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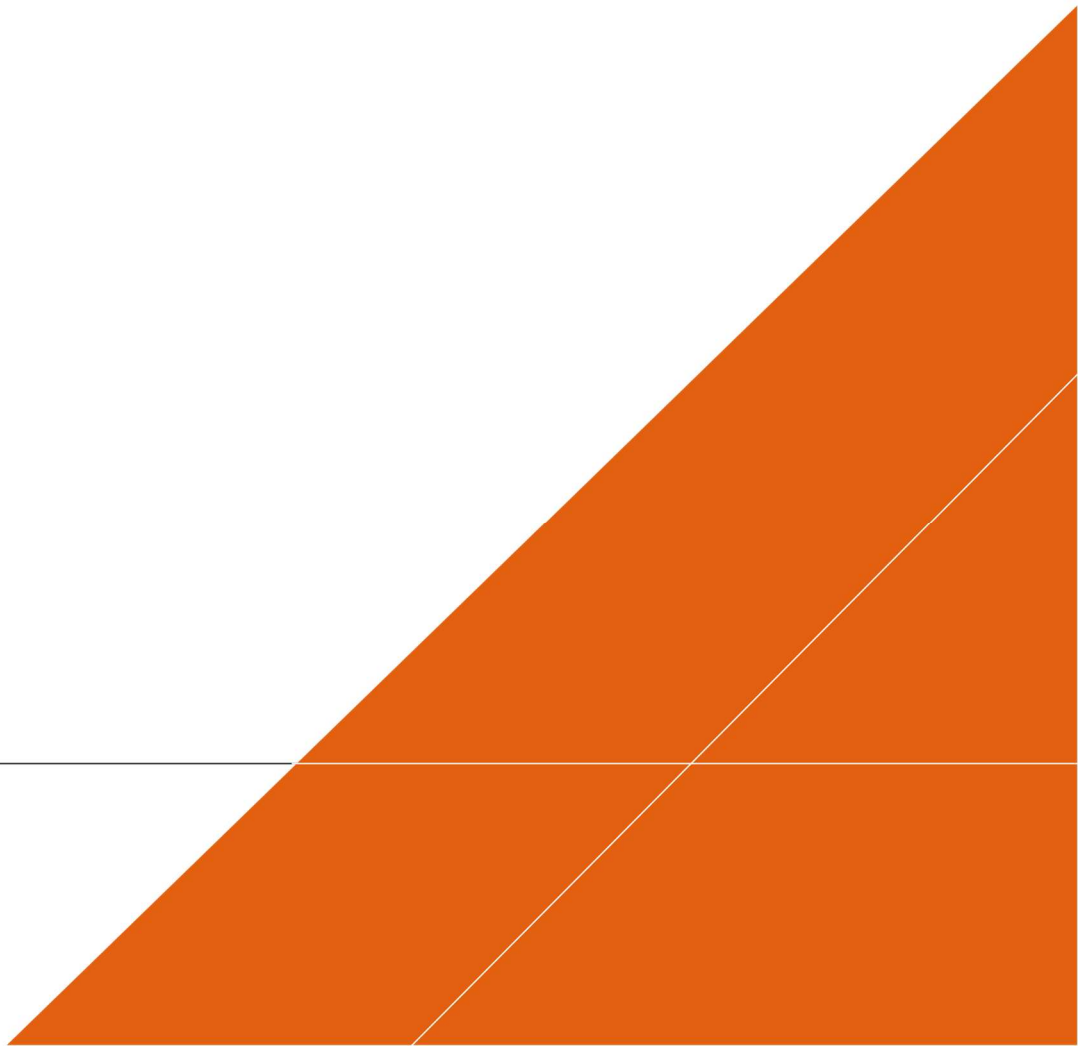
COG MOORS WWTW – PROPOSED ADVANCED ANAEROBIC DIGESTION (AAD) PLANT

Dormouse Survey Report

NOVEMBER 2017



Incorporating

EC HARRIS BUILT ASSET CONSULTANCY

Hyder

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COG MOORS WWTW – PROPOSED ADVANCED ANAEROBIC DIGESTION (AAD) PLANT

Dormouse Survey Report

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Report No	4798-S-202-HYD-XX-XX-RP-NX-10403
Date	NOVEMBER 2017

VERSION CONTROL

Version	Date	Author	Changes
1	August 2017	Porscha Thompson	Issue of interim survey report for pre-application
2	November 2017	Porscha Thompson and Julie Player	Updated to include results of September – November 2017 surveys. SKW reviewed
3	November 2017	Lucy Fay	Updated to include comments following Collins Environmental Consultancy review

CONTENTS

Non-technical Summary

Surveys were undertaken to determine the presence/likely absence of dormice within the footprint of the proposed Development at Cog Moors Wastewater Treatment Works.

The surveys found one dormouse nest and small numbers of wood mice. The results suggest the site supports a small population of dormice.

As dormice have been found on site, a development licence from Natural Resources Wales is required before any vegetation clearance can take place. Vegetation clearance will be undertaken in a sensitive manner and at an appropriate time of year so as not to disturb or harm dormice. Landscaping has been designed to maintain and enhance habitat quality and connectivity to minimise impacts on dormice.

Summary

This report presents the results of dormouse surveys associated with the proposed Advanced Anaerobic Digestion (AAD) plant at Cog Moors Wastewater Treatment Works (WwTW) undertaken by Arcadis Consulting (UK) Ltd on behalf of Dŵr Cymru Welsh Water.

The proposed AAD plant comprises a number of new process and storage tanks and buildings, together with the demolition of, and modifications to, some existing items of plant, equipment and infrastructure.

The aims of the study were to confirm the presence, or likely absence, of dormouse (*Muscardinus avellanarius*) within the site in order to identify any potential constraints to the proposed Development and to provide recommendations for appropriate mitigation.

Phase 1 surveys undertaken in 2006 by Cresswell Associates concluded it was unlikely dormice would be present due to sub-optimal habitat quality and absence of dormouse records in the vicinity. A Preliminary Ecological Appraisal undertaken in October 2016 by Mott McDonald Bentley found no records of dormouse within 2 km of the site; but the site was found to contain suitable habitat to support this species. A Preliminary Ecological Appraisal report (dated August 2017) produced by Arcadis Consulting (UK) Ltd found a record of dormice at St Cyres, Dinas Powys,1 km north of the proposed Development site in June 2015. The habitat within the proposed Development site was considered sub-optimal for dormice due to a lack of understorey within the woodlands and limited range of food species. However, the site is connected via woodland and hedgerows to the record of dormouse identified in 2015 and it was considered possible that the proposed Development site could support dormice.

One hundred and one dormouse nest tubes were deployed in areas within Cog Moors WwTW and adjacent woodland affected by the proposed Development in suitable habitat for dormice based on results of the Preliminary Ecological Appraisals. Checks were carried out monthly between April and November in accordance with The Dormouse Conservation Handbook.

A single dormouse nest was identified during the October and November visits within an area of broadleaved plantation woodland, in the eastern area of the site.

Results confirm that the site supports a low population of dormice and as the habitats on site are also connected to a known dormouse record, mitigation measures have been recommended to minimise impacts to dormice. This includes:

- Obtain a dormouse mitigation licence to carry out vegetation clearance within the proposed Development site boundary.
- In areas that support dormice (trees, hedgerow and scrub) the vegetation clearance will be required to be undertaken as a two-stage process. Vegetation would be cleared in winter (November to February/March inclusive) to a height of no less than 500 mm using hand tools only. This will be followed by vegetation clearance down to ground level, stump extraction and earth removal the following spring (May onwards) once dormice have emerged from hibernation.
- Planting of replacement species-rich habitats and improved management of retained woodland/hedgerows will compensate for the loss of habitat during the construction phase. A range of shrub/tree species would be planted to provide food throughout the year. The planting of replacement vegetation has been designed to maintain the connectivity already found within the site.
- Protective fencing would be installed around retained trees and hedgerows.

1 Introduction and aims

This report presents the results of dormouse (*Muscardinus avellanarius*) surveys associated with the proposed Advanced Anaerobic Digestion (AAD) plant at Cog Moors Wastewater Treatment Works (WwTW), undertaken by Arcadis Consulting (UK) Ltd on behalf of Dŵr Cymru Welsh Water.

The aims of the study were to confirm the presence, or likely absence of dormouse within the site in order to identify any potential constraints to the proposed Development and to provide recommendations for appropriate mitigation.

2 Background information and proposed development

2.1 Site Location

The site is located in the Vale of Glamorgan south of Dinas Powys at grid reference ST 16327 69571 (see Drawing 4798-S-202-HYD-XX-XX-DR-NX-08021 for the location and survey boundary).

Cog Moors WwTW is situated to the east of the A4055 Cardiff Road, approximately 2km east of Barry and 1km south of Dinas Powys.

The site contains both concrete and steel process tanks, together with a series of process and control buildings and associated items of plant and equipment.

Vehicular and pedestrian access to the site is gained via a private road (Green Lane), which runs in a south easterly direction from its junction with the A4055.

The WwTW site is located within a low lying landscape, characterised by flat fields separated by ditches. The land rises steeply to the north of the WwTW site (Pop Hill) and is intermittently wooded.

The nearest residential properties to the WwTW site are located at Downs Farm and Brook Cottage, approximately 230m and 290m to the east, respectively. Other residential properties are located at distances of more than 0.5km, on Ashby Road to the south, along Cross Common Road to the north east and along Sully Road and Cog Road to the east and south, respectively.

The WwTW is well screened in the surrounding landscape, and from most of the surrounding roads and properties, by the localised topography and by existing hedgerows and trees. The only significant views of the WwTW are from nearby public footpaths.

The land use within the immediate surrounding area is predominately agricultural with a residential estate to the north-east.

2.2 Proposed Development

The proposed AAD plant comprises a number of new process and storage tanks and buildings, together with the demolition of and modifications to some existing items of plant and equipment.

The proposed Development is shown on Drawing 4798-S-202-HYD-XX-XX-DR-XX-06120.

The proposed development would provide for:

- Additional digestion capacity;
- Conditioning of the sludge generated on the site (dewatering and removal of contaminating rags and plastic);
- Reception facilities for sludge imported to the site from satellite WwTWs;
- Blending of the indigenous sludge and imported sludge;
- A thermal hydrolysis plant (THP), which uses steam to increase the temperature and pressure in a reaction vessel to pre-treat the sludge;
- Boilers to generate the steam for thermal hydrolysis;
- A siloxane plant to remove contaminants from the biogas generated;

- A combined heat and power (CHP) plant to generate useable heat and electricity, which can be used on site, exported to the grid, or both;
- A UV plant to treat some of the final effluent water from the WwTW, to provide better quality process water, for the sludge downstream of thermal hydrolysis;
- Tanks to hold sludge and liquor, resulting from the thickening and dewatering processes;
- A cake storage silo;
- Odour control equipment;
- New internal site access roads and drainage;
- Site clearance and earthworks and new fencing;
- New MCC equipment and control kiosks; and
- Appropriate mitigation planting and ecological mitigation measures.

The proposed development will not involve the use of any hazardous substances in notifiable quantities.

The proposed AAD plant will operate in conjunction with the existing sewage sludge treatment facilities and is located, therefore, on the eastern side of the existing Cog Moors WwTW, adjacent to the existing sewage sludge treatment infrastructure.

Part of the proposed AAD plant would be located within the existing operational area of the WwTW. The balance of the proposed development would be sited immediately to the east of the existing operational area, on an area of woodland, scrub and ruderal vegetation. This area immediately adjacent to the existing WwTW (Cog Moors Site of Importance for Nature Conservation (SINC)) is designated for its series of species-rich rush pastures.

Temporary construction compounds would be sited on an area of mown grassland, immediately adjacent to the existing final settlement tanks, and on an area of grassland within Cog Moors SINC to the east of the proposed AAD plant.

Vehicular access to the proposed development would continue to be gained from the A4055 via Green Lane.

In addition, an upgrade to the electricity connection will be required.

2.3 Background Information

A Phase 1 habitat survey of Cog Moors SINC undertaken in 2006 by Cresswell Associates at Cog Moors WwTW (Ref 1) found that although the site contained species-rich hedgerows that could potentially be suitable for dormice, it was considered unlikely that dormice would be using the adjacent hedgerows outside of the existing WwTW due to their gappy nature and the small areas of woodland present, combined with no records of dormice in the vicinity.

A Preliminary Ecological Appraisal of the site was undertaken in October 2016 by Mott McDonald Bentley (Ref 2) including a desk study which was undertaken in order to identify any existing ecological information relating to the proposed Development site and its surroundings. The South East Wales Biological Recording Centre (SEWBReC) were consulted to obtain any records of protected species or species of conservation concern within 2 km of the proposed Development site. Their desk study found no records of dormouse within 2 km of the site. No dormice or evidence of dormice were recorded on site. The site was found to contain suitable habitat to support this species in both semi-natural broadleaved woodland and broadleaved plantation woodland which contain species including Hazel (*Corylus avellana*), Pedunculate Oak (*Quercus robur*), Bramble (*Rubus fruticosus* agg.), Ash (*Fraxinus excelsior*), Hornbeam (*Carpinus betulus*), Silver Birch (*Betula pendula*) and Hawthorn (Crataegus monogyna) (Drawings 4798-S-202-MMB-06-LP-N1-G1-01001 and 4798-S-202-HYD-XX-XX-DR-NX-00005).

A Preliminary Ecological Appraisal report (dated November 2017) was produced by Arcadis Consulting (UK) Ltd (Ref 3). The desk study found dormice to be present at St Cyres, Dinas Powys, 1 km north of the proposed Development site in June 2015. The habitat within the proposed Development site was considered sub-optimal for dormice due to a lack of understorey within the woodlands and limited range of food species (Hazel, oak,

Bramble and Hawthorn). At the time of the survey (November 2016), very little of the Hazel (a key food species for dormice prior to hibernation) was found to have evidence of fruiting. However, the site is connected via woodland and hedgerows to the record of dormouse identified in 2015 and it was considered possible that the proposed Development site could support dormice.

3 Legislation

The legislative protection afforded to dormice and relevant local policy is summarised in Table 1 below:

Table 1: Legislative protection for dormice

Legislation	Offence
Conservation of Habitats and Species Regulations 2010 (as amended) (Ref 4)	The dormouse is a fully protected species under UK and European Law. Under the Conservation of Habitats and Species Regulations 2010 (as amended), it is an offence to: • deliberately capture, injure or kill any wild dormouse; • deliberately disturb wild dormice; and • damage or destroy a breeding site or resting place of dormice. Disturbance is defined as that which is likely: 1. to impair their ability – • to survive, to breed or reproduce, or to rear or nurture their young, or • in the case of animals of a hibernating or migratory species, to hibernate or migrate; or 2. to affect significantly the local distribution or abundance of the species to which they belong.
Wildlife and Countryside Act 1981 (as amended) (Ref 5).	Under the Wildlife and Countryside Act 1981(as amended) it is an offence to: • intentionally or recklessly disturb any dormouse while it is occupying a structure or place which it uses for shelter or protection; • intentionally or recklessly obstructs access to any structure or place used by a dormouse for shelter or protection; and • sell, offer or expose for sale any dormouse.
Environment (Wales) Act 2016 (Ref 6)	Section 7 of the Environment (Wales) Act 2016 lists the living organisms of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. Dormice are included in this list. Section 6 of the Environment (Wales) Act 2016 places a duty on all public authorities (including statutory undertakers) to “seek to maintain and enhance biodiversity” and to “promote the resilience of ecosystems”.
Vale of Glamorgan Local Biodiversity Action Plan (LBAP) (Ref 7)	Dormice are a Vale of Glamorgan LBAP species and are considered to be rare within the Vale of Glamorgan. The overall objective of the Vale of Glamorgan LBAP is to conserve and enhance the biodiversity of the Vale by: • Protecting all habitats and species important at a local as well as national or international level for nature conservation; • Promoting optimum management for these sites; • Where appropriate, improving degraded habitats or creating new habitats; and • Creating a healthy environment in which the commoner species can thrive;

Legislation	Offence
	• Creating public awareness of local biodiversity through education and information to all sectors. The LBAP also has objectives to protect the current populations of dormice and employ woodland management practices which maintain a shrub layer suitable for dormice (e.g. coppicing).
Vale of Glamorgan Local Development Plan 2011-2026 (Ref 8)	Policy MG21 of the Local Development Plan states that: "Development proposals likely to have an adverse impact on Priority species will only be permitted where it can be demonstrated that: 1. The need for the development clearly outweighs the nature conservation value of the site; 2. Adverse impacts on nature conservation and geological features can be avoided: 3. Appropriate and proportionate mitigation and compensation measures can be provided: and 4. The development conserves and where possible enhances biodiversity interests."

4 Methodology

Dormouse surveys were undertaken in accordance with the guidance provided in The Dormouse Conservation Handbook (Ref 9).

The survey method used was a 'dormouse nest-tube survey', whereby specially constructed artificial nesting tubes were fastened underneath horizontal branches in areas of suitable habitat using garden wire, and were left in place over a period of several months. When present, dormice often find and make nests in these tubes and their presence can then be detected by means of periodic monitoring to find actual animals or nests, both of which are distinctive.

The standard survey methodology requires the deployment of at least 50 nest tubes and uses an index of probability to calculate a survey effort score. Nest tubes are most frequently occupied in May, August and September and so these months score the highest.

One hundred and one dormouse tubes were deployed on the 8th March 2017 in areas identified within the Preliminary Ecological Appraisal (Ref 3) as suitable dormouse habitat. These locations can be found on Drawing 4798-S-202-HYD-XX-XX-DR-NX-08021.

Nest tube checks were carried out monthly on dates detailed in Table 2 below. Each survey was carried out by one licenced surveyor and an assistant.

Table 2: Dormouse survey dates

Visit Number	Date	Surveyors
1	27th April 2017	Julie Player (Licence number 75746:OTH:SA:2017) Porscha Thompson
2	30th May 2017	Lucy Fay (Licence number 74024:OTH:SA:2016) Alex Ellis
3	26th June 2017	Julie Player Alex Ellis
4	26th July 2017	Julie Player Mike Bailey
5	30th August 2017	Julie Player Kailey O'Brien
6	21st September 2017	Sian Carr (Licence number 75765a:OTH:SA:2017) Kailey O'Brien
7	23rd October 2017	Sian Carr Kailey O'Brien
8	13th November 2017	Sian Carr Kailey O'Brien

The search effort scores of the surveys are detailed in the table below (Table 3). English Nature guidelines state that "assumed absence should not be based on a search effort score of less than 20" (Ref 9).

Table 3: Index of probability survey effort score

Month	Search effort score (based on 50 nest tubes) (taken from the Dormouse Conservation Handbook (Ref 9)
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2
Total Score	**25**

5 Survey Constraints

It was not possible to carry out a nut search during winter 2016/2017 due to a lack of nuts.

On the initial five surveys up to 13 of the nest tubes could not be located due the nest tubes becoming hidden by dense scrub vegetation. This is not considered to affect the validity of the survey as large number of tubes were checked (i.e. more than the minimum 50 tubes required to achieve the search effort scores detailed in Table 3).

Trees/hedgerows along Green Lane were not surveyed due to access restrictions. This is not considered to impact the results of the surveys as no works are proposed along Green Lane.

6 Results

A dormouse nest was found in broadleaved plantation woodland in nest tube number 2 during the October 2017 survey (see Photograph 1 below). Although the nest was only partially constructed the nest was characteristic of dormice (being woven from stripped bark).

Photograph 1: Dormouse nest found in nest tube 2 (October 2017)

During the November 2017 survey, the nest was found to still be incomplete (Photograph 2 below).

Photograph 2: Dormouse nest found in nest tube 2 (November 2017)

Wood mice and/or nests were found in nest tubes within Area 1 (nest tubes 4, 31, 36, 47, 48 and 91), Area 2 (nest tube 8, 17, 51), Area 3 (nest tube 11, 26 and 99), Area 4 (nest tubes 2, 3, 6, 24, 26, 27, 52, 69 and 92), Area 5 (nest tubes 4, 7, 38 and 40) and Area 6 (nest tubes 18 and 46) (see Drawing 4798-S-202-HYD-XX-XX-DR-NX-08021).

7 Discussion

The desk study identified a record of dormice 1 km north of the proposed Development site in June 2015. The proposed Development site is connected via woodland and hedgerows to this record.

The Preliminary Ecological Appraisal carried out by Arcadis (UK) Ltd (Ref 3) assessed the habitat within the existing WwTW and adjacent Cog Moors SINC as sub-optimal to support dormice. However, due to the connectivity of the site to the known dormouse record, it was considered that a low population of dormice may be present.

Being sub-optimal habitat, and with the presence of a single nest found relatively late in the survey season, it is considered that dormice are present at low density, but that the site does not form part of a core dormouse territory.

A total of 0.45 ha of broadleaved plantation woodland, 0.68 ha semi-natural broadleaved woodland and 0.03 ha of dense scrub will be lost as part of the proposed works. Without mitigation this will result in a narrowing of the potential dispersal corridor which extends north to south across the SINC and severing of the dispersal corridor which extends east to west across the existing WwTW. There is also the risk that during these works, dormice may be disturbed and/or killed or injured. Due to the presence of dormice on site, the removal of vegetation will require a development licence from Natural Resources Wales.

In order to reduce the potential impacts to dormice, targeted mitigation is proposed.

8 Conclusions

One dormouse nest was found within an area of woodland during the October and November 2017 surveys, suggesting the site supports a low population of dormice. Due to the presence of dormice on site and connectivity of the site to known dormouse records, proposals for mitigation have been provided below.

9 Mitigation and Enhancement

9.1 Mitigation

Based on the presence of a low population of dormice, the following mitigation is recommended:

- A dormouse mitigation licence will be required in order to carry out vegetation clearance within the proposed Development site boundary. A mitigation licence can only be applied for once planning permission has been granted. Once received, Natural Resources Wales (NRW) can take at least 6 weeks to process the application.

- Planting of replacement species-rich habitats and improved management of retained habitats in accordance with a Habitat Management Plan (Ref 10) will be required to compensate for the loss of habitat during the construction phase. As part of the Biodiversity Strategy a total of 0.28 ha of broadleaved woodland will be created and a further 0.63 ha of retained woodland will undergo improved management to improve its quality (Ref 11). The landscaping proposals are shown on Drawing 4798-S-202-HYD-XX-XX-DR-NX-06127. All planting / landscaping has been designed in consultation with the Vale of Glamorgan ecologist with the aim of minimising habitat fragmentation.
- A range of different shrub/tree species will be planted to provide food throughout the year, ideally sourced and grown local to the proposed Development site as shown on Drawing 4798-S-202-HYD-XX-XX-DR-NX-06127. These include Hazel for its nuts and ability to support insect species and oak which is an important source of insect food (Bright *et al*., 2006). A diversity of other species to offer flowers, insects and fruits at different times e.g. Holly (*Ilex aquifolium*), Alder (*Alnus glutinosa*), Wild Cherry (*Prunus avium*) and Silver Birch will also be used. The planting of replacement vegetation will maintain the connectivity already found around and within the site (Ref 11) (Drawing 4798-S-202-HYD-XX-XX-DR-NX-06127).
- Vegetation clearance will be undertaken as a two-stage process. Vegetation would be cleared in winter (November to February inclusive) to a height of no less than 500 mm using hand tools only. It may be possible to extend this into March (subject to agreement with NRW), depending on local weather conditions and presence of nesting birds. This will be followed by vegetation clearance down to ground level, stump extraction and earth removal the following spring (May onwards). This will remove sufficient vegetation to persuade dormice emerging from hibernation in April or May to move to more appropriate habitat nearby (Ref 9). Vegetation clearance would be carried out under the guidance and supervision of a licensed ecologist.
- Dormouse nest boxes would need to be provided in retained habitat in advance of vegetation clearance. These will provide alternative nesting habitat for dormice, outside of the works area, and would be monitored during and post-construction in accordance with the licence to determine the success of the mitigation.
- Protective fencing would be installed around retained trees (distance of fencing from trunk = 12x trunk diameter when measured at 1.5 m above ground level) and hedgerows (at least at maximum canopy/branch distance) in accordance with the Arboricultural Impact Assessment (Ref 12).

9.2 Toolbox Talk

All contractors would be provided with a toolbox talk prior to construction works commencing on site. The toolbox would cover the presence of dormice, identification, mitigation and action to be taken in the event of discovering a dormouse or dormouse nest.

10 References

Ref 1: Cresswell Associates (2006). Proposed Extension of Cog Moors WWTW, Vale of Glamorgan: Supplementary Report to the Ecological Impact Assessment

Ref 2: Mott MacDonald Bentley (2016) Cog Moors WwTW South Sludge Strategy - Preliminary Ecological Appraisal (P02).

Ref 3: Arcadis Consulting (UK) Ltd (2017). Cog Moors WwTW - Proposed Advanced Anaerobic Digestion (AAD) Plant. Addendum Preliminary Ecological Appraisal (Rev 3) (Report number 4798-S-202-HYD-XX-XX-RP-NX-10406).

Ref 4: Conservation of Habitats and Species Regulations 2010 (as amended).

Ref 5: Wildlife and Countryside Act 1981 (as amended). HMSO.

Ref 6: Environment (Wales) Act 2016. HMSO.

Ref 7: Vale of Glamorgan Council (2002). Vale of Glamorgan Local Biodiversity Action Plan.

Ref 8: Vale of Glamorgan Council (2017). Vale of Glamorgan Local Development Plan 2011-2026. Written Statement.

Ref 9: Bright, P., Morris, P., and Mitchell-Jones, T. (2006). The Dormouse Conservation Handbook, Second Edition. English Nature.

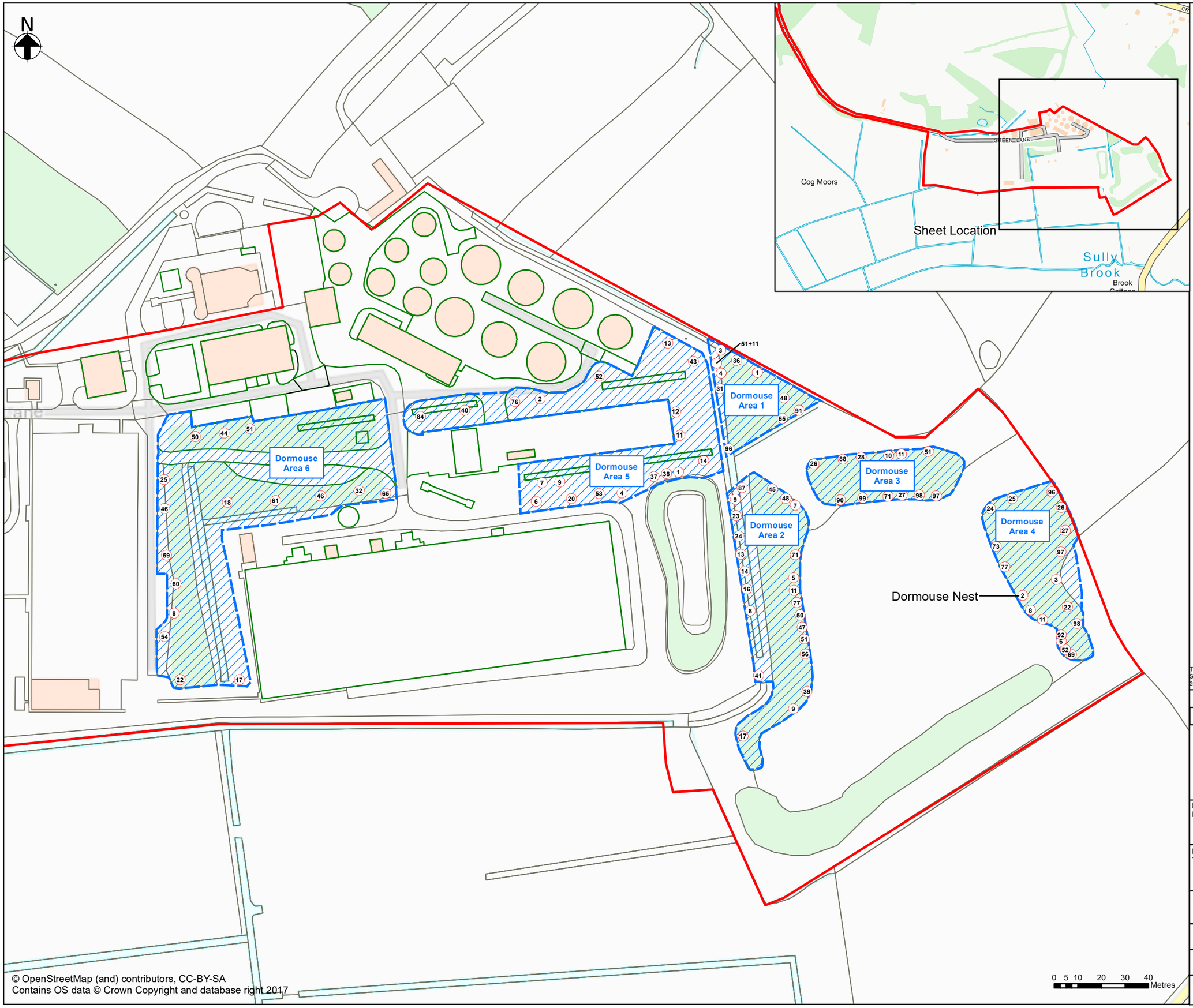
Ref 10: Arcadis Consulting (UK) Ltd (2017). Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant. Habitat Management Plan (Report number 4798-S-202-HYD-XX-XX-RP-NX-10199).

Ref 11: Arcadis Consulting (UK) Ltd (2017). Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant. Biodiversity Strategy (Report number 4798-S-202-HYD-XX-XX-RP-NX-10192).

Ref 12: Arcadis Consulting (UK) Ltd (2017). Cog Moors WwTW - Proposed Advanced Anaerobic Digestion (AAD) Plant. BS 5837: 2012. Tree Survey Report and Arboricultural Impact Assessment.

Drawings

Drawing 4798-S-202-HYD-XX-XX-DR-NX-08021- Dormouse nest tube location plan



A3

LEGEND

- Dormouse Nest Tube Location
- Planning Application Boundary
- Survey Locations

Rev.	Date.	Drawn	Description.	Chkd.	Appd.	Date.
01	21JUN17	AH	Reptile Refugia Locations	PT		21JUN17

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name.
Cog Moors WwTW

Drawing Title.
Dormouse Nest Tube Location Plan

Suitability.	Suitability Code.
For Information	S2

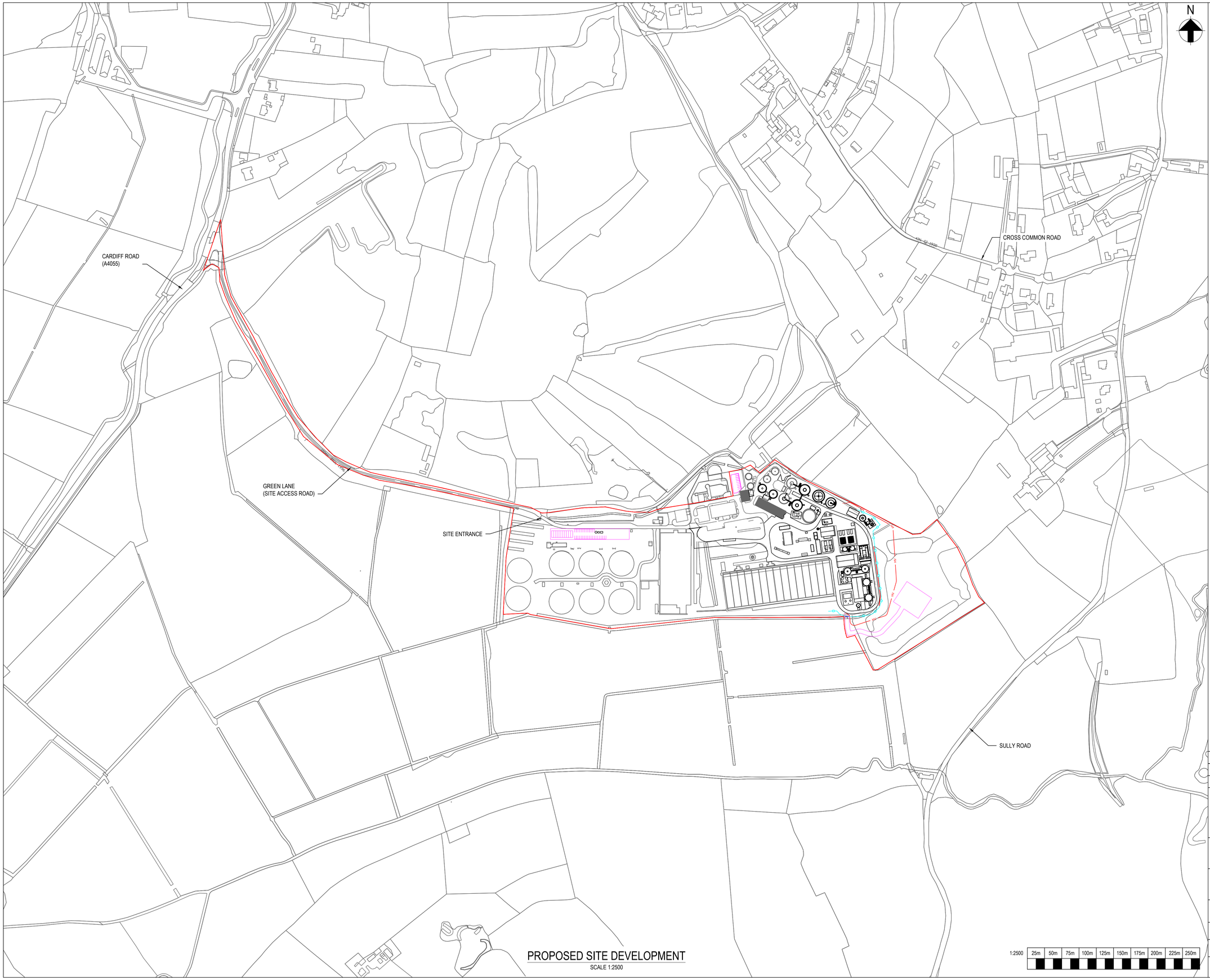
Originator	Designer	Date.
A.Hankinson	P.Thompson	21JUN17

Internal Project Number	Scale	Rev.
UA007902	1:1,500	01

Drawing Number.
4798-S-202-HYD-XX-XX-DR-NX-08021

K:\projects\UA007902-Cog Moors\E-OurDrawings\UA007902-Reptile Refugia Locations-A1.mxd

Drawing 4798-S-202-HYD-XX-XX-DR-XX-06120 – Proposed Site Development



PROPOSED SITE DEVELOPMENT
SCALE 1:2500

A1

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METERS ABOVE GROUND LEVEL.
3. DO NOT SCALE FROM THIS DRAWING.

LEGEND:

- PLANNING APPLICATION BOUNDARY
- EXISTING
- PROPOSED
- TEMPORARY CONTRACTORS COMPOUND
- PROPOSED SECURITY FENCE TO TIE INTO EXISTING FENCE LINE

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
P02	17/10/17	DP	FOR INFORMATION	YF	MN	17/10/17
P01	21/08/17	DP	FOR INFORMATION	YF	MN	21/08/17

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP10 8FZ

Project Name.
COG MOORS WwTW AAD

Drawing Title.
PROPOSED SITE DEVELOPMENT

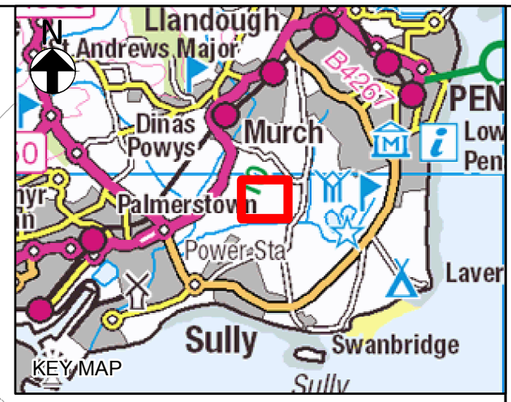
Suitability.	Suitability Code.
ISSUED FOR INFORMATION	S2

Originator.	Designer.	Date.
DP	RN	17/10/17
Internal Project Number.	Scale.	Rev.
UA007902	1:2500	P02

Drawing Number.
4798-S-202-HYD-XX-XX-DR-XX-06120

1:2500 25m 50m 75m 100m 125m 150m 175m 200m 225m 250m

Drawing 4798-S-202-MMB-06-LP-N1-G1-01001 - Phase 1 Habitat Map (existing WwTW)



A3

Legend

- Target note
- J2.3.1 - Hedge with trees - native species-rich
- J2.4 - Fence
- J2.6 - Dry ditch
- J2.8 - Earth bank
- A1.1.1 - Broadleaved woodland - semi-natural
- A1.1.2 - Broadleaved woodland - plantation
- C3.1 - Other tall herb and fern - ruderal
- J1.2 - Cultivated/disturbed land - amenity grassland
- J3.6 - Buildings & infrastructure
- J5 - Hardstanding
- Site Boundary
- Restricted Access - Not surveyed during PEA

0 12.5 25 50 75 100 Metres

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
P2	02/11/2016	JW	Preliminary issue	JB	CW	02/11/2016

Mott MacDonald Bentley
Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name.
South Sludge Strategy

Drawing Title.
Phase 1 Habitat Map

Suitability.	Suitability Code.
Preliminary	PRE

Originator	Designer	Date.
JW	JJB	02/11/2016

Internal Project Number	Scale	Rev.
QN29	1:2,250	P2

Drawing Number.
4798-S-202-MMB-06-LP-N1-G1-01001

Drawing 4798-S-202-HYD-XX-XX-DR-NX-00005 - Phase 1 Habitat Survey (land adjacent to existing WwTW)

A3

LEGEND

- Planning Application Boundary
- Dry Ditch
- Scattered Tree

Habitat Type

- Tall Ruderal
- Dense Scrub
- Marshy Grassland
- Broadleaved Woodland - Plantation
- Neutral Grassland - Semi-Improved
- SI — Poor Grassland (Semi-Improved)

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
01	19JUN17	AH	Initial Issue	JP		19JUN17

Capital Delivery Alliance
Cynghrair Cyflawni Cyfalaf
Ty Awen, Spooner Close, Coed Kernew, Newport, NP10 8FZ

Project Name.
Cog Moors WwTW

Drawing Title.
Cog Moors WwTW Phase 1 Habitat Survey

Suitability.	Suitability Code.
For Information	S2

Originator	Designer	Date.
A.Hankinson	J.Player	19JUN17

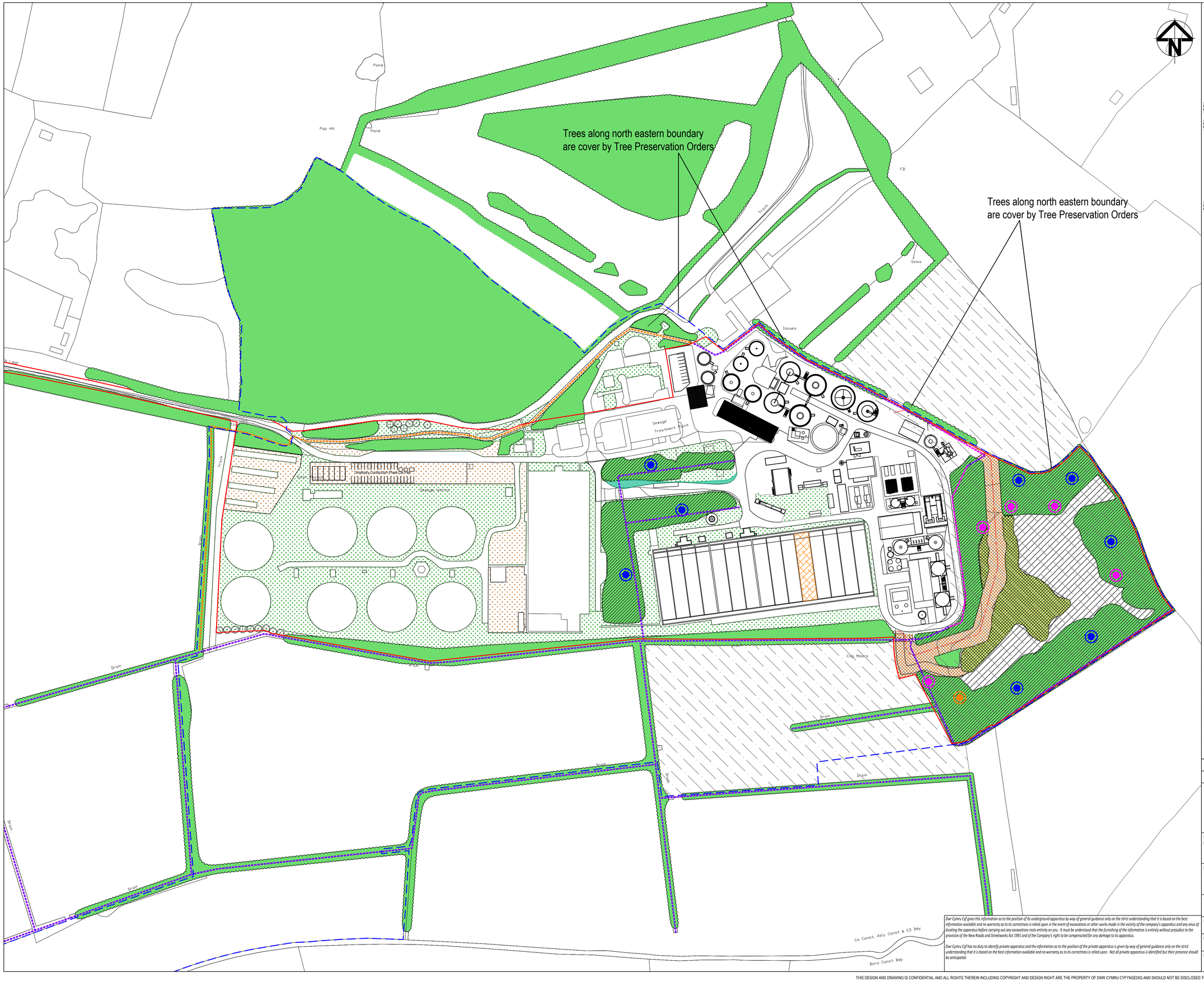
Internal Project Number	Scale	Rev.
UA007902	1:1,000	01

Drawing Number.
4798-S-202-HYD-XX-XX-DR-NX-00005

K:\projects\UA007902-Cog Moors\E-Our Drawings\UA007902-Reptile Refuge Locations-A4.mxd

Drawing 4798-S-202-HYD-XX-XX-DR-NX-06127– Landscape Mitigation Plan Screening

A1



LEGEND:

- Planning Application Boundary
- DCWW Land Ownership Boundary
- Site of Important Nature Conservation (SINC)
- Existing Amenity Grass
- Existing Tree and Shrub Planting
- Existing Tree planting to be managed for biodiversity
- Existing Grassland to be managed as Species Rich Grassland
- SINC Grassland Management Area
- Proposed Amenity Grassland
- Proposed Species Rich Grassland
- Proposed Woodland Belt Planting
- Proposed Individual Tree Planting
- Area to be Managed for Wildlife
- Bird Nest Box
- Bat Box
- Hibernaculum to be created
- Existing Ephemeral Ditch
- Existing Dry Ditch
- Proposed Drainage Ditch

Woodland Belt Forestry Transplant Mix			
Quercus robur	Pedunculate Oak	1+1 Forestry transplant; Bare root; 1.5m spacing.	40%
Corylus avellana	Hazel	As above.	20%
Ilex aquifolium	Holly	2L Pot; 1.5m spacing.	10%
Alnus glutinosa	Alder	1+1 Forestry transplant; Bare root; 1.5m spacing.	10%
Prunus avium	Wild Cherry	As above.	10%
Betula pendula	Silver Birch	As above.	10%
Individual Trees			
Quercus robur	Pedunculate Oak	2x, 3 Breaks,Fthd, BR, 1.5-1.75m. 10m spacing	40%
Alnus glutinosa	Alder	As above.	30%
Prunus avium	Wild Cherry	2x, 5 Breaks,Fthd, BR, 1.5-1.75m. 10m spacing	30%

Species Rich Grassland		
Festuca rubra litoralis	Slender Creeping Red Fescue	30%
Cynosurus cristatus	Crested Dogstail	25%
Festuca ovina	Sheep's Fescue	5%
Festuca pratensis	Meadow Fescue	5%
Phleum bertolonii	Timothy Grass	5%
Trisetum flavescens	Golden Oat-Grass	5%
Centaurea nigra	Common Knapweed	3%
Plantago lanceolata	Ribwort Plantain	3%
Agrostis capillaris	Browntop Bent	2%
Anthoxanthum odoratum	Sweet Vernal Grass	2%
Trifolium pratense	Red Clover	2%
Trifolium repens	White Clover	2%
Leucanthemum vulgare	Ox-eye Daisy	1.60%
Ranunculus acris	Meadow Buttercup	1%
Achillea millefolium	Yarrow	1%
Galium verum	Lady's Bedstraw	1%
Lotus corniculatus	Birdsfoot Trefoil	1%
Sanguisorba minor	Salad Burnet	1%
Agrimonia eupatorium	Agrimony	0.50%
Filipendula ulmaria	Meadowsweet	0.50%
Prunella vulgaris	Self Heal	0.50%
Ranunculus bulbosus	Bulbous Buttercup	0.50%
Rhinanthus minor	Yellow Rattle	0.50%
Dactylis glomerata	Cocksfoot	0.50%
Agrostis stolonifera	Creeping Bent	0.50%
Arrhenatherum elatius	False Oat Grass	0.50%
Leontodon autumnalis	Autumn Hawkbit	0.20%
Leontodon hispidus	Rough Hawkbit	0.20%

Rev.	Date.	Drawn.	Description.	Chkd.	Appd.	Date.
P02	25.10.17	RG	SECOND ISSUE	SF	LW	25.10.17
P01	27.07.17	RG	FIRST ISSUE	SF	LW	21.06.17

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Project Name.
COG MOORS WwTW AAD

Drawing Title.
FIGURE 10
LANDSCAPE MITIGATION PLAN
SCREENING

Suitability.	Suitability Code.
INFORMATION	S2

Originator.	Designer.	Date.
R.G.	S.F.	21.06.17
Internal Project Number.	**Scale.**	**Rev.**
UA007902	1:1250@A1	P02

Drawing Number.
4798-S-202-HYD-XX-XX-DR-NX-06127

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Dwr Cymru Cyf has no duty to identify private apparatus and the information as to the position of the private apparatus is given by way of general guidance only on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon. Not all private apparatus is identified but their presence should be anticipated.

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