4.21*) do not include the retention of any terrestrial habitats. The baseline length of culvert (0.007 km) is the only habitat retained (Table 4). All other habitats are lost. The Post-Development proposals include the creation of Grassland, Urban, and Woodland and forest area-based habitats. The area-based habitats identified on Site post-development vary in ecological value, ranging from 'Very Low' to 'Medium' distinctiveness. The post-development habitats are shown on the 'Post-Development Habitat Plan' in Appendix B.

4.1.5 The Landscape Plans proposals include the creation of Lines of trees, Native hedgerow and, Native hedgerow with trees – associated with bank or ditch.

4.1.6 As outlined in Section 2.1.3, SS has been assigned to all post-development habitats proposed within the landscaping. The SS for created habitats areas/lengths has been assigned as follows:

- 'High' SS has been assigned to 'Species-rich native hedgerow with trees' and 'Species-rich native hedgerow' as these habitat typeshas been identified as locally important within the LBAP.
- 'Medium' SS has been assigned to 'Woodland and forest – Other woodland; broadleaved', 'Line of trees' and 'Native hedgerow' as these habitat is suitable for protected or priority species, for example breeding birds and roosting bats. 'Medium' SS has also been assigned to a length of 'Grassland – Modified grassland' as it is present along a ditch and therefore provides boundary commuting habitat for species.
- 'Low' SS has been assigned remaining areas of 'Grassland – Modified grassland', 'Grassland – Other neutral grassland' and 'Urban – Developed land; sealed surface' as they are not considered to be ecologically important within the local area.

4.1.7 The high-level management prescriptions required for the created and enhanced habitats to reach their target condition in the specified timeframe is provided in Appendix G.

Table 4. Retained Watercourse Habitats

Habitat type (UKHab)	Length (km)	Distinctiveness	Condition	SS	Watercourse Units
Culverts	0.007	Low	Poor	Low	0.01
Total	**0.007**	-	**-**	**-**	**0.01**

Created Habitats

4.1.8 Habitats that are due to be created within the Proposed Development are detailed in Tables 5, 6 and 7. In total, 3.95 ha of area-based habitats, 0.39 km of hedgerow habitats and 0.006 km of watercourse habitats are proposed to be created, this resulting in biodiversity unit values of 5.70 habitat units, 2.62 hedgerow units and 0.05 watercourse units respectively.

Table 5. Created Area-Based Habitats

Habitat type (UKHab)	Area (ha)	Distinctiveness	Target Condition	SS	Time to target condition (yrs.)	Habitat Units
Grassland – Modified grassland	0.084	Low	Poor	Low	1	0.16
Grassland – Modified grassland	0.055	Low	Poor	Medium	1	0.12
Grassland – Other neutral grassland	0.446	Medium	Moderate	Low	5	2.99
Urban – Developed land; sealed surface	2.891	V. Low	N/A – Other	Low	0	0.00
Woodland and forest – Other woodland; broadleaved	0.472	Medium	Moderate	Medium	15	2.43
Total	**3.95**	**-**	**-**	**-**	**-**	**5.70**

Table 6. Created Linear Habitats

Habitat type (UKHab)	Length (km)	Distinctiveness	Target Condition	SS	Time to target condition (yrs.)	Hedgerow Units
Line of Trees	0.051	Low	Moderate	Medium	20	0.11
Native Hedgerow	0.089	Low	Moderate	Medium	5	0.33
Species-rich native Hedgerow with trees	0.144	Medium	Moderate	High	10	1.39
Species-rich native hedgerow	0.103	Medium	Moderate	High	5	0.79
Total	**0.39**	**-**	**-**	**-**	**-**	**2.62**

4.1.9 The new access road to the Theddlethorpe Facility (Option 2) includes the extension of an existing culvert of ditch DX111BP. This has been inputted as a created habitat within the metric (Table 7) and the existing ditch has not been retained.

Table 7. Created Watercourse Habitats

Habitat type (UKHab)	Length (km)	Distinctiveness	Target Condition	SS	Time to target condition (yrs.)	Watercourse Units
Culvert	0.024	Low	Poor	Low	1	0.05
Total	**0.024**	**-**	**-**	**-**	**-**	**0.05**

Summary of Results

4.1.10 All baseline habitats and habitats created and retained are present within the accompanying Biodiversity Metric 4.0[1] assessment for the Proposed Development (Appendix H).

4.1.11 A summary of the results is shown in Table 8. Based on the current Post-Development Plan, the Proposed Development is predicted to result in a net loss of 2.83habitat units (-33.18%%), a net gain of 2.52 hedgerow units (2562.26 %) and a net loss of 0.124 watercourse units (-66.68%).

Table 8. Summary of Results

Habitat Type	Baseline	Post-Development	Total Net Unit Change	Total Net % Change
Area-Based Units	8.53	5.70	-2.83	-33.19%
Hedgerow Units	0.10	2.62	2.52	2562.26%
Watercourse Units	0.18	0.06	-0.12	-66.68%

Trading Rules

4.1.12 The trading rules within the Biodiversity Metric 4.0 are a set of rules that try to prevent the 'trading down' of habitat distinctiveness. Under the trading rules losses of habitat are to be compensated for on a “like for like” or “like for better” basis.

Area-Based Habitats

4.1.13 For area-based habitats, the trading rules for High and Low Distinctiveness habitats within the Biodiversity Metric 4.0 are currently not satisfied, however Very High and Medium Distinctiveness habitats are satisfied (see Table 9), changes in broad habitat types are detailed below (Table 10).

Table 9. Trading Rules Summary – Area-Based Habitats

Distinctiveness Group	Trading Rule	Trading Satisfied?
V. High	Bespoke compensation likely to be required	Yes
High	Same habitat required	No
Medium	Same broad habitat or a higher distinctiveness habitat required	Yes
Low	Same distinctiveness or better habitat required	No

4.1.14 Table 10 shows the overall change in broad habitat types. There is an overall loss of Cropland and, Urban, habitats. There is an overall gain for 'Grassland' and 'Woodland and forest' habitats. The trading rules are used to ensure there is no loss of valuable habitat types, and those of lower value are compensated on a like-for-like or by a better value habitat basis.

Table 10. Change by Broad Area-Based Habitat Type

	Baseline		Post development		Change	
Habitat group	Existing area	Existing value	Proposed area	Proposed value	Area change	Unit change
Cropland	2.83	5.66	0.00	0.00	-2.83	-5.66
Grassland	0.07	0.81	0.59	3.26	0.52	2.46
Urban	1.05	2.06	2.89	0.00	1.84	-2.06
Woodland and forest	0.00	0.00	0.47	2.43	0.47	2.43

Hedgerow Habitats

4.1.15 For hedgerow habitats, the trading rules within the Biodiversity Metric 4.0 are currently not satisfied for each distinctiveness level (see Table 11).

Table 11. Trading Rules Summary – Hedgerow Habitats

Distinctiveness Group	Trading Rule	Trading Satisfied?
High	Same habitat required	No
Medium	Same broad habitat or a higher distinctiveness habitat required	Yes
Low	Same distinctiveness or better habitat required	Yes

4.1.16 Table 12 shows the overall change in hedgerow habitat types. There is an overall loss of, 'Native hedgerow with trees - associated with bank or ditch' and 'Native hedgerow with trees'. There is an overall gain of 'Species-rich native hedgerow with trees', 'Native hedgerow' and 'Line of Trees' Habitats. There are no overall gains for any hedgerow habitats.

Table 12. Change by Hedgerow Type

	Baseline		Post development		Change	
Hedgerow type	Existing length	Existing value	Proposed length	Proposed value	Length change	Unit change
Species-rich native hedgerow with trees	0.00	0.00	0.14	1.39	0.14	1.39
Native hedgerow with trees – associated with bank or ditch	0.01	0.03	0.00	0.00	-0.01	-0.03
Species-rich native hedgerow	0.00	0.00	0.10	0.79	0.10	0.79
Native hedgerow with trees	0.01	0.06	0.00	0.00	-0.01	-0.06
Native hedgerow	0.00	0.00	0.09	0.33	0.09	0.33
Line of trees	0.00	0.01	0.05	0.11	0.05	0.10

Watercourse Habitats

4.1.17 For watercourse habitats, the trading rules within the Biodiversity Metric 4.0 are currently satisfied for each distinctiveness level (see Table 13).

Table 13. Trading Rules Summary – Watercourse Habitats

Distinctiveness Group	Trading Rule	Trading Satisfied?
Medium	Same broad habitat or a higher distinctiveness habitat required	No
Low	Same distinctiveness or better habitat required	Yes

4.1.18 Table 14 shows the overall change in broad habitat types. There is an overall loss of ‘Ditches’ Habitats and a minimal increase in ‘Culvert’ units.

Table 14. Change by Watercourse Type

	Baseline		Post development		Change	
Habitat group	Existing length	Existing value	Proposed length	Proposed value	Length change	Unit change
Ditches	0.024	0.17	0.00	0.00	-0.024	-0.17
Culvert	0.007	0.01	0.031	0.06	0.014	+0.05

5. Conclusions

5.1.1 This assessment has identified a predicted net gain in Hedgerow Units (however, all trading rules are not satisfied) and net losses in Habitat and Watercourse Units. This is based on a realistic worst case scenario approach. The final assessment will be updated to reflect any changes and it is considered likely the final assessment will be more favourable once impacts are refined.

5.1.2 The outputs of the Biodiversity Metric 4.0 are dependent on all created habitats meeting the target conditions, subject to the criteria outlined within Biodiversity Metric 4.0 guidance documents. Habitats would need to be monitored at suitable intervals for the duration of the 30-year management period to ensure correct establishment and growth, and remedial action would need to be taken if this does not proceed as expected, otherwise the target conditions used in the calculations may not be met and the predicted biodiversity units might not be achieved.

5.1.3 The Applicant has developed an Outline BNG Strategy that sets out opportunities to achieve the voluntary 10% BNG target both on-site (i.e., within Site boundary of the DCO application) and offsite.

5.1.4 Opportunities for BNG are set out in the Outline BNG Strategy, and details are set out below.

5.1.5 In order to satisfy the trading rule for ‘High’ distinctiveness habitats (for both area-based and hedgerow):

- ‘Grassland – Floodplain wetland mosaic and CFGM’; and
- ‘Native hedgerow with trees – associated with bank or ditch’.

5.1.6 ‘To satisfy the trading rule for ‘Medium’ distinctiveness habitats (required for watercourse habitats only):

- ‘Ditches’

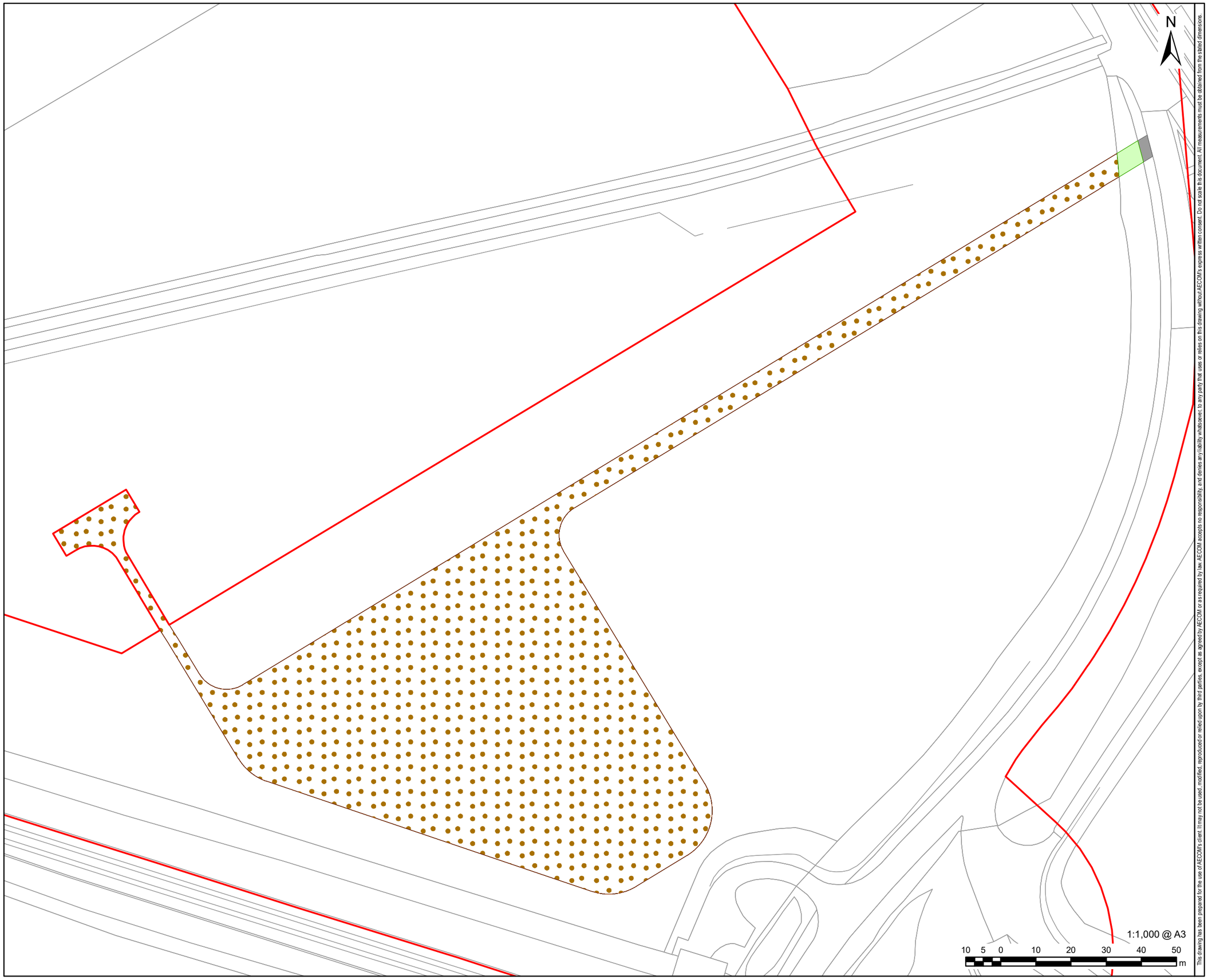
5.1.7 ‘In order to satisfy the ‘Low’ distinctiveness trading rule (required for area-based habitats only):

- ‘Cropland – Cereal crops’;
- ‘Urban – Bare ground’.

Appendix A Baseline Habitat Plan

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_A_BNG_Baseline_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Grassland - Modified Grassland
- Urban - Bare Ground
- Urban - Developed Land;Sealed Surface - Hardstanding

NOTES:

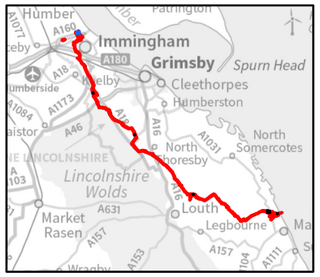


FIGURE TITLE

Appendix A (1 of 6)
Biodiversity Net Gain
Baseline Habitats
Immingham

ISSUE PURPOSE

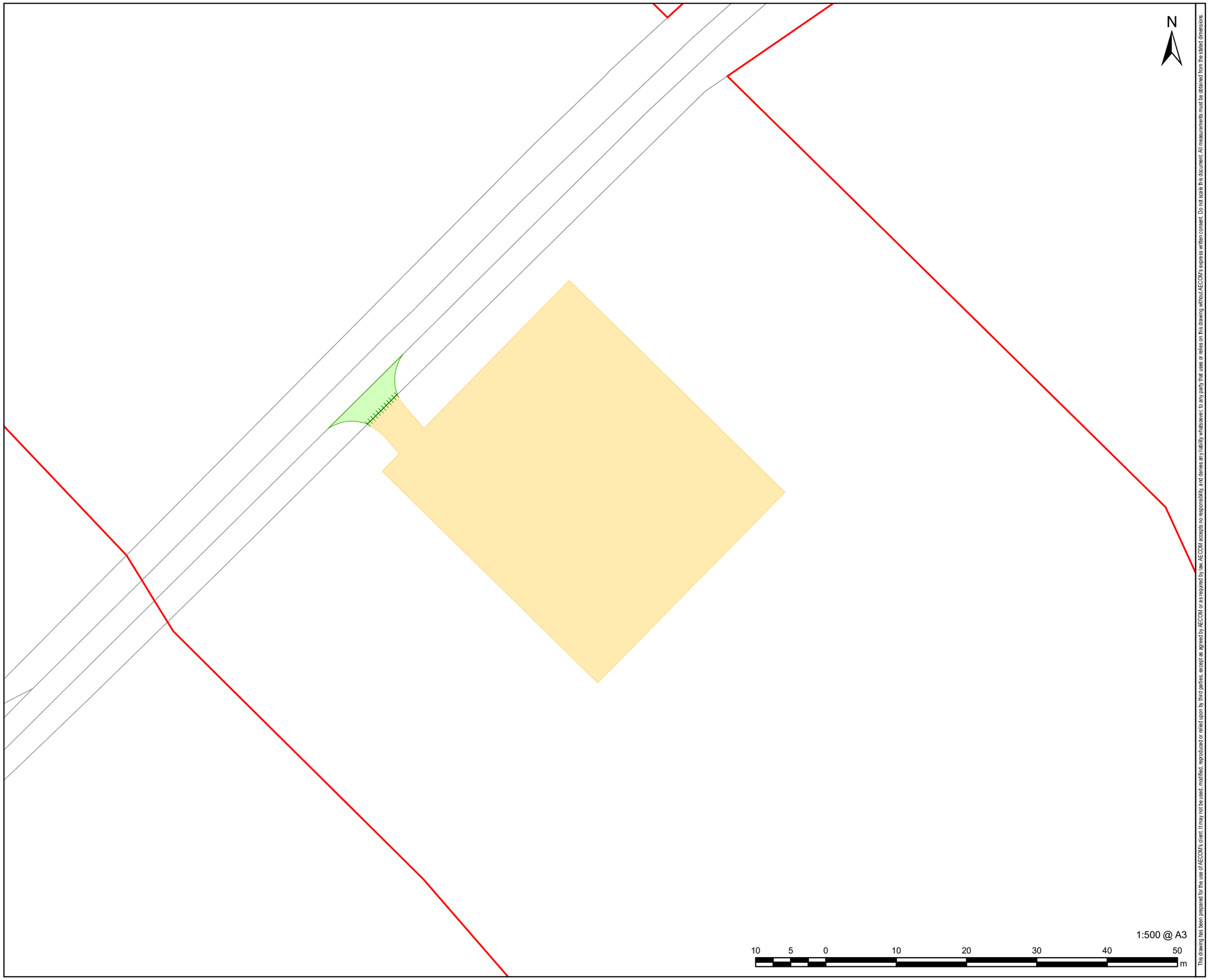
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_A

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_A_BNG_Baseline_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Native Hedgerow with Trees
- Cropland - Cereal Crops
- Grassland - Modified Grassland

NOTES:

FIGURE TITLE

Appendix A (2 of 6)
Biodiversity Net Gain
Baseline Habitats
Washingdales Block Valve Station

ISSUE PURPOSE

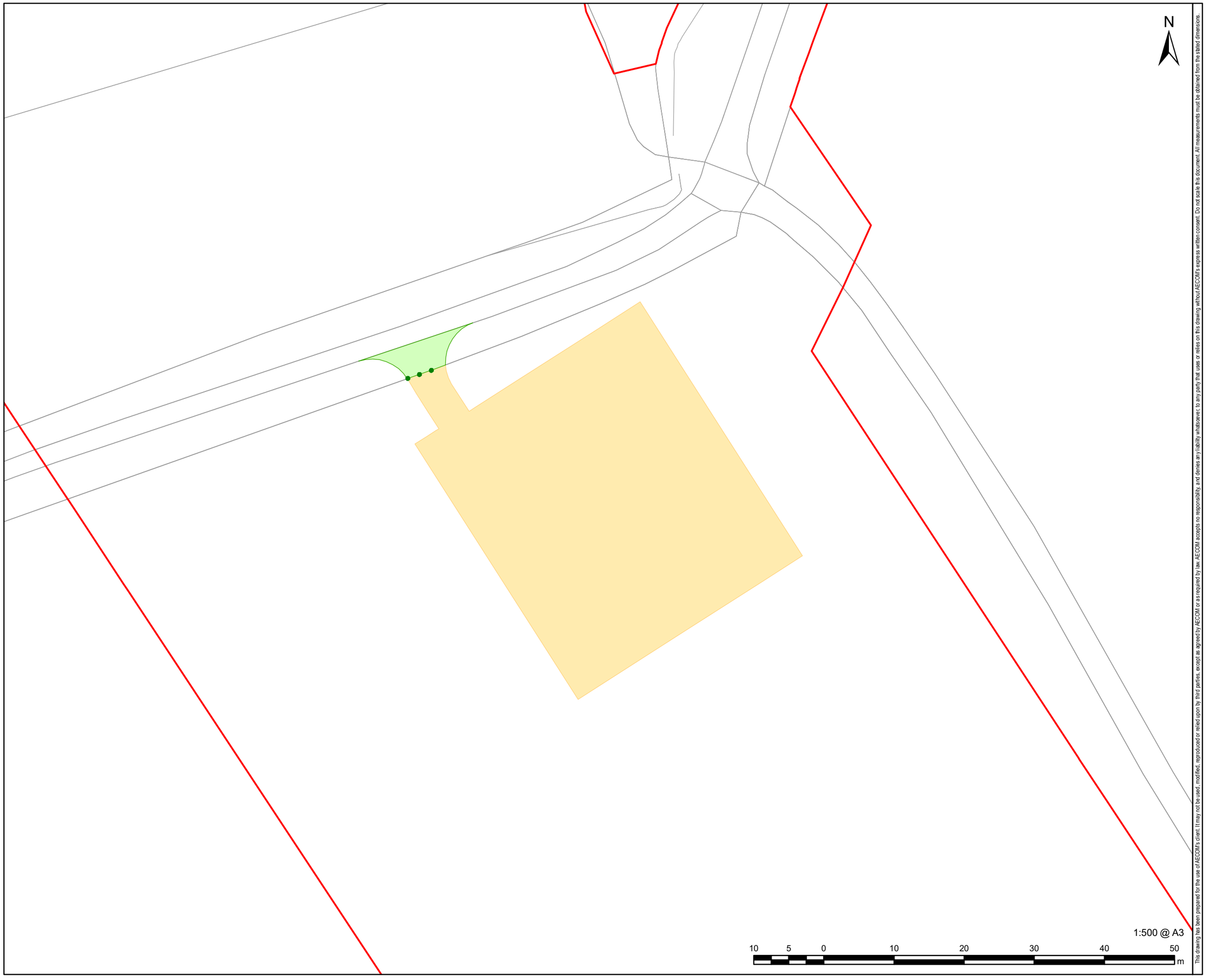
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_A

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_A_BNG_Baseline_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Line of Trees
- Cropland - Cereal Crops
- Grassland - Modified Grassland

NOTES:

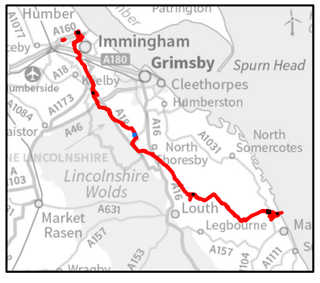


FIGURE TITLE

Appendix A (3 of 6)
Biodiversity Net Gain
Baseline Habitats
Thoroughfaree Block Valve Station

ISSUE PURPOSE

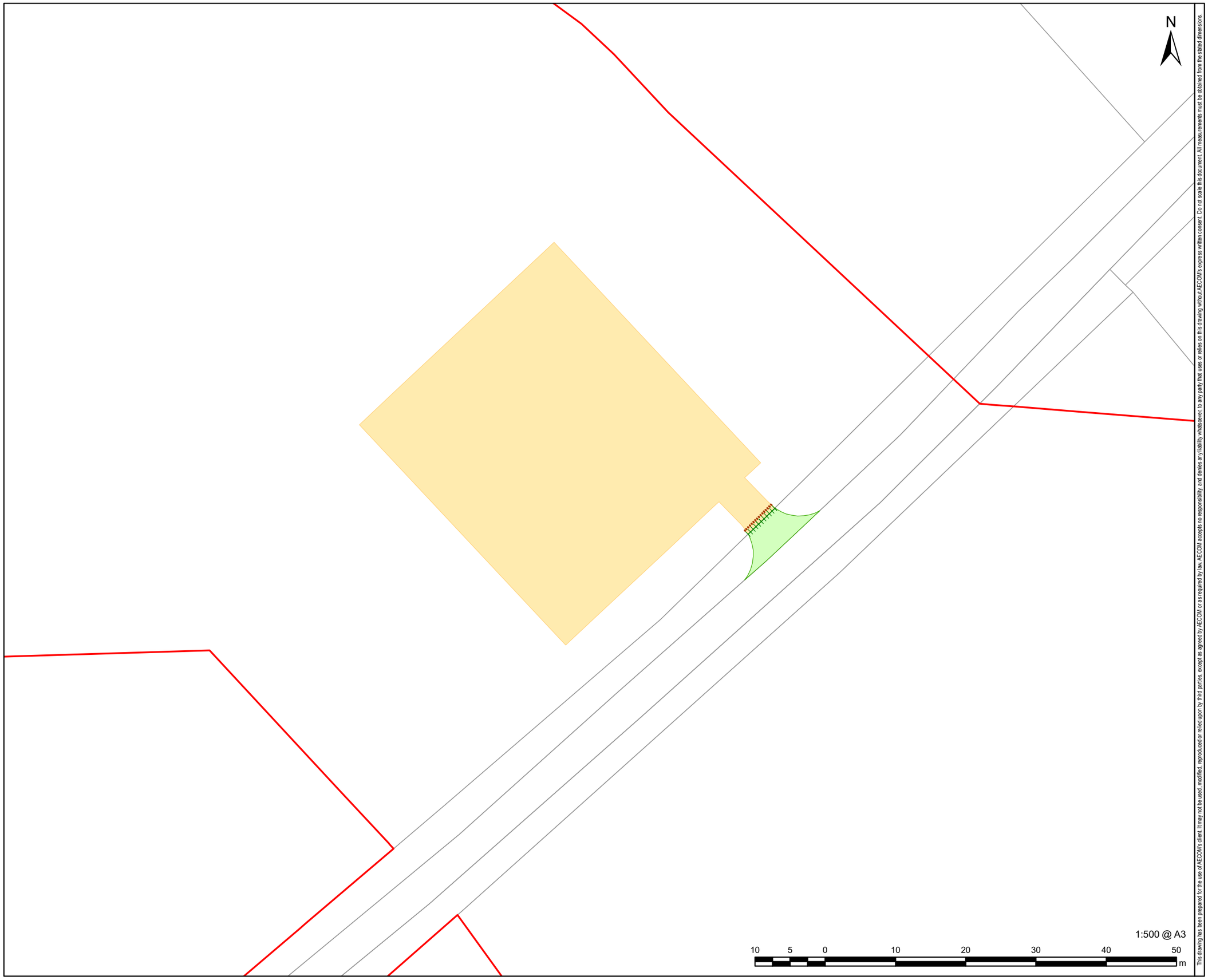
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_A

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_A_BNG_Baseline_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Native Hedgerow with Trees - Associated with Bank or Ditch
- Cropland - Cereal Crops
- Grassland - Modified Grassland

NOTES:

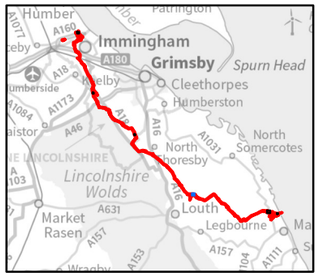


FIGURE TITLE

Appendix A (4 of 6)
Biodiversity Net Gain
Baseline Habitats
Louth Road Block Valve Station

ISSUE PURPOSE

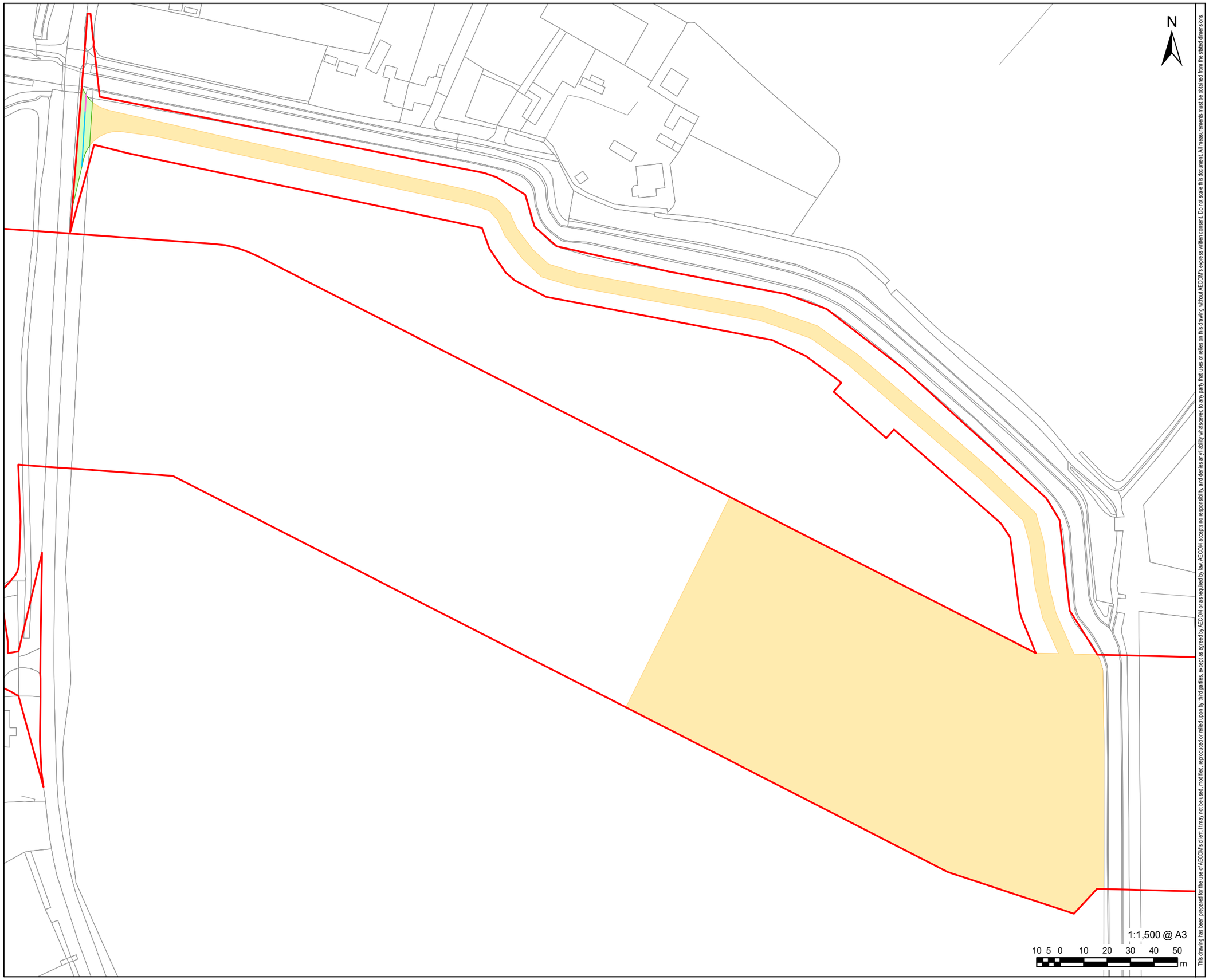
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_A

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UKI\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_A_BNG_Baseline_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Culvert
- Ditch
- Cropland - Cereal Crops
- Grassland - Modified Grassland
- Urban - Developed Land;Sealed Surface - Hardstanding

NOTES:

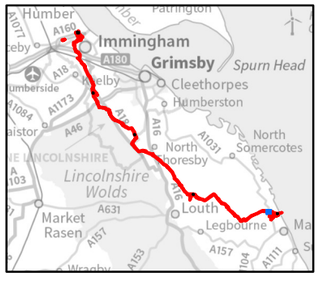


FIGURE TITLE

Appendix A (5 of 6)
Biodiversity Net Gain
Baseline Habitats
Theddlethorpe Facility Option 2

ISSUE PURPOSE

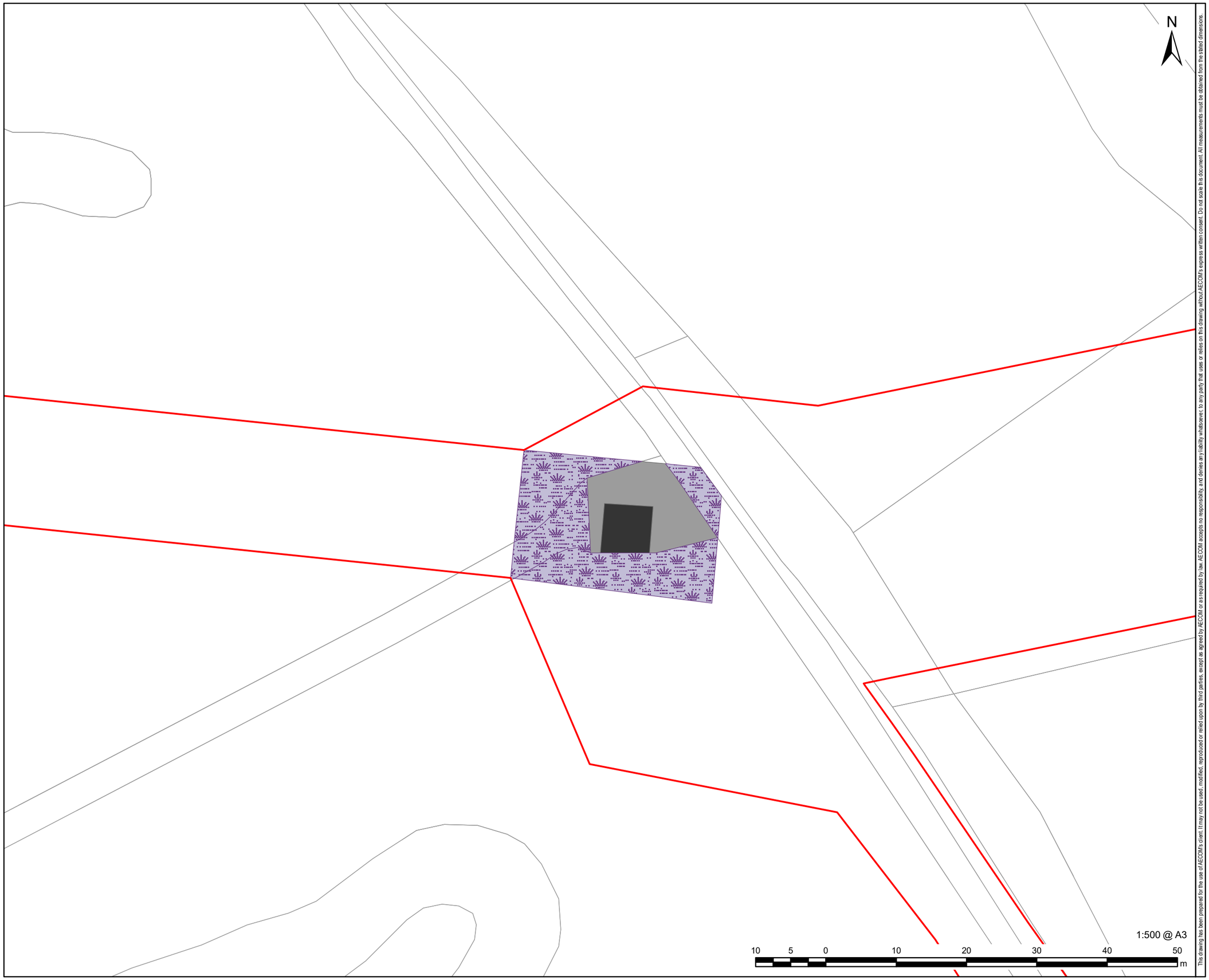
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_A

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UKI\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNGV_Net_Zero_App_A_BNG_Baseline_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Grassland - Floodplain Wetland Mosaic and CFGM
- Urban - Developed Land; Sealed Surface - Building
- Urban - Developed Land;Sealed Surface - Hardstanding

NOTES:

FIGURE TITLE

Appendix A (6 of 6)
Biodiversity Net Gain
Baseline Habitats
Dune Isolation Valve

ISSUE PURPOSE

BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

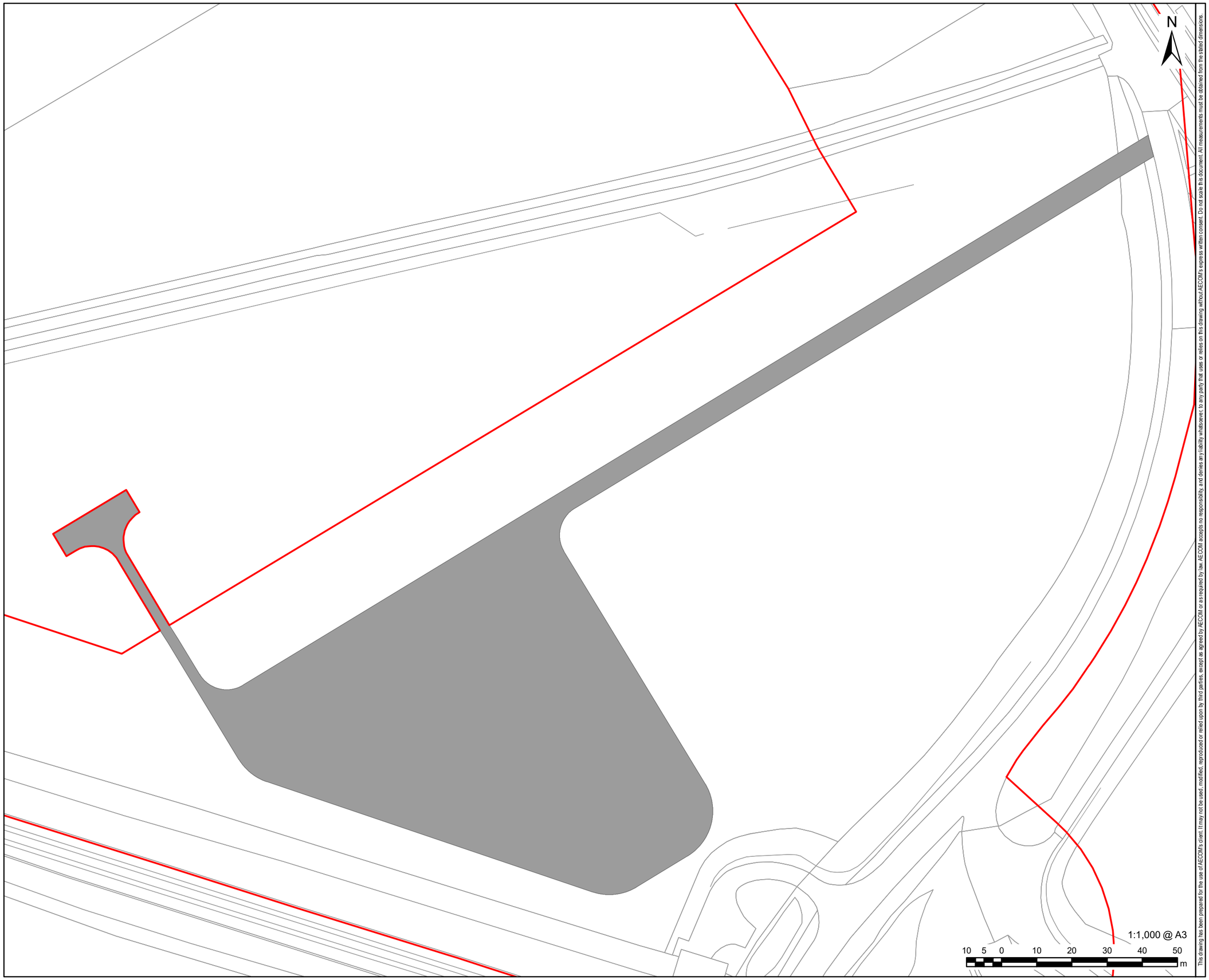
PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_A

Appendix B Post-Development Habitat Plan

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_B_BNG_Post_Dev_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Urban - Developed Land;Sealed Surface - Hardstanding

NOTES:

FIGURE TITLE

Appendix B (1 of 6)
Biodiversity Net Gain
Post Development Habitats
Immingham

ISSUE PURPOSE

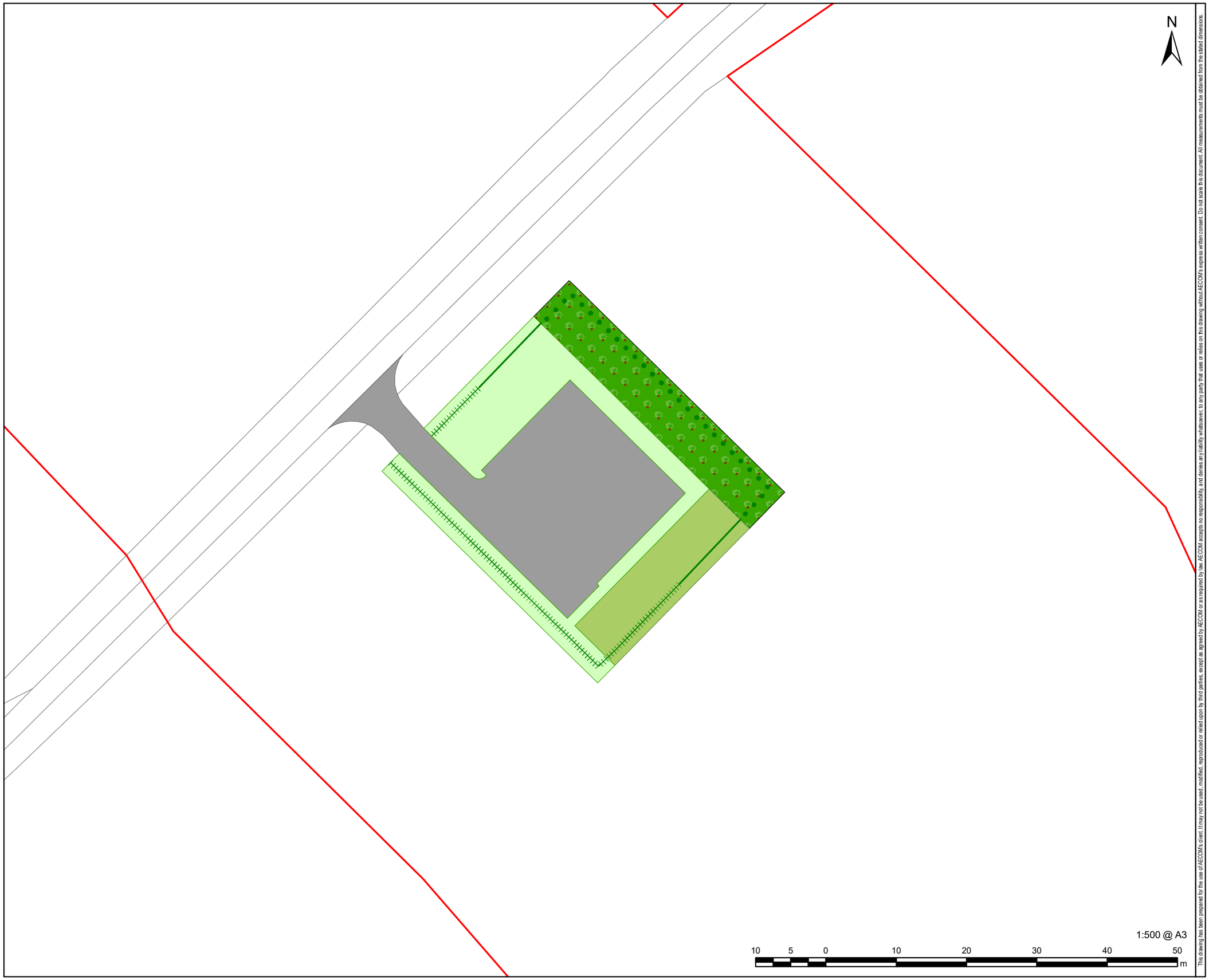
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_B

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_B_BNG_Post_Dev_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Line of Trees
- Native Hedgerow
- Native Hedgerow with Trees
- Grassland - Modified Grassland
- Grassland - Other Neutral Grassland
- Urban - Developed Land;Sealed Surface - Hardstanding
- Woodland and Forest - Other Woodland; Broadleaved

NOTES:

FIGURE TITLE

Appendix B (2 of 6)
Biodiversity Net Gain
Post Development Habitats
Washingdales Block Valve Station

ISSUE PURPOSE

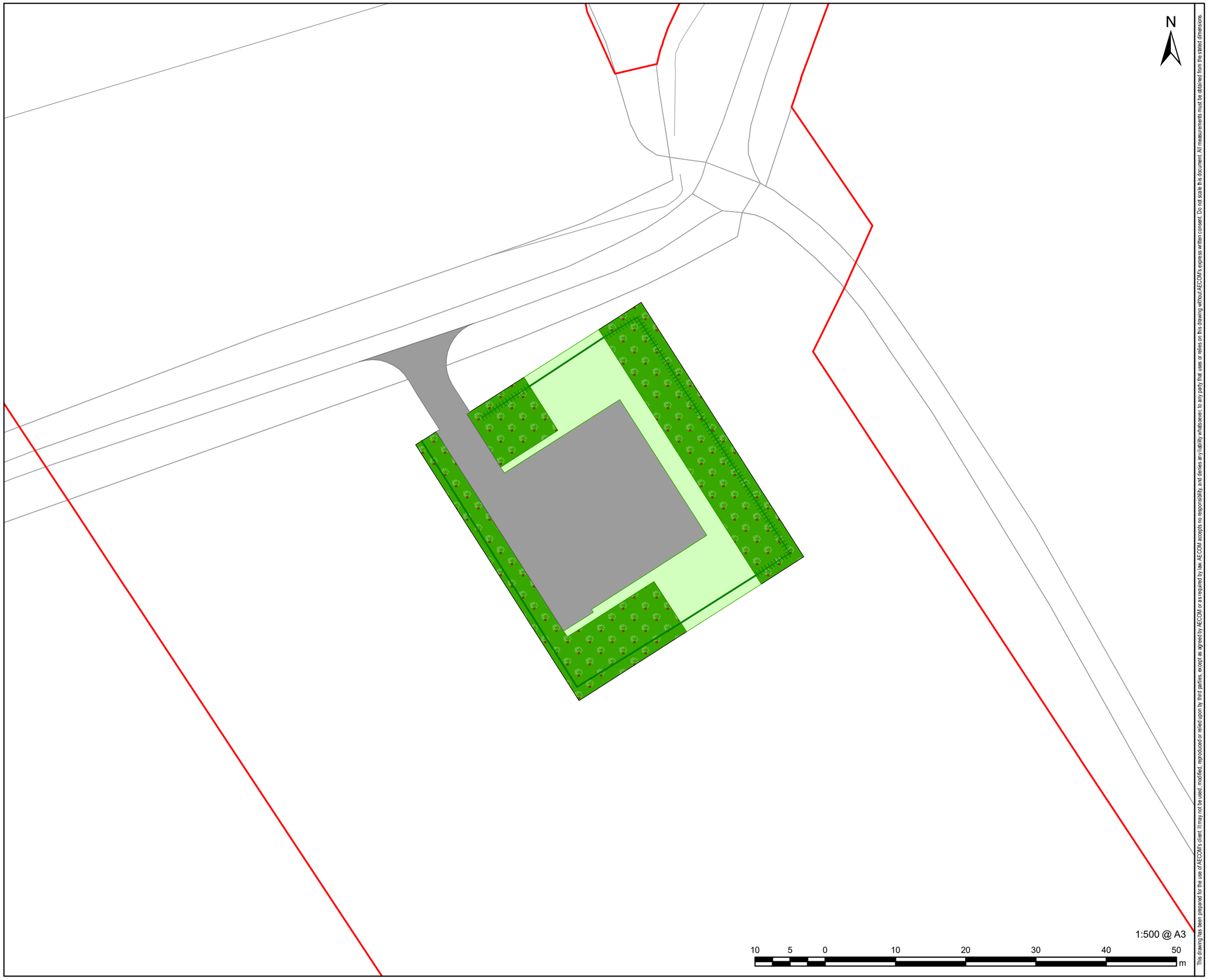
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_B

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNGV_Net_Zero_App_B_BNG_Post_Dev_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Native Hedgerow
- Native Hedgerow with Trees
- Grassland - Modified Grassland
- Urban - Developed Land;Sealed Surface - Hardstanding
- Woodland and Forest - Other Woodland; Broadleaved

NOTES:

FIGURE TITLE

Appendix B (3 of 6)
Biodiversity Net Gain
Post Development Habitats
Thoroughfaree Block Valve Station

ISSUE PURPOSE

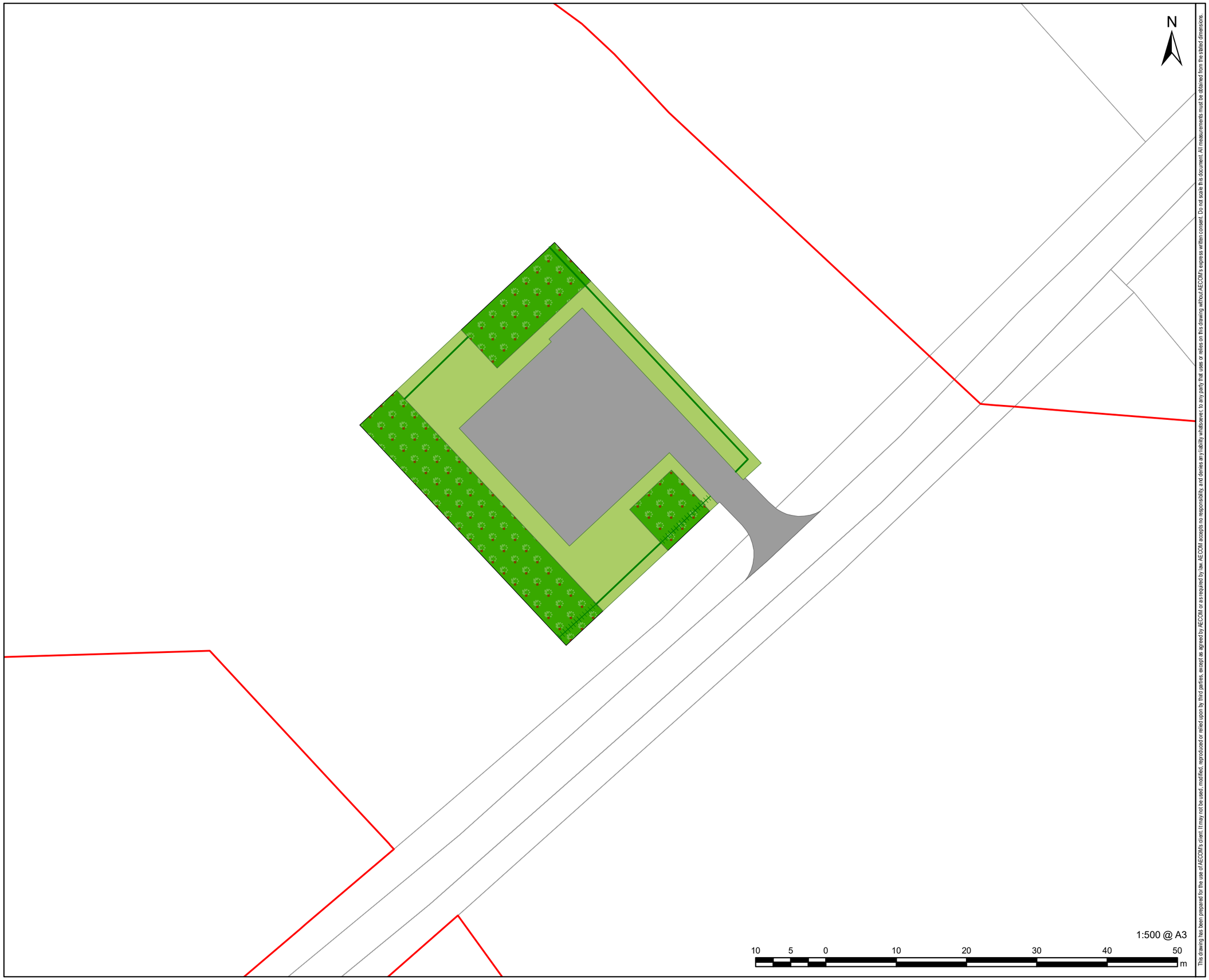
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_B

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_B_BNG_Post_Dev_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Native Hedgerow
- Native Hedgerow with Trees
- Grassland - Other Neutral Grassland
- Urban - Developed Land;Sealed Surface - Hardstanding
- Woodland and Forest - Other Woodland; Broadleaved

NOTES:

FIGURE TITLE

Appendix B (4 of 6)
Biodiversity Net Gain
Post Development Habitats
Louth Road Block Valve Station

ISSUE PURPOSE

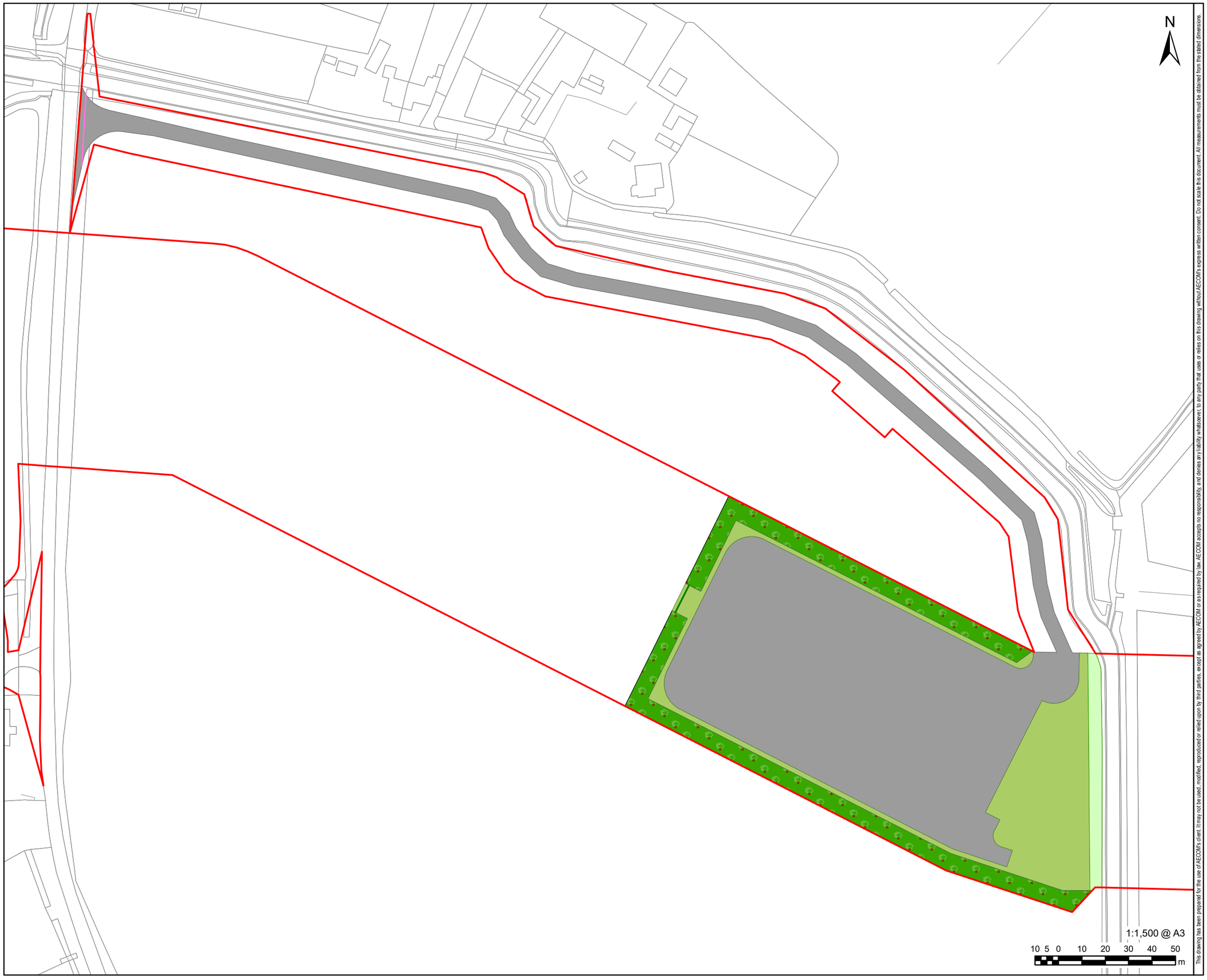
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_B

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UK\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_B_BNG_Post_Dev_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Culvert
- Native Hedgerow
- Grassland - Modified Grassland
- Grassland - Other Neutral Grassland
- Urban - Developed Land;Sealed Surface - Hardstanding
- Woodland and Forest - Other Woodland; Broadleaved

NOTES:

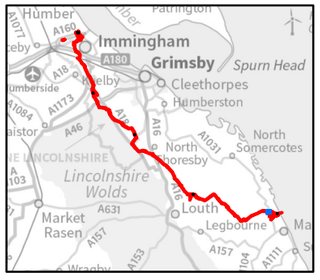


FIGURE TITLE

Appendix B (5 of 6)
Biodiversity Net Gain
Post Development Habitats
Theddlethorpe Facility Option 2

ISSUE PURPOSE

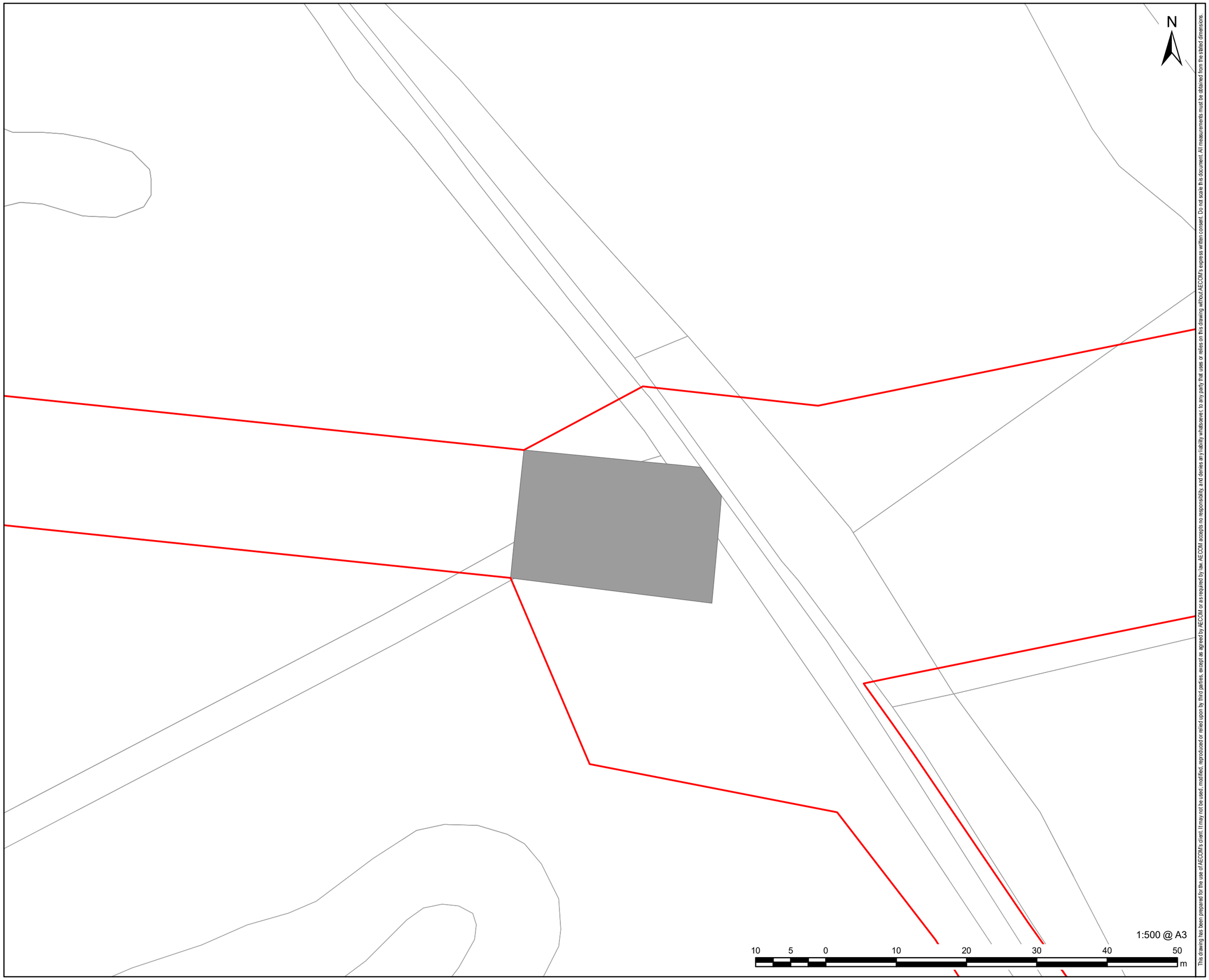
BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_B

Revision: 1 Drawn: CA Checked: LC Approved: LD Date: 2023-10-16

Filename: \\eu.aecomnet.com\EMIA\UKI\UKNCL2\Jobs\60668955 V_Net_Zero_Project\900_CAD_GIS\920_GIS\02_Maps\BNG\V_Net_Zero_App_B_BNG_Post_Dev_R1_A3_20231016_CA.mxd



VikingCCS

AECOM

PROJECT

Viking CCS Pipeline

LEGEND

- DCO Site Boundary
- Urban - Developed Land;Sealed Surface - Hardstanding

NOTES:

FIGURE TITLE

Appendix B (6 of 6)
Biodiversity Net Gain
Post Development Habitats
Dune Isolation Valve

ISSUE PURPOSE

BIODIVERSITY NET GAIN REPORT
APPENDIX 6.11

PROJECT NUMBER / REFERENCE

60668955 / VCCS_231016_BNG_B

Appendix C Habitat Classification Conversions

C.1 Phase 1 Habitat to UKHab Conversion

Phase 1 Habitat Classification	UKHab Classification
B4 – Improved grassland	Grassland – Modified grassland
B6 – Poor semi-improved grassland	Grassland – Modified grassland
J1.1 - Cultivated/disturbed land – arable	Cropland – Cereal crops
J2.1.1 – Intact hedge – species -poor	Native hedgerow
J3.6 – Buildings	Urban – Developed land; sealed surface
J4 – Bare ground	Urban – Vacant or derelict land
Z99 – Hardstanding	Urban – Developed land; sealed surface
J2.3.2 – Hedge with trees – species-poor	Native hedgerow with trees/ Native hedgerow with trees – associated with bank or ditch
A3.1 - Broadleaved parkland/scattered trees	Line of trees
G2 - Running water	Other Rivers and Streams/ Ditches/ Culvert

C.2 Figures 1 - 4 Landscape Plans to UKHab Conversion

[X Post-Development Plan] Classification	UKHab Classification
HEDGEROW TYPE 1 (OVER PIPELINE)	Species-rich native hedgerow
HEDGEROW TYPE 2 + TREES	Native hedgerow with trees
SHRUBS MIXED + TREES	Heathland and shrub – Mixed scrub

[X Post-Development Plan] Classification	UKHab Classification
GRASSLAND LOW MAINTENANCE	Grassland – Modified grassland
SPECIES RICH GRASSLAND	Grassland – Other neutral grassland
TREE	Individual trees – Rural tree

Appendix D Strategic Significance Rationale

Source	Strategic Significance Information
Lincolnshire Biodiversity Action Plan[14]	Habitats within the Lincolnshire Biodiversity Action Plan are the following: • Coastal sand dunes • Peat and clay exposures • Sabellaria spinulosa reefs • Saline lagoons • Saltmarsh • Arable field margins • Grazing Marsh • Hedgerows and hedgerow trees • Lowland calcareous grassland • Lowland meadows • Heathland and peatland • Lowland dry acid grassland • Chalk streams and blow wells • Fens • Ponds, lakes and reservoirs • Reedbeds and bittern • Rivers, canals and drains • Springs and flushes • Chalk streams and blow wells • Lowland mixed deciduous woodland • Traditional orchards • Wet woodland • Wood-pasture and parkland

Source	Strategic Significance Information
	• Brownfield • Churchyards and cemeteries • Gardens and allotments • Parks and open spaces **Application to assessment** The following LBAP habitats have therefore been assigned High SS: Species-rich native hedgerow and Native hedgerow with trees – associated with bank or ditch
Phase 1 Habitat Survey	Habitats that were identified during the Phase 1 survey as being suitable to support priority/protected species have been assigned Medium SS to reflect this importance. Riparian zones have also been assigned Medium SS to account for the importance of the vegetation along watercourse. Field boundaries and road/path verges have been assigned Medium SS to capture the importance of these habitats for connectivity. The approach has been taken whereby all ditches are considered to be of Low Strategic Significance unless there are records of otter and water vole habitats along these ditches which have been identified by ecologists either through surveys or desk study records. The strategic significance has been designated Medium to reflect that the ditches within the site do not provide suitable habitats and foraging resources but may be used as corridors instead. Where water voles have been identified these have designated as High as there are likely burrows within the ditch and unlike otters, have a small territorial range and therefore the habitat is of higher importance. **Application to assessment** The following habitats were identified as holding importance for protection/priority species: Other woodland; broadleaved, Line of trees, Habitats within the riparian zone and habitats within field margins and verges. Ditches that are considered as connectivity resource for otters and water vole have been assigned Medium SS.

Source	Strategic Significance Information
MAGIC[18]	MAGIC was used to assess the present of statutory and non-statutory Sites, Priority habitats and Network enhancement zones. **<u>Application to assessment</u>** ‘Grassland - Floodplain wetland mosaic and CFGM’ has been assigned High SS as it is a priority habitat...

Appendix E BNG Best Practice Principles

Principle	How has this been applied in the assessment
Principle 1: Apply the Mitigation Hierarchy	The mitigation hierarchy has been applied during this assessment by means of restoring habitats to their baseline condition along the pipeline where possible. Recommendations have been provided and effort will be made to mitigate for the loss of habitats within the development footprint.
Principle 2: Avoid losing biodiversity that cannot be offset by gains elsewhere	There is no loss of irreplaceable biodiversity due to take place within the Site.
Principle 3: Be inclusive and equitable	Stakeholder engagement was not considered necessary for this Scheme; several meetings have been held with Natural England, and the proposals explained as they evolved. .
Principle 4: Address risks	All risks regarding difficulties of achieving net gains for the Scheme have been mitigated for where possible with recommendations for of sufficient provision of compensatory habitats being provided which will enable the project to achieve net gains.
Principle 5: Make a measurable Net Gain contribution	Net gains are currently being achieved for hedgerows; however, trading rules are not satisfied. Net gains are not currently being achieved on Site for area-based and watercourse habitats however recommendations have been made to provide the maximum number of units considered feasible within the Site and subsequent off-site recommendations that will then result in a measurable net gain and all trading rules being satisfied.
Principle 6: Achieve the best outcomes for biodiversity	The project has minimised the impacts to biodiversity as much as possible by avoiding habitats of high value and designation where possible (e.g. SSSI located at Theddlethorpe end of the development has been avoided).

Principle 7: Be additional	Although the Scheme does not yet deliver a net gain in biodiversity, if the recommendations made in the Draft BNG Strategy[20] are implemented, they will provide a +10% net gain on habitats lost permanently to the above ground facilities.
Principle 8: Create a net gain legacy	The impacts to biodiversity have been minimised as much as possible resulting in a relatively low net loss in relation to the size of the Scheme. If the recommendations in the Draft BNG Strategy[21] are implemented a substantial net gain will be achieved demonstrating that although the Scheme is focused on CO_2 transport, biodiversity can still benefit.
Principle 9: Optimise sustainability	The Scheme is vital for the Viking CCS Project for the transport of compressed and conditioned CO_2. The recommendations to achieve a net gain will also contribute to providing far more biodiverse habitats across the Site when compared to baseline habitats with particular reference to hedgerows and woodland which are recommended to be enhanced.
Principle 10: Be transparent	Particular effort has been made to adopt a precautionary and transparent approach when assessing the impacts of the development upon the habitats currently present and the feasibility of mitigating for losses within the development footprint.

[20] 6.7 Draft BNG Strategy, AECOM (2023)
[21] 6.7 Draft BNG Strategy, AECOM (2023)

Appendix F Habitat Management Required to Achieve Target Condition

Habitat type	Target condition and condition criteria	Associated habitat management requirements	Condition score
Native Hedgerow	Target condition is ‘Moderate’ in 5 years. The condition criteria to achieve this are as follows, passes 4 criteria: • Height >1.5m average along length. Fail • Width >1.5m average along length. Fail • Gap between ground and base of canopy <0.5m for >90% of length. Pass • Gaps make up <10% of total length and no canopy caps >5m. Pass • >1m with of undisturbed ground for >90% of the length. Fail • Plan species indicative of nutrient enrichment soils dominate <20% cover of undisturbed ground. Pass • >90% of the hedgerow and undisturbed ground is free of invasive non-native plant species. Pass • >90% of the hedgerow or undisturbed ground is free of damage caused by human activities. Pass	To achieve target condition, it will be necessary to: • Prepare the ground along a 1.5m wide strip to provide good soil conditions and as little competition from other vegetation as possible consider fencing hedgerow section. Hedging whips to be in line with landscape proposals • At least 2-year-old transplants Between 450mm to 600mm high • native species, (with hawthorn, blackthorn and hazel comprising at least 70% of the mix) planted in a staggered ‘double row’ 400mm apart with a minimum of 6 plants per metre kept clear of weeds until they are established Under sown with Emorsgate EH1 Hedgerow mix or similar. • Watering - In periods of dry weather apply sufficient water to maintain healthy growth;	Moderate

		• Refirming - Ensure that all hedgerow whips are firmly bedded in the ground after strong winds, frost heave or other disturbances.	
Native hedgerow with trees	Target condition is ‘Moderate’ in 10 years. The condition criteria to achieve this are as follows, passes 6 criteria: • Height >1.5m average along length. Fail • Width >1.5m average along length. Fail • Gap between ground and base of canopy <0.5m for >90% of length. Pass • Gaps make up <10% of total length and no canopy caps >5m. Pass • >1m with of undisturbed ground for >90% of the length. Fail • Plan species indicative of nutrient enrichment soils dominate <20% cover of undisturbed ground. Pass • >90% of the hedgerow and undisturbed ground is free of invasive non-native plant species. Pass • >90% of the hedgerow or undisturbed ground is free of damage caused by human activities. Pass • More than one age-class of tree, at least one mature, ancient, or veteran tree per 20-50m. Fail • At least 95% of trees are in healthy condition with little or no evidence of adverse impact on tree health. Pass	To achieve target condition, it will be necessary to: • Prepare the ground along a 1.5m wide strip to provide good soil conditions and as little competition from other vegetation as possible consider fencing hedgerow section. Hedging whips, tree species and size to be in line with landscape proposals. • At least 2-year-old transplants Between 450mm to 600mm high. Native species, planted in a staggered ‘double row’ 400mm apart with a minimum of 6 plants per metre kept clear of weeds until they are established Under sown with Emorsgate EH1 Hedgerow mix or similar. • Watering - In periods of dry weather apply sufficient water to maintain healthy growth; • Refirming - Ensure that all trees and hedgerow whips are firmly bedded in the ground after strong winds, frost heave or other disturbances.	Moderate

Heathland and shrub – Mixed scrub	Target condition is 'Moderate' in 10 years. The condition criteria to achieve this are as follows: • Scrub is a good representation of the habitats type based on UKHab description. At least 80% is native with at least 3 woody species. Pass • Seedlings, saplings, young shrubs and mature shrubs are present. Pass • Absence of invasive non-native species and species indicative of sub-optimal condition cover <5%. Pass • Scrub has well developed edge habitat with scattered scrub, tall grassland and forbs present between scrub and adjacent habitat. Pass • There are clearings, glades or rides present. Fail	To meet target condition, it will be necessary to: **Year 1** Use low fertility topsoil for any landscaping. September to October sow with tussock seed mix (Emorsgate EG26, EM10, EM10F or similar) Plant ¼ area with hawthorn. Blackthorn, gorse and bramble Protect with biodegradable guards where appropriate. **Year 3** Plant ¼ area with hawthorn. Blackthorn, gorse and bramble Protect with biodegradable guards where appropriate. **Year 5** Plant ¼ area with hawthorn. Blackthorn, gorse and bramble Protect with biodegradable guards where appropriate. Manage invasive non-native species. **Years 6-10** Restructure scrub planting to create a mosaic of mixed age scrub stands and open tussock grassland aiming to achieve a mosaic/matrix of 75% scrub. Mange on a rotational cut removing 30% of closed canopy scrub every 2 years – with the	Moderate

		aim to develop a spectrum of successional scrub communities by maintaining patches of mixed scrub at different stages of growth from freshly cut to closed canopy.	
Grassland – Modified grassland	Target condition is 'Poor' in 1 year. The condition criteria to achieve this are as follows, passes 5 of 7 criteria but does not pass essential criterion A: • 6-8 vascular plant species per m^2 present including at least 2 forbs. Fail • Sward height is varied with 20% <7cm and at least 20% >7cm. Fail • Some scattered scrub may be present but covers <20%. Pass • Physical damage is evident in <5%. Pass • Cover of bare ground is between 1% and 10%. Pass • Cover of bracken is <20%. Pass • Absence of invasive, non-native plant species. Pass	To meet target condition, it will be necessary to: • Ground preparations to take place. • September to October – Seed with Emorsgate Em1 seed mix. • Regularly cut (approx. 12-14 times a year) to ensure amenity use. • Review and amend cutting regime as necessary	Poor
Grassland – Other neutral grassland	Target condition is 'Moderate' in 5 years. The condition criteria to achieve this condition are as follows, passes 4 of 5 criteria. • Grassland is a good representation of the habitat type based on UKHab description. Pass • Sward height varies with at least 20% <7cm and at least 20% >7cm. Fail • Cover of bare ground is between 1% and 5%. Pass • Cover of bracken is <20% with scrub <5%. Pass • Combined cover of species of indicative sub-optimal condition and physical damage. Pass	To meet target condition, it will be necessary to: **<u>Year 1:</u>** June – Ground preparation to take place if required or spray off or remove competitive/ruderal growth. July – power/disc harrow August – Spray off or remove competitive/ruderal growth. September to October – Seed with seed mix (Low growing Wildflower Seeds LW12M or	Moderate

		similar dep. Upon soil chemistry with additional yellow rattle @ 0.1g/m2) **<u>Year 2:</u>** April to June/July – control annual weeds by pulling or pot treatment. July to September – Mow to 5-10cm **<u>Year 3</u>** onwards Cut and collect arisings late July early August. Management intervention options following monitoring should include alteration of mowing regimes and additional over seeding (including the use of additional yellow rattle where considered necessary).	
Individual trees – Rural tree	Target condition is 'Poor' in 10 years. The condition criteria to achieve this are as follows, passes 2 of 6 criteria: The condition criteria for these urban trees are as follows: • More than 70% of trees are native species. Fail. • Tree canopy is predominantly continuous with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide. Pass. • More than 50% of trees are mature or veteran. Fail. • There is little or no evidence of an adverse impact on tree health by anthropogenic activities such as vandalism or herbicide use. There is no current regular pruning regime,	To meet target condition, it will be necessary to: • Plant species as per landscape plan ensuring suitable spacing. Ensure ground is treated and cleared appropriately prior to planting in line with LEMP. • All plants to be fitted with rabbit protection guards; • Watering - In periods of dry weather apply sufficient water to maintain healthy growth;	Poor

so the trees retain >75% of expected canopy for their age range and height. Pass.

- Management regime has encouraged micro habitat sites for birds, mammals and insects e.g., presence of deadwood, cavities or loose bark etc. Fail.
- Trees are immediately adjacent to other vegetation, and tree canopies are oversailing vegetation beneath. Fail.

- Refirming - Ensure that all trees and shrubs are firmly bedded in the ground after strong winds, frost heave or other disturbances;
- Ensure rabbit guards are checked periodically and removed when trees have reached a stable growth; and
- Take remedial action if plants become damaged and replace if there is any failure.

Appendix G Biodiversity Metric 4.0 Calculation

Metric to be included as an attachment.

VikingCCS

Harbour Energy | AECOM