

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

## Bat Activity Survey Report

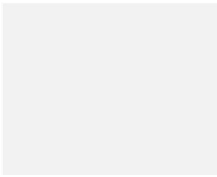
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# COG MOORS WWTW – PROPOSED ADVANCED ANAEROBIC DIGESTION (AAD) PLANT

## Bat Activity Survey Report

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### VERSION CONTROL

Version	Date	Author	Changes
1	August 2017	Porscha Thompson	Issue of final report
2	November 2017	Lucy Fay	Non-technical summary added
3	March 2018	Lucy Fay	Red line boundary updated

This report dated 27 March 2018 has been prepared for Dwr Cymru Welsh Water (the “Client”) in accordance with the terms and conditions of appointment dated 01 July 2014 (the “Appointment”) between the Client and **Arcadis Consulting (UK) Limited** (“Arcadis”) for the purposes specified in the Appointment. For avoidance of doubt, no other person(s) may use or rely upon this report or its contents, and Arcadis accepts no responsibility for any such use or reliance thereon by any other third party.

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## Non-technical Summary

Surveys were undertaken to determine which bat species utilise Cog Moors Wastewater Treatment Works and associated land where development is proposed, and the ways in which they use they site.

Surveys recorded small numbers of soprano pipistrelle and common pipistrelle foraging and commuting, with activity concentrated around woodland in Cog Moors Site of Importance for Nature Conservation which adjoins Cog Moors Wastewater Treatment Works. Other bat species recorded infrequently include noctule, Myotis and brown long-eared bats.

The scheme has been designed with intelligent lighting technology to minimise light spill to onto retained and newly planted vegetation, and bat boxes will be provided to increase the number of available roosting sites. Landscaping has been designed to maintain and enhance habitat connectivity.

## Summary

This report presents the results of bat activity 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 and equipment.

The aim of the study was to obtain a view of which bat species utilise the proposed Development site and the ways in which they utilise the site. The survey findings will inform the design process and appropriate mitigation and enhancement measures.

Surveys undertaken in 2006 by Cresswell Associates at Cog Moors WwTW found the site to contain mature oak (*Quercus* sp.) trees that contained features potentially suitable for roosting bats. The hedgerows, adjacent ditches, grazed pastures and open grassland appeared to provide suitable foraging and commuting habitat for the local bat community. Bat activity surveys undertaken by Arup in 2005 recorded soprano pipistrelle (*Pipistrellus pygmaeus*) and common pipistrelle (*Pipistrellus pipistrellus*) foraging along the hedges, and noctule were recorded foraging at height. In addition, Natterer's bat (*Myotis Nattereri*) and brown long-eared (*Plecotus auritus*) were also potentially present. A Preliminary Ecological Appraisal of the site was undertaken in October 2016 by Mott McDonald Bentley. Their desk study found six species of bat within 2 km of the site including lesser horseshoe bat (*Rhinolophus hipposideros*), noctule bat (*Nyctalus noctula*), Leisler's bat (*Nyctalus leisteri*), soprano pipistrelle, common pipistrelle, and serotine (*Eptesicus serotinus*). No evidence of bats was recorded on site, but suitable habitat to support roosting and foraging bats was identified. A Preliminary Ecological Appraisal report (dated March 2018) was produced by Arcadis Consulting (UK) Ltd. The site was found to contain suitable habitat to support foraging, commuting and roosting bats within woodland areas with six mature oak trees that were assessed as having potential to support roosting bats.

Bat activity transect surveys were undertaken on 27th April 2017, 24th May 2017 and 20<sup>th</sup> June 2017 in appropriate weather conditions within the footprint of the scheme to assess the use of the survey area by bats. A transect route was identified to incorporate habitats that are likely to be affected by the proposed work along with surrounding habitats such as woodlands and field boundary features and included the main Cog Moors WwTW site and also the SINC to the east of the proposed Development.

Surveys were also carried out using static detectors for five nights each month to further assess species utilising the site.

Bat activity transect surveys recorded small numbers of soprano pipistrelle and common pipistrelle foraging and commuting particularly concentrated around areas of woodland within Cog Moors SINC. Noctules were recorded commuting over the site, a single myotis call was recorded during the May transect, and brown long-eared bats were recorded foraging at two locations within Cog Moors SINC during the June transect. Individual bat passes were recorded infrequently within the existing WwTW. Results were broadly consistent across each month.

Results from static surveys were also consistent between months with the same species identified.

It is anticipated that the works associated with the proposed Development are likely to lead to a reduction in the foraging and commuting resources available to the local bat population that are currently utilising the site without appropriate mitigation. In order to reduce these potential effects, the scheme has been designed to maintain and enhance habitat connectivity with additional mitigation and enhancement recommended where appropriate.

# 1 Introduction and aims

This report presents the results of bat activity 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 aim of the study was to obtain a view of which bat species utilise the proposed Development site and the ways in which they utilise the site. The survey findings will inform the design process and appropriate mitigation and enhancement measures.

## 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-XX-06120 (P03)).

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/industrial 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 Site Development is shown on Drawing 4798-S-202-HYD-XX-XX-DR-XX-06120 (P03).

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

Phase 1 habitat surveys undertaken in 2006 by Cresswell Associates at Cog Moors WwTW (Ref 1) found the SINC to contain mature oak (*Quercus* sp.) trees that contained a number of features potentially suitable for roosting bats. Hedgerows and adjacent ditches appeared to provide suitable foraging habitat and commuting corridors for bats. Grazed pasture to the south of the WwTW and an area of more open grassland within the SINC could also provide potentially valuable foraging habitat for the local bat community.

A report produced by Arup (dated February 2007) (Ref 2) in relation to the extension to Cog Moors WwTW detailed the results of bat activity surveys undertaken in 2005 on three hedgerows on land to the south of the WwTW. The surveys found at least three species to be present: soprano and common pipistrelle (*Pipistrellus pygmaeus* and *P. pipistrellus*) were recorded foraging along the hedges, and noctules (*Nyctalus noctula*) were recorded foraging at height. In addition, a further two species (Natterer's (*Myotis nattereri*) and brown long-eared (*Plecotus auritus*)) were potentially present, although these were not positively identified.

A Preliminary Ecological Appraisal of the existing Cog Moors WwTW site was undertaken in October 2016 by Mott McDonald Bentley (Ref 3) 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 (SEWBRc) 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 six species of bats within 2km of the site. Species included lesser horseshoe (*Rhinolophus hipposideros*), noctule, Leisler's (*Nyctalus leisleri*), soprano pipistrelle, common pipistrelle, and serotine (*Eptesicus serotinus*), and included two pipistrelle species roosts 1.2 km north-west and 1.8 km north-east of the WwTW, four common pipistrelle roosts 1.8 km south-west, 1.9 km north-west, 2 km north-east, 2.1 km



north-west of the WwTW and a lesser horseshoe roost 3.6 km north-east of the WwTW. No evidence of bats was recorded on site, but suitable habitat to support roosting and foraging bats was identified.

A Preliminary Ecological Appraisal report (dated March 2018) was produced by Arcadis Consulting (UK) Ltd (Ref 4), focusing on Cog Moors SINC to the east of the WwTW and a field immediately north-west of the WwTW which is to be used for habitat compensation (see section 9.1). The site was found to contain suitable habitat to support foraging, commuting and roosting bats within woodland areas. 35 trees within the survey boundary were assessed as having potential to support roosting bats (Ref 5).

### 3 Legislation

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

Table 1: Legislative protection for bats

Legislation	Offence
Conservation of Habitats and Species Regulations 2017 (Ref 6)	<p>Bats (and their habitat) are protected under the Conservation of Habitats and Species Regulations 2017. Under this legislation it is an offence to:</p> <ul style="list-style-type: none"> <li>•Deliberately capture, kill or injure a bat;</li> <li>•Deliberately disturb wild bats (disturbance is defined as any activity likely to impair the ability to breed, reproduce, rear or nurture young, hibernate, migrate and/or significantly affect the local distribution or abundance of the species);</li> <li>•Damage or destroy a breeding site or resting place (i.e. roost); and</li> <li>•Possess, control, transport, sell, exchange, offer for sale or exchange, any live or dead animal or part of an animal.</li> </ul>
Wildlife and Countryside Act 1981 (as amended) (Ref 7)	<p>Bats are also partially protected under the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally or recklessly:</p> <ul style="list-style-type: none"> <li>•Damage or destroy any structure or place which bats use for shelter or protection;</li> <li>•Disturb bats while occupying a structure or place which is used for shelter or protection; and</li> <li>•Obstruct access to any structure or place which any such animal uses for shelter or protection.</li> </ul>
Environment Act Wales 2016 (Ref 8)	<p>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. Species included in this list are: barbastelle (<i>Barbastella barbastellus</i>), Bechstein’s (<i>Myotis bechsteinii</i>), noctule, common pipistrelle, soprano pipistrelle, brown long-eared, greater horseshoe bat (<i>Rhinolophus ferrumequinum</i>) and lesser horseshoe.</p> <p>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”</p>
Vale of Glamorgan Local Biodiversity Action Plan (LBAP) (Ref 9)	<p>All UK bat species are considered Vale of Glamorgan LBAP species. The overall objective of the Vale of Glamorgan LBAP is to conserve and enhance the biodiversity of the Vale by:</p> <ul style="list-style-type: none"> <li>• Protecting all habitats and species important at a local as well as national or international level for nature conservation;</li> <li>• Promoting optimum management for these sites;</li> <li>• Where appropriate, improving degraded habitats or creating new habitats; and</li> <li>• Creating a healthy environment in which the commoner species can thrive;</li> <li>• Creating public awareness of local biodiversity through education and information to all sectors</li> </ul>

Legislation	Offence
Vale of Glamorgan Local Development Plan 2011-2026 (Ref 10)	<p>Policy MG21 of the Local Development Plan states that:</p> <p>“Development proposals likely to have an adverse impact on Priority species will only be permitted where it can be demonstrated that:</p> <ol style="list-style-type: none"> <li>1. The need for the development clearly outweighs the nature conservation value of the site;</li> <li>2. Adverse impacts on nature conservation and geological features can be avoided;</li> <li>3. Appropriate and proportionate mitigation and compensation measures can be provided: and</li> <li>4. The development conserves and where possible enhances biodiversity interests.”</li> </ol>

## 4 Methodology

### 4.1 Transect surveys

Bat activity surveys were undertaken within the footprint of the proposed Development to assess the use of the survey area by bats with reference to guidance provided in the Bat Conservation Trust Good Practice Guidelines (Ref 11). A transect route was identified from aerial maps and Phase 1 habitat survey data to incorporate habitats that will be affected by the proposed work along with surrounding habitats such as woodlands and field boundary features, which included hedges and tree lines (see Drawing 4798-S-202-HYD-XX-XX-DR-NX-08020 (Rev 02)). The transect route included the main Cog Moors WwTW site and also the SINC to the east of the proposed Development.

The transect was walked twice per survey by a pair of bat surveyors at a measured pace. At pre-determined locations along each transect, three-minute point counts were undertaken where any bats that were observed were recorded including species and activity observed. Four point count locations were identified for the transect and the start/end locations were altered for each survey to account for temporal changes in bat activity (see Drawing 4798-S-202-HYD-XX-XX-DR-NX-08020 (Rev 02) and Appendix A). Any bat activity observed when walking between point count locations was also noted. Bat species, activity (e.g. foraging/commuting/feeding) and the time that the calls were recorded during the survey were noted. Surveys were carried out on 27<sup>th</sup> April 2017, 24<sup>th</sup> May 2017 and 20<sup>th</sup> June 2017 in appropriate weather conditions for bats (see Appendix A for full details). The surveys were undertaken using Batlogger detectors with built in recording devices allowing calls to be recorded for subsequent identification using Bat Explorer software.

### 4.2 Static survey

Static bat surveys were undertaken in conjunction with transect surveys to further assess the species utilising the woodland within the site. Surveys were undertaken following guidance provided in the Bat Conservation Trust Good Practice Guidelines (Ref 11).

A Song Meter SM4BAT acoustic recorder was deployed in woodland within the SINC (grid reference ST163695). The recorder was deployed for five consecutive nights in April (20<sup>th</sup>-24<sup>th</sup>), May 2017 (24<sup>th</sup>-28<sup>th</sup>) and June 2017 (20<sup>th</sup>-24<sup>th</sup>) when weather conditions were favourable for bats to be active (see Appendix B for full details). Data collected was subsequently analysed using Bat Sound software.

## 5 Survey Constraints

There were no constraints to the surveys.

## 6 Results

### 6.1 Transect Surveys

#### April

Four bat species/species groups were recorded during the April bat activity transect: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), pipistrelle species (*Pipistrellus* sp.) and noctule (*Nyctalus noctula*).

Small numbers (a maximum of three individuals) of common pipistrelle and soprano pipistrelle were recorded foraging and commuting with activity concentrated along the access track leading from the south-east corner of the WwTW in to the entrance of the SINC, over the soil mound in the east of the WwTW site at Point Count 1, over woodland at the entrance to the SINC (Point Count 2) and in the woodland clearing at Point Count 3.

Common pipistrelles were also recorded foraging in a woodland clearing in the north-east corner of the SINC and also commuting from this area west towards woodland.

Noctules were recorded throughout the activity transect at Point Count 2 at the SINC entrance, Point Count 3 and also at Point Count 4. These bats were heard not seen therefore the activity of the bats was not known.

Individual bat passes were recorded infrequently within the existing WwTW. The WwTW site was well-lit by artificial light throughout the survey.

Results of the April transect are shown on drawing 4798-S-202-HYD-XX-XX-DR-NX-08018 (Rev 02).

#### May

Five bat species/species groups were recorded during the April bat activity transect: common pipistrelle, soprano pipistrelle, pipistrelle species, noctule and Myotis species.

The results of the May transect were broadly consistent with those of the April transect.

Small numbers (a maximum of four individuals) of common pipistrelle and soprano pipistrelle were recorded foraging and commuting with activity mainly concentrated over woodland at the entrance to the SINC (Point Count 2). Both species were also recorded foraging over the eastern and northern edge of the storm tank (close to Point Count 1) and commuting along woodland to the south-east of the SINC and across the access track at the WwTW entrance heading to woodland north of the WwTW, however these bat passes were recorded infrequently.

Common pipistrelles were recorded commuting over the SINC woodland heading west over the site.

Soprano pipistrelles were recorded within woodland near Point Count 3. These bats were heard not seen therefore the activity of the bats was not known.

Noctule passes were recorded 16 minutes after sunset and 12 bats were observed flying very high above site following no particular feature south-east over Point Count 3.

A single Myotis call was recorded at the entrance to the SINC close to Point Count 2.

As with the April transect the WwTW site was well-lit throughout the survey.

Results of the May transect are shown on drawing 4798-S-202-HYD-XX-XX-DR-NX-08019 (Rev 02).

#### June

Four bat species were recorded during the June bat activity transect: common pipistrelle, soprano pipistrelle, noctule and brown long-eared (*Plecotus auritus*).

The results of the June transect were broadly consistent with those of the April and May transects.

Small numbers (a maximum of three individuals) of common pipistrelle and soprano pipistrelle were recorded foraging and commuting with activity mainly concentrated along the woodland edges within the SINC. Common pipistrelle bats were also recorded foraging in more open habitat within the existing WwTW.

Noctule passes were recorded 11 minutes after sunset and at least six bats were observed flying very high above site following no particular feature south-east over Point Count 3.

A single brown long-eared bat was recorded foraging in the south-west corner of the SINC and also within a woodland clearing at Point Count 3.

As with the previous transects the WwTW site was well-lit throughout the survey.

Results of the June transect are shown on drawing 4798-S-202-HYD-XX-XX-DR-NX-08027 (Rev 02).

In addition, two glow worms were identified in the south-east of the survey area – one within the existing WwTW site at ST162695 and one within Cog Moors SINC at ST162694.

## 6.2 Static survey

### April

Seven species/species groups were recorded during the April static survey: common pipistrelle, soprano pipistrelle, noctule, Leisler's bat (*Nyctalus leisleri*), whiskered/Brandt's bat (*Myotis mystacinus/brandtii*), Myotis species and brown long-eared.

Pipistrelles were most frequently recorded, while Leisler's (seven passes) and brown long-eared bats (five passes) were least frequently recorded during the five day survey period.

On 20<sup>th</sup>, 23<sup>rd</sup> and 24<sup>th</sup> April, bat activity was concentrated around dusk with only occasional passes after approximately 10.45pm. On 21<sup>st</sup> April, bat activity was continuous throughout the night. On 22<sup>nd</sup> April, bat activity was concentrated around dusk and dawn with occasional passes between midnight and 4.30am.

### May

Six species/species groups were recorded during May: common pipistrelle, soprano pipistrelle, noctule, lesser horseshoe, nyctalus species and myotis species.

Pipistrelles were most frequently recorded, while lesser horseshoe bats were least frequently recorded with just a single pass on 28th May.

On 24<sup>th</sup> and 26<sup>th</sup> May, bat activity was concentrated around dusk with only occasional passes after approximately 10.15pm. On 25<sup>th</sup> and 28<sup>th</sup> May, bat activity was concentrated around dusk and dawn with occasional passes between 10.30pm and 3.45am. On 27<sup>th</sup> May, bat activity was continuous throughout the night.

### June

Five species/species groups were recorded during the June survey: common pipistrelle, soprano pipistrelle, noctule, nyctalus species and myotis species.

Pipistrelles were most frequently recorded.

On 20<sup>th</sup> June, bat activity was concentrated around dusk and dawn with occasional passes between midnight and 3am. On 21<sup>st</sup>-24<sup>th</sup> June, bat activity was continuous throughout the night.

## 7 Discussion

During the May and June transect surveys, noctule passes were recorded shortly after sunset and several bats were observed commuting south east over Point Count 3. The closeness of these recordings to sunset and number of bats observed suggest the likelihood of a noctule roost within close proximity to the proposed Development site.

Bat activity was mainly concentrated within the SINC during all transects with the majority of activity along woodland edges with very little activity noted within the WwTW in comparison. High levels of artificial light were noted within the WwTW during the survey which would likely deter bats from using the WwTW. In comparison, the SINC is unlit and offers more suitable conditions for foraging/commuting/feeding and is of higher value to bats.

The results of the static surveys were broadly consistent across each night and each month with bats recorded within the SINC woodland predominantly at dusk and frequently also throughout the night, suggesting the woodland is of value to foraging bats.

The dominance of pipistrelle species and presence of no more than four bats at any one time (frequently individual bats) indicate that the SINC (especially the woodland habitat) is of no more than local value for foraging and commuting bats.

Bats utilise features such as treelines and woodland edges as corridors to navigate between roosts and also as foraging/feeding areas and the continuity of such features is important. Most bat species, other than high-flying species such as noctules, tend to fly close to linear features or close to a tree canopy, so the presence of protected flight routes is important. The loss of linear features and connectivity can result in leaving roosts isolated in the landscape and fragmenting foraging/feeding areas (Ref 12).

It is anticipated that the works associated with the proposed Development may lead to an increase in local noise levels and artificial lighting as well as loss of woodland habitat which has shown to be used for foraging, feeding and commuting. Without appropriate mitigation, this would have a negative impact on the overall foraging and commuting resources available to the local bat population that are currently utilising the site.

In order to reduce any potential negative effects, targeted mitigation is proposed and has been built into the scheme design e.g. landscaping/planting has been designed to maintain/increase foraging habitat and connectivity across the site.

## 8 Conclusions

The surveys undertaken confirmed that the proposed Development site (predominantly Cog Moors SINC) is used mainly by small numbers of common pipistrelle and soprano pipistrelles bats for commuting and foraging and also by noctules, whiskered/brandts, brown long-eared and Leisler's bats. Lesser horseshoe were recorded only once. It is anticipated that the proposed Development would have a negative effect on the foraging and commuting resources available to the local bat population without the implementation of appropriate mitigation to offset these potential impacts.

## 9 Mitigation and Enhancement

### 9.1 Mitigation

Construction lighting and any lighting proposed for the Development would be designed to ensure that the retained / newly planted vegetation is not illuminated to minimise any adverse effects on bats and other nocturnal wildlife. Proposed permanent lighting has been designed in consultation with a bat ecologist and minimises light spill on through use intelligent lighting technology, with exterior lighting normally switched off between 7pm and 7am (subject to routine maintenance/emergency works/operational need) and lighting activation linked to motion sensors, thereby minimising night-time lighting and associated impacts on bat activity (Ref 13).

The route of the proposed high voltage cable would be restored to grassland, creating a woodland ride effect and increasing the amount of woodland edge habitat.

As part of landscaping proposals, compensatory replacement planting would be undertaken to replace lost foraging habitat. This would comprise plant species which are native and/or with a proven wildlife benefit. Planting will be predominantly focused within the field immediately north-west of the existing WwTW to provide a large woodland area. Additional planting would also be provided within Cog Moors SINC to enhance retained woodland and ensure good connectivity is maintained around the perimeter of the SINC for bats to utilise for foraging, feeding and commuting. Individual tree planting will also be provided on the boundary of the existing WwTW to strengthen habitat connectivity. Planting proposals are shown on drawing 4798-S-202-HYD-XX-XX-DR-NX-06127 (P06).

The value of the proposed Development would be further enhanced for bats with the installation of five Schwegler 2F bat boxes on the retained trees before works start (see drawing 4798-S-202-HYD-XX-XX-DR-NX-06127 (P06)).

## 9.2 Toolbox Talk

All contractors would be provided with a toolbox talk prior to construction works commencing on the site. The toolbox talk would cover the presence of bats, mitigation (including areas to be avoided/undisturbed) and action to be taken in the event of discovering bats unexpectedly.

## 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: Arup (2007). Extensions to Cog Moors Waste Water Treatment Works- Specification for the Translocation of Grassland and Forming the Flood Compensation Storage (ISSUE 2).

Ref 3: Mott MacDonald Bentley (2016). Cog Moors WwTW South Sludge Strategy - Preliminary Ecological Appraisal (P02)

Ref 4: Arcadis Consulting (UK) Ltd (2018). Cog Moors WwTW - Proposed Advanced Anaerobic Digestion (AAD) Plant. Addendum Preliminary Ecological Appraisal (Rev 5) (Report number 4798-S-202-HYD-XX-XX-RP-NX-10406).

Ref 5: Arcadis Consulting (UK) Ltd (2018). Cog Moors - Proposed Advanced Anaerobic Digestion (AAD) Plant. Bat Tree Roost Assessment Report (Rev 3) (Report number 4798-S-202-HYD-XX-XX-RP-NX-11021).

Ref 6: Conservation of Habitats and Species Regulations 2017.

Ref 7: Wildlife and Countryside Act 1981 (as amended). HMSO.

Ref 8: Environment (Wales) Act 2016. HMSO.

Ref 9: Vale of Glamorgan Council (2002). Vale of Glamorgan Local Biodiversity Action Plan.

Ref 10: Vale of Glamorgan Council (2017). Vale of Glamorgan Local Development Plan 2011-2026. Written Statement.

Ref 11: Collins, J., (ed.) (2016). Bat Surveys for Professional Ecologists. Good Practice Guidelines (3rd edition). The Bat Conservation Trust. London.

Ref 12: Mitchell-Jones, A.J. (2004). Bat Mitigation Guidelines. English Nature, Peterborough.

Ref 13: Arcadis (UK) Consulting Ltd (2018). Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant. Landscape and Visual Appraisal (Rev R04).

Ref 14: The Weather Company (2017). <https://www.wunderground.com/history/airport/EGFF/2017> [Accessed 18<sup>th</sup> August 2017].

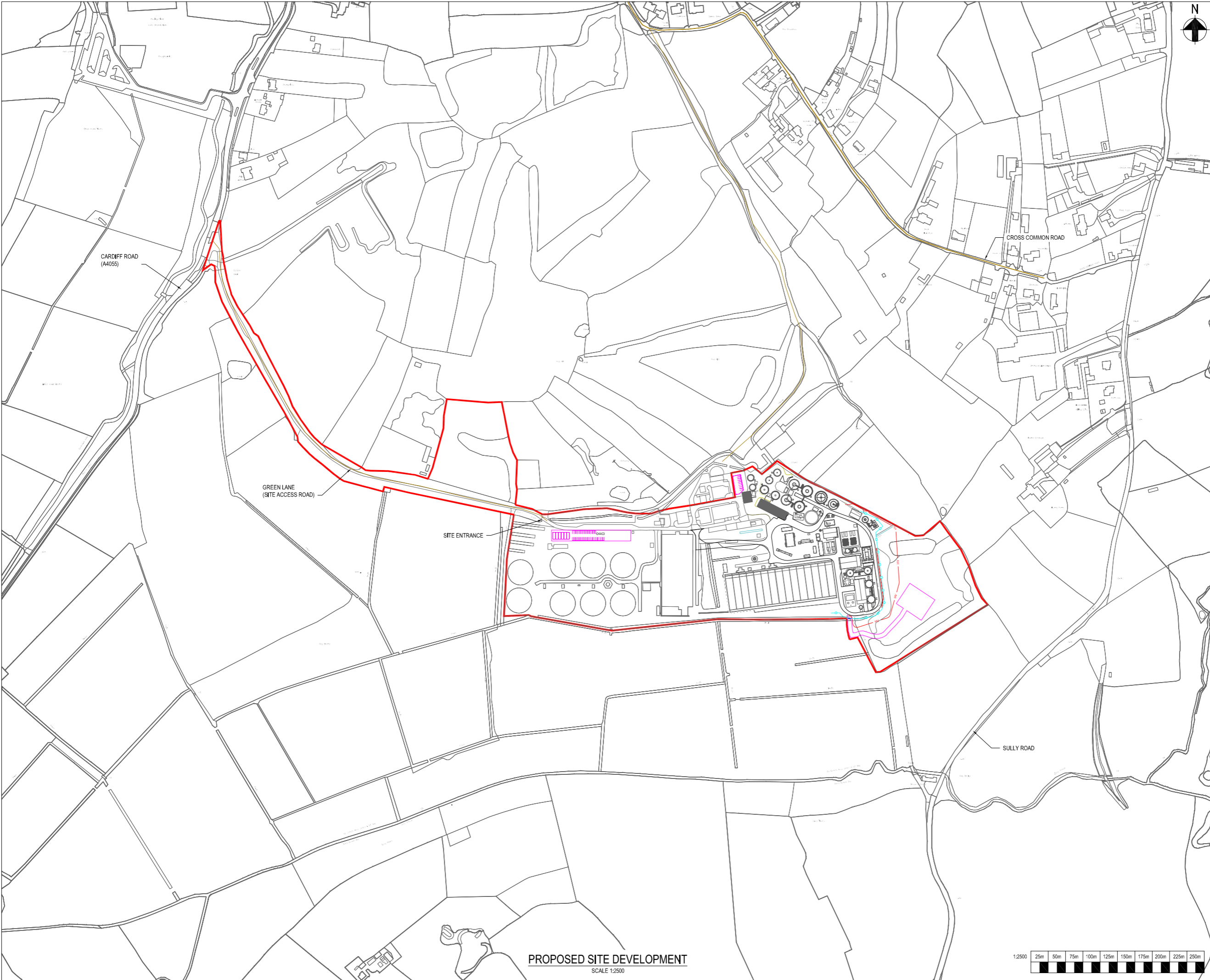
## **DRAWINGS**

**Drawing 4798-S-202-HYD-XX-XX-DR-XX-06120 (P03) - Proposed Site  
Development**



- 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



P03	14/03/18	DM	UPDATED BOUNDARY	LW	MN	14/03/18
P02	17/10/17	DP	FOR INFORMATION	YF	MN	17/10/17
P01	21/08/17	DP	FOR INFORMATION	YF	MN	21/08/17
Rev.	Date	Drawn	Description	Chkd.	Aspt.	Date

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

Project Name:  
 COG MOORS WwTW AAD

Drawing Title:  
 PROPOSED SITE DEVELOPMENT

Subsidiary Code:  
 S2

ISSUED FOR INFORMATION

Originator: DP, Designer: RN, Date: 17/10/17

Internal Project Number: UA007902, Scale: 1:2500, Rev: P03

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

**PROPOSED SITE DEVELOPMENT**  
 SCALE 1:2500



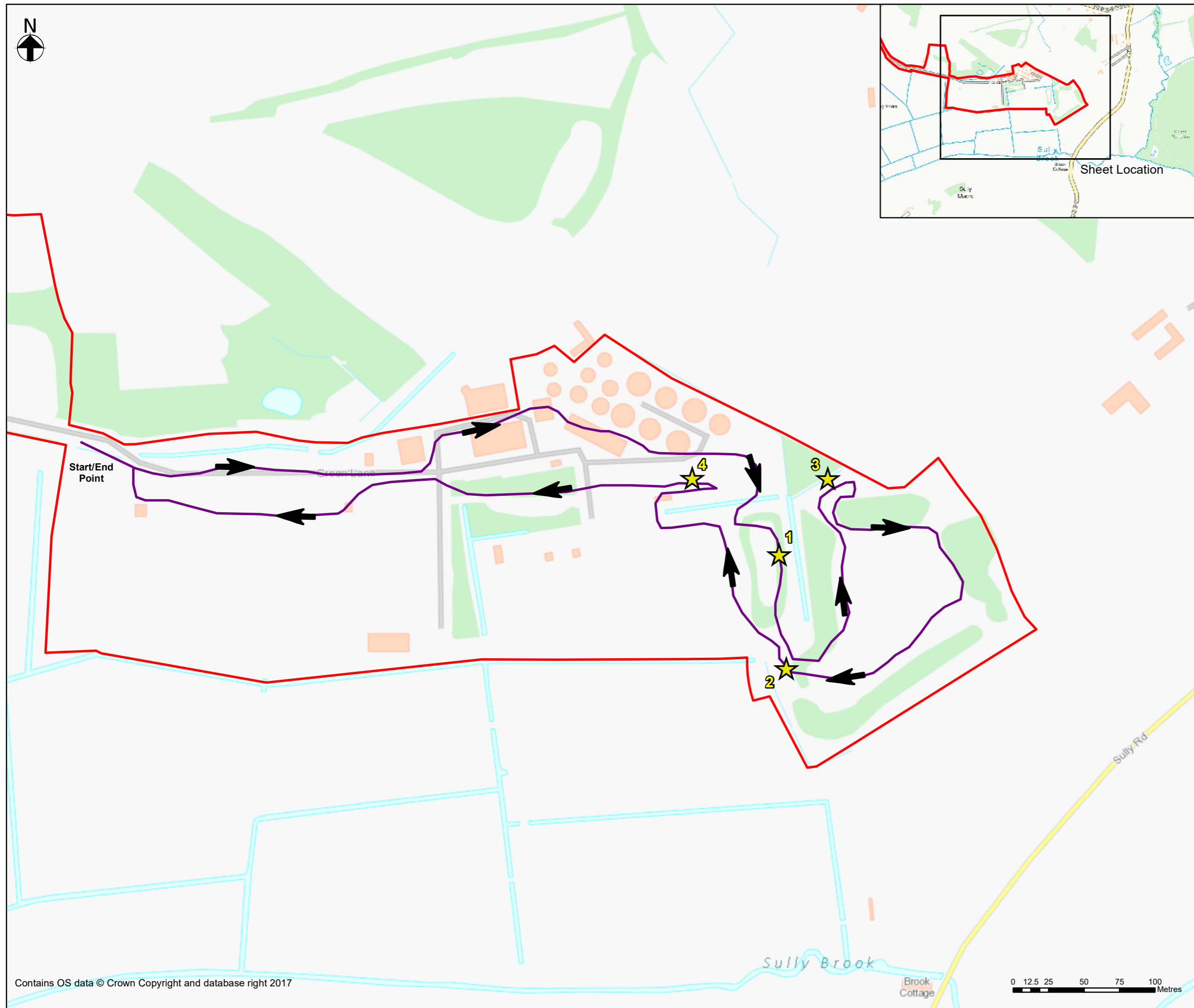
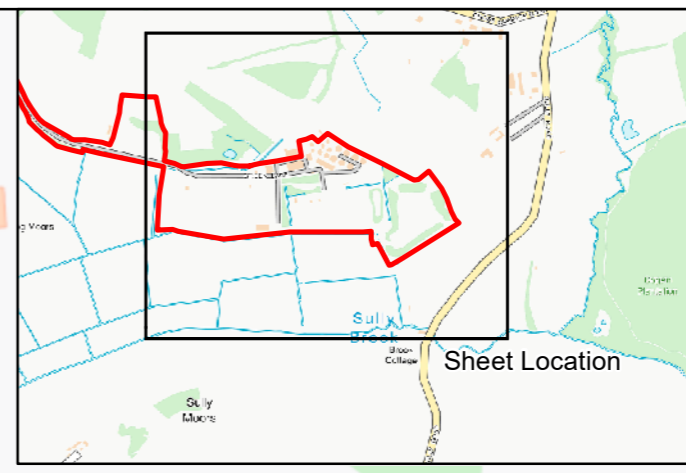


**Drawing 4798-S-202-HYD-XX-XX-DR-NX-08020 (Rev 02) - Bat Activity  
Transect Route**



**LEGEND**

- Spot Count = 3 Minutes
- Transect Route
- Planning Application Boundary



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01	15JUN17	AH	Initial Issue	PT	15JUN17
Rev.	Date.	Drawn	Description.	Chkd.	Appd.

**Capital Delivery Alliance**  
**Cynghair Cyflawni Cyfalaf**

Ty Awon, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name: Cog Moors WWTW

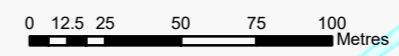
Drawing Title: Bat Activity Transect Route

Suitability: For Information      Suitability Code: S2

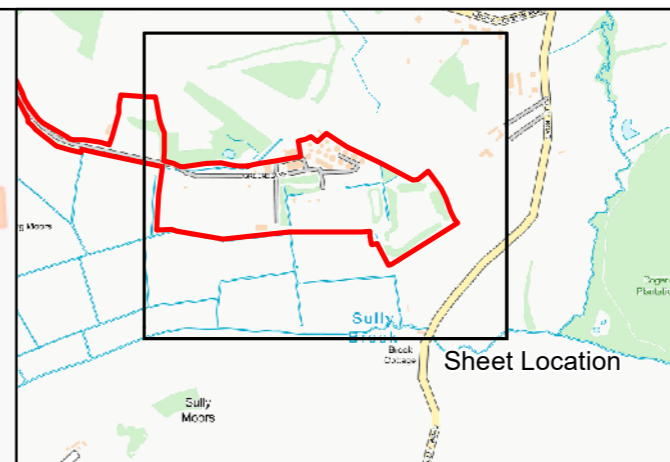
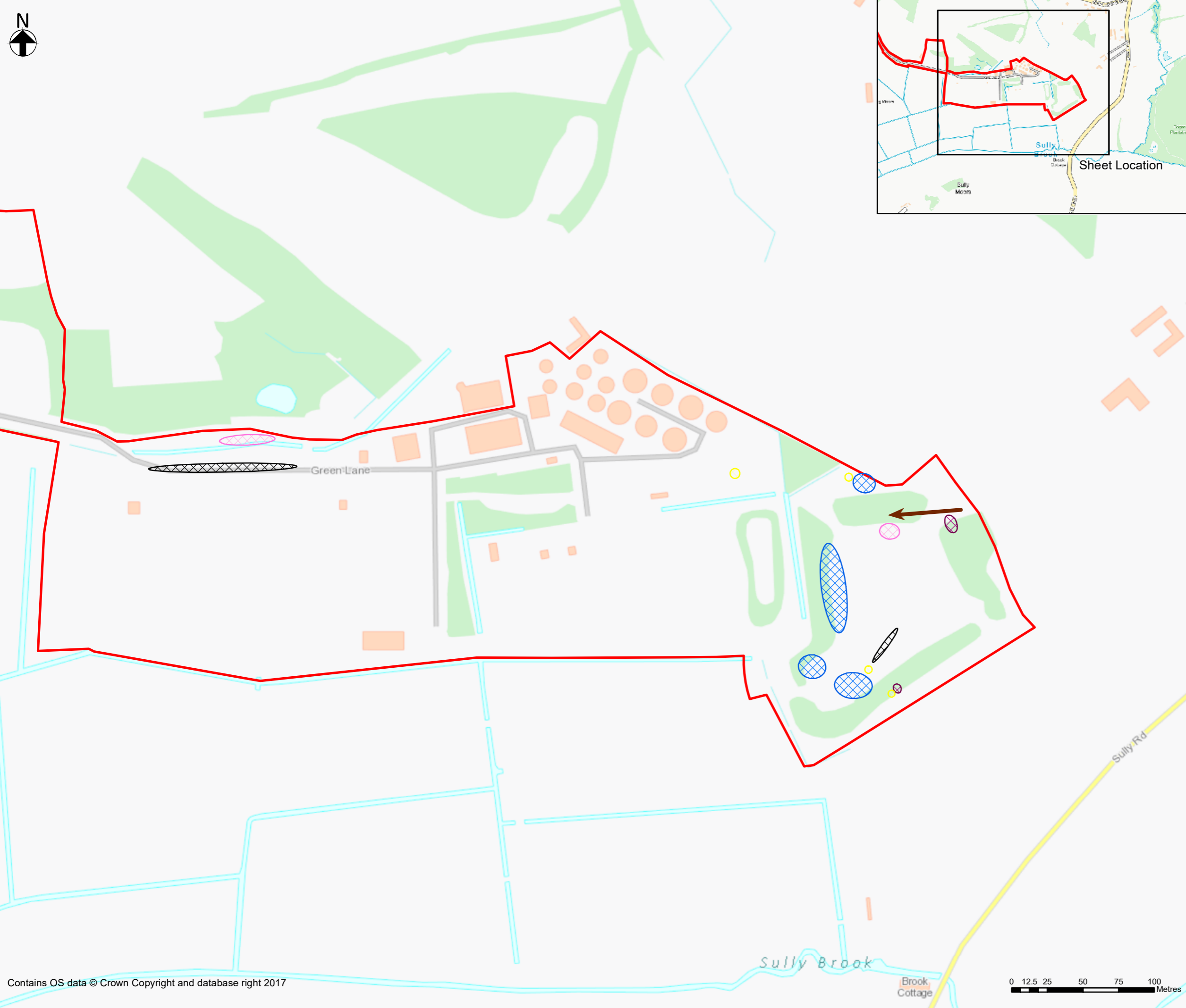
Originator A.Hankinson	Designer P.Thompson	Date 15JUN17
Internal Project Number UA007902	Scale 1:2,500	Rev. P02

Drawing Number: 4798-S-202-HYD-XX-XX-DR-NX-08020

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**Drawing 4798-S-202-HYD-XX-XX-DR-NX-08018 (Rev 02) - Bat Activity  
Survey Results – April 2017**



**LEGEND**

**Bat Activity Type**

- Pipistrelle Commuting Activity
- Common Pipistrelle Foraging Activity
- Common Pipistrelle Heard Not Seen
- Common Pipistrelle and Soprano Pipistrelle Foraging Activity
- Common Pipistrelle and Soprano Pipistrelle Heard Not Seen
- Noctule Heard Not Seen
- Planning Application Boundary

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01	15JUN17	AH	Initial Issue	PT	15JUN17
Rev.	Date.	Drawn	Description.	Chkd.	Appd.

**Capital Delivery Alliance**  
**Cynghair Cyflawni Cyfalaf**

Ty Awon, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name: **Cog Moors WwTW**

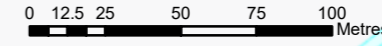
Drawing Title: **Bat Activity Survey Results - April 2017**

Suitability: **For Information** Suitability Code: **S2**

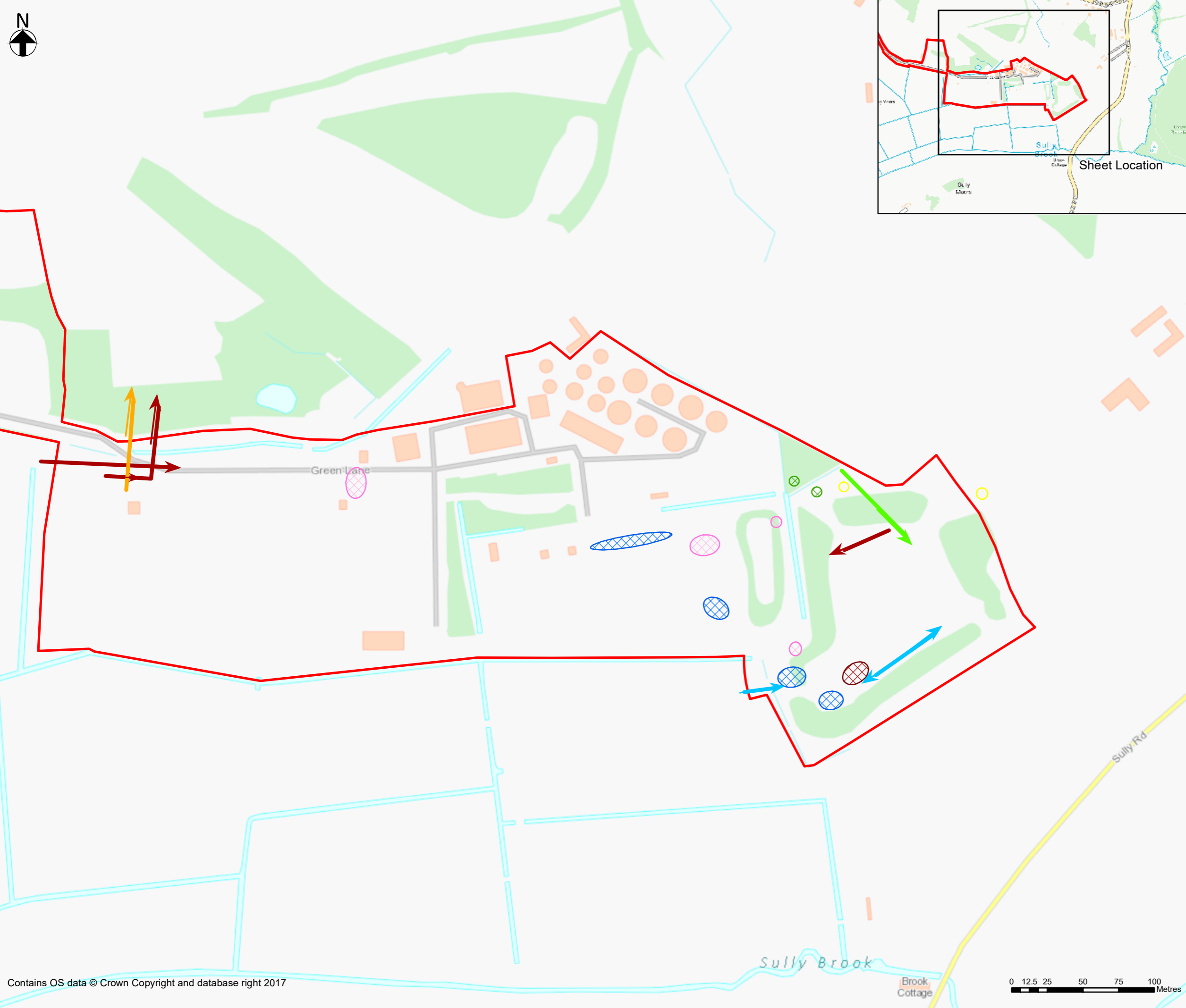
Originator <b>A.Hankinson</b>	Designer <b>P.Thompson</b>	Date. <b>15JUN17</b>
Internal Project Number <b>UA007902</b>	Scale <b>1:2,500</b>	Rev. <b>P02</b>

Drawing Number: **4798-S-202-HYD-XX-XX-DR-NX-08018**

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**Drawing 4798-S-202-HYD-XX-XX-DR-NX-08019 (Rev 02) - Bat Activity  
Survey Results – May 2017**



**LEGEND**

**Bat Activity Type**

- Common Pipistrelle Commuting Activity
- Common Pipistrelle and Soprano Pipistrelle Commuting Activity
- Noctule Commuting Activity
- Soprano Pipistrelle Commuting Activity
- Common Pipistrelle Heard Not Seen
- Common Pipistrelle and Soprano Pipistrelle Foraging Activity
- Myotis Heard Not Seen
- Noctule Commuting Activity
- Noctule Heard Not Seen
- Planning Application Boundary

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01	15JUN17	AH	Initial Issue	PT	15JUN17
Rev.	Date.	Drawn	Description.	Chkd.	Appd.

**Capital Delivery Alliance**  
**Cynghair Cyflawni Cyfalaf**

Ty Awon, Spooner Close, Coed Kernew, Newport, NP108FZ

Project Name: **Cog Moors WwTW**

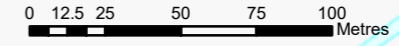
Drawing Title: **Bat Activity Survey Results - May 2017**

Suitability: **For Information** Suitability Code: **S2**

Originator <b>A.Hankinson</b>	Designer <b>P.Thompson</b>	Date. <b>15JUN17</b>
Internal Project Number <b>UA007902</b>	Scale <b>1:2,500</b>	Rev. <b>P02</b>

Drawing Number: **4798-S-202-HYD-XX-XX-DR-NX-08019**

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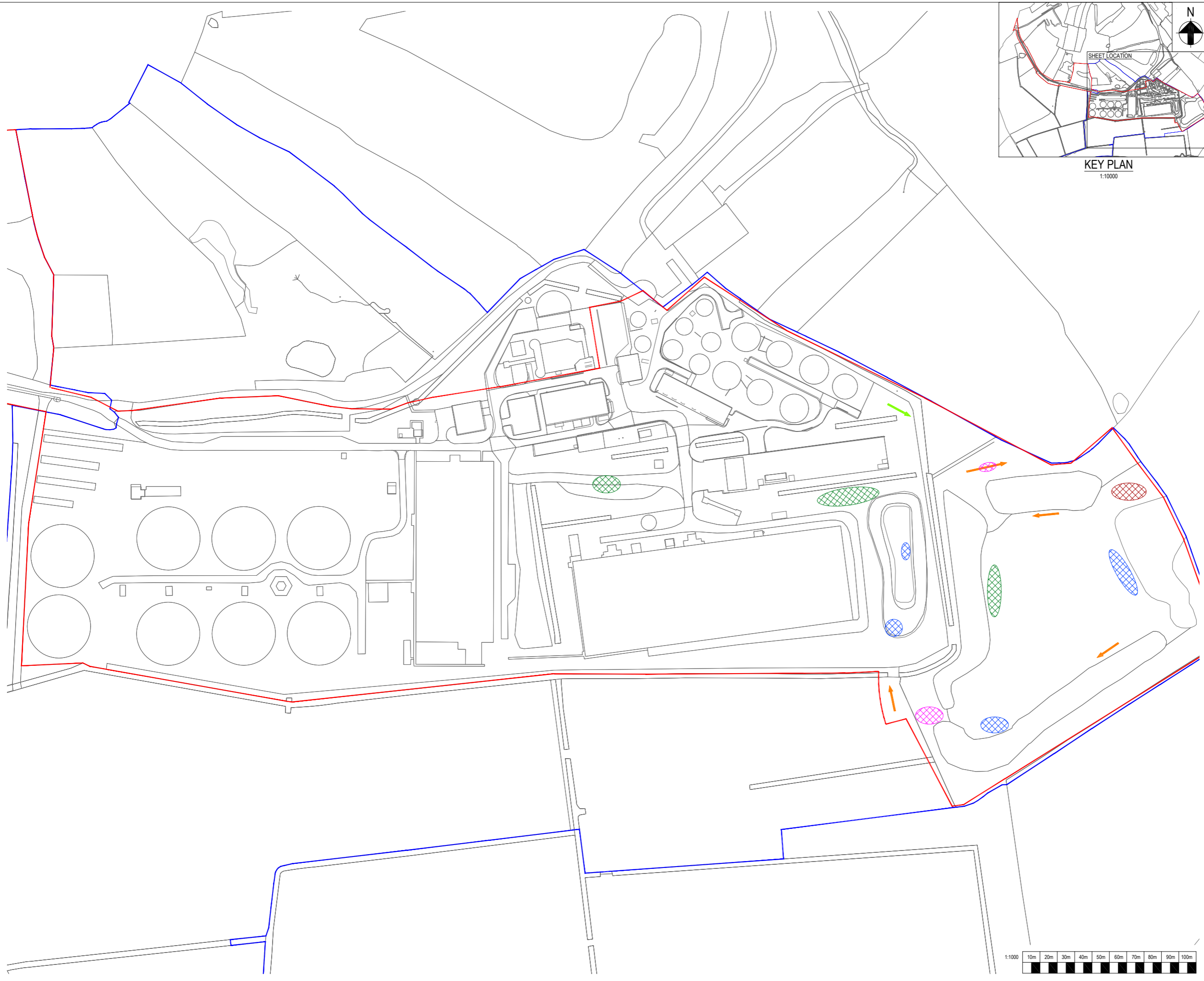
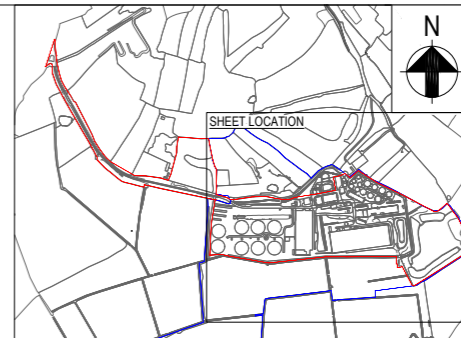
**Drawing 4798-S-202-HYD-XX-XX-DR-NX-08027 (Rev 02) - Bat Activity  
Survey Results – June 2017**

NOTES:

- 1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
- 2. ALL LEVELS ARE IN METERS RELATIVE TO AOD.
- 3. DO NOT SCALE FROM THIS DRAWING.

LEGEND:

-  PLANNING APPLICATION BOUNDARY
-  NOCTULE COMMUTING
-  COMMON PIPISTRELLE COMMUTING
-  BROWN LONG EARED FORAGING
-  COMMON PIPISTRELLE FORAGING
-  SOPRANO PIPISTRELLE FORAGING
-  COMMON PIPISTRELLE, SOPRANO PIPISTRELLE AND BROWN LONG EARED FORAGING



P02	29/03/18	RP	FOR INFORMATION	LF	LW	29/03/18
P01	18/08/17	RP	FOR INFORMATION	LF	LF	18/08/17
Rev.	Date	Drawn	Description	Chkd	Appd	Date

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

Project Name:  
 COG MOORS WwTW AAD

Drawing Title:  
 BAT ACTIVITY SURVEY RESULTS - JUNE 2017

Suitability:  
 FOR INFORMATION  
 Suitability Code:  
 S2

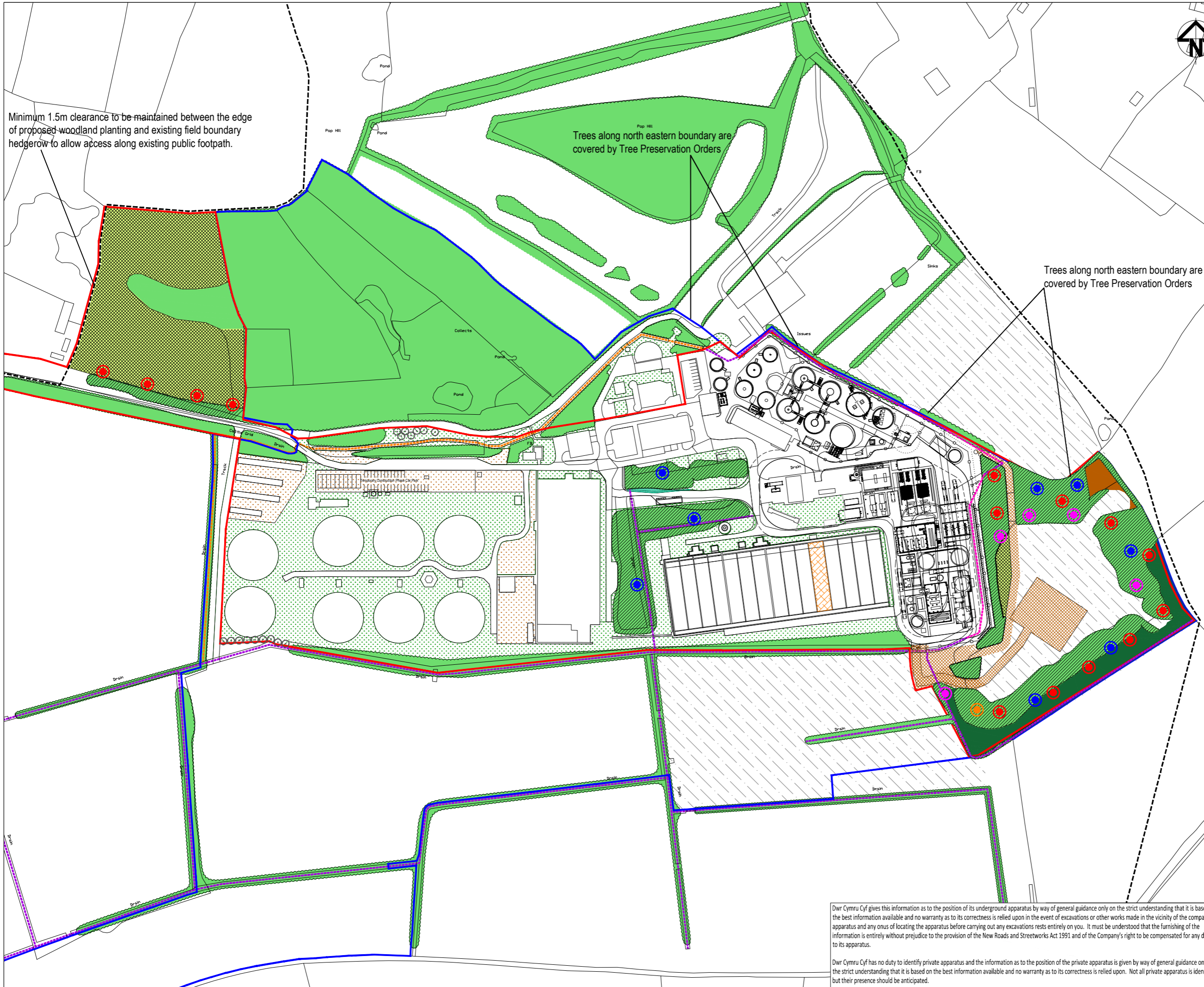
Originator: AH	Designer: PT	Date: 18/08/17
Internal Project Number: UA007902	Scale: 1:1000@A1	Rev: P02

Drawing Number:  
 4798-S-202-HYD-XX-XX-DR-NX-08027





**4798-S-202-HYD-XX-XX-DR-NX-06127 (P06) – Landscape Mitigation Plan**



- LEGEND:**
- Planning Application Boundary
  - DCWW Land Ownership Boundary
  - Public Rights of Way
  - Site of Importance for 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
  - Tall Ruderal
  - Dense Scrub
  - Proposed Individual Tree Planting
  - Area to be Managed for Wildlife
  - Bird Nest Box
  - Bat Box
  - Hibernaculum to be created
  - Dormouse Nest Boxes
  - Existing Ephemeral Ditch
  - Existing Dry Ditch
  - Proposed Drainage Ditch

Latin Name	Common Name	Outline Specification	% in Mix
<b>Proposed Woodland Belt Forestry Transplant Mix</b>			
<i>Corylus avellana</i>	Hazel	1+1 Forestry transplant; Bare root; 1.5m spacing.	24%
<i>Quercus robur</i>	Pedunculate Oak	As above.	24%
<i>Carpinus betulus</i>	Hornbeam	As above.	6%
<i>Crataegus monogyna</i>	Hawthorn	As above.	6%
<i>Prunus avium</i>	Wild Cherry	As above.	5%
<i>Ligustrum vulgare</i>	Wild Privet	As above.	4%
<i>Malus sylvestris</i>	Crab Apple	As above.	4%
<i>Acer campestre</i>	Field Maple	As above.	4%
<i>Viburnum lantana</i>	Wayfaring-Tree	As above.	4%
<i>Sorbus aucuparia</i>	Rowan	As above.	3%
<i>Cornus sanguinea</i>	Dogwood	As above.	3%
<i>Lonicera periclymenum</i>	Honeysuckle	2L Pot; 1.5m spacing.	2%
<i>Frangula alnus</i>	Alder Buckthorn	1+1 Forestry transplant; Bare root; 1.5m spacing.	2%
<i>Rhamnus cathartica</i>	Buckthorn	As above.	2%
<i>Euonymus europaea</i>	Spindle	As above.	2%
<i>Prunus padus</i>	Bird Cherry	As above.	2%
<i>Sambucus nigra</i>	Elder	As above.	2%
<i>Ilex aquifolium</i>	Holly	2L Pot; 1.5m spacing.	1%
<i>Hedera helix</i>	Ivy	2L Pot; 1.5m spacing.	1%
<b>Individual Trees</b>			
<i>Quercus robur</i>	Pedunculate Oak	2x, 3 Breaks, Fthd, BR, 1.5-1.75m, 10m spacing.	40%
<i>Alnus glutinosa</i>	Alder	As above.	30%
<i>Prunus avium</i>	Wild Cherry	2x, 5 Breaks, Fthd, BR, 1.5-1.75m, 10m spacing.	30%

P06	13.03.18	DM	UPDATED BOUNDARY	LF	LW	13.03.18
P05	12.02.18	DM	SOLAR PANELS MOVED	LF	LW	12.02.18
P04	31.01.11	DM	THIRD ISSUE	LF	LW	31.01.11
P03	19.12.17	RG	SECOND ISSUE	SF	LW	19.12.17
P02	25.10.17	RG	SECOND ISSUE	SF	LW	25.10.17
P01	27.07.17	RG	FIRST ISSUE	SF	LW	21.06.17
Rev.	Date	Drawn	Description	Chkd	Appd	Date

**Capital Delivery Alliance**  
**Cynghair Cyflawni Cyfalaf**  
 Ty Awon, Spooner Close, Coed Kernes, Newport, NP108FZ

Project Name:		COG MOORS WwtW AAD	
Drawing Title:		FIGURE 10 LANDSCAPE MITIGATION PLAN	
Suitability:		S2	
Originator:	Designer:	Date:	
R.G.	S.F.	21.06.17	
Internal Project Number:	Scale:	Rev:	
UA007902	1:1250@A1	P06	
Drawing Number:			
4798-S-202-HYD-XX-DR-NX-06127			

Dwr Cymru Cyf gives this information as to the position of its underground apparatus 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 in the event of excavations or other works made in the vicinity of the company's apparatus and any onus of locating the apparatus before carrying out any excavations rests entirely on you. It must be understood that the furnishing of the information is entirely without prejudice to the provision of the New Roads and Streetworks Act 1991 and of the Company's right to be compensated for any damage to its apparatus.

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.

## APPENDICES

### Appendix A - Bat activity transect survey metadata

Date	Temperature (°C)	Cloud cover (1/8s)	Wind speed (Beaufort scale 1-12)	Rain	Sunset time	Start time	Start location	Transect direction	Finish time	Time of first bat	Time of last bat
27.04.2017	12	7/8	2	0	20:29	20:29	Western end of WwTW site adjacent to entrance gates	Clockwise	22:29	20:46	22:29
24.05.2017	21	1/8	0	0	21:09	21:09	Southern boundary of WwTW adjacent to gates leading to Cog Moors SINC	Clockwise	23:46	21:24	22:43
20.06.2017	27	1/8	0	0	21:32	21:32	Spot Count 2 (within Cog Moors SINC)	Anti-clockwise	00:18	21:40	23:59

### Appendix B - Bat activity static survey metadata (Ref 14)

Date	Average maximum temperature (°C)	Average minimum temperature (°C)	Average wind speed (km/h)	Rain
20.04.2017 – 24.04.2017	14	6.8	11.4	0
24.05.2017 – 28.05.2017	22	12.8	15	0
20.06.2017 – 24.06.2017	22.8	15.2	19	0

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