

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

Cog Moors SINC Botanical Survey

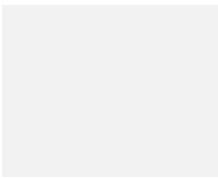
NOVEMBER 2017

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COG MOORS WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Cog Moors SINC Botanical Survey

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Report No 4798-S-202-HYD-XX-XX-RP-NX-11022

Date NOVEMBER 2017

VERSION CONTROL

Version	Date	Author	Changes
1	August 2017	Julie Player	Issue of final document
2	November 2017	Lucy Fay	Non-technical summary added

This report dated 01 November 2017 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

A botanical survey was undertaken of Cog Moors Site of Importance for Nature Conservation to allow accurate assessment of the impacts of the proposed Development at Cog Moors Wastewater Treatment Works.

The survey found that the area surveyed does not meet the criteria for which the site was designated (“Purple Moor-grass and Rush Pasture”); however, it does meet the criteria for designation as “Neutral Grassland/Lowland Meadow”.

A number of mitigation measures are proposed to minimise the impacts of the proposed Development on Cog Moors Site of Importance for Nature Conservation including habitat reinstatement and long-term management, protection of retained habitats during construction and management of invasive plants.

Executive Summary

This report presents the results of the Cog Moors Site of Interest for Nature Conservation (SINC) Botanical survey undertaken in support of the planning application for the proposed Advanced Anaerobic Digestion (AAD) plant at Cog Moors Wastewater Treatment Works (WwTW) by Arcadis Consulting (UK) Ltd on behalf of Dŵr Cymru Welsh Water. This report should be read in conjunction with the Preliminary Ecological Appraisal report (dated November 2017) produced by Arcadis Consulting (UK) Ltd.

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). The proposed Development is to include a temporary compound within Cog Moors SINC located to the east of the WwTW.

The aim of the survey was to undertake a botanical survey within the areas of Cog Moors SINC affected by the proposed Development, in order to identify any potential constraints to the proposed Development and to provide recommendations for appropriate mitigation. SINC habitats are important for their local biodiversity value.

Preliminary Ecological Appraisals were previously undertaken by Mott MacDonald Bentley in October 2016 and Arcadis Consulting (UK) Ltd in November 2016. Cog Moors SINC was identified as part of the desk study and has been designated as a “Purple Moor-grass and Rush Pasture” and described as a series of species-rich rush pastures with neutral grassland and associated wet ditches. Further survey was recommended to allow accurate assessment of the temporary and permanent impacts of the proposed Development.

A range of habitats were identified within the survey boundary including broad-leaved plantation woodland, species-rich semi-improved neutral grassland, marshy grassland, dense continuous scrub, tall ruderal habitat and dry ditches. Indian (Himalayan) Balsam was identified within broad-leaved plantation woodland. The impacts from the proposed development will include the loss of areas of broad-leaved plantation woodland and species-rich semi-improved neutral grassland habitat.

The site is currently designated as “Purple Moor-grass and Rush Pasture” SINC habitat. The current survey of the SINC habitat located within the proposed Development area indicates that it is not of “Purple Moor-grass and Rush Pasture” SINC quality but may be SINC quality “Neutral Grassland/ Lowland Meadow”. Any proposed development would need to be in accordance with local policy, in addition to national policy and legislation. Where possible, the ecological value of the site should be maintained and any effect from the proposed Development should be reduced or removed by appropriate mitigation and / or compensation / enhancement measures in line with the Vale of Glamorgan Local Development Plan.

An extensive list of mitigation measures to minimise the impacts of the proposed Development are provided in Section 9 of this report and include:

- Habitats affected by the proposed Development will be reinstated and/or mitigated for through the enhancement of existing habitats within the site and/or creation of new habitats of nature conservation value within the site. These will be managed in the long-term in accordance with a Habitat Management Plan;
- Mitigation measures within species-rich semi-improved neutral grassland during and post construction to protect the retained grassland;
- Creation of additional habitats within the site, which enhance its ecological value, and management to enhance the ecological value of existing/retained habitats;
- Mitigation measures will be in place to ensure that the remainder of Cog Moors SINC (outside of the development footprint) is protected and ecological connectivity is maintained; and
- Indian (Himalayan) Balsam within the working areas will be managed in accordance with best practice guidelines and legislation to ensure that it does not spread.

1 Introduction and aims

This report presents the results of a botanical survey of Cog Moors Site of Interest for Nature Conservation (SINC), 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. This report should be read in conjunction with the Preliminary Ecological Appraisal report (dated November 2017) produced by Arcadis Consulting (UK) Ltd (Ref 1) (Report number 4798-S-202-HYD-XX-XX-RP-NX-10406).

The aim of the survey was to assess the importance of the habitat within Cog Moors SINC to inform appropriate mitigation measures and enhancements.

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-08023 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/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.

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 WwTW's;
- 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 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 Preliminary Ecological Appraisal of the site was undertaken in October 2016 by Mott McDonald Bentley (Ref 2) and Arcadis Consulting (UK) Ltd in November 2016 (Ref 1). The surveys included a desk study which was undertaken to identify existing ecological information relating to the proposed Development site and its surroundings. The desk study included a search of the local statutory and non-statutory sites within 2 km of the Cog Moors WwTW. Cog Moors SINC is partially located within the proposed Development boundary to the east of the existing WwTW. Cog Moors SINC is categorised as “Purple Moor-grass and Rush Pastures” and described as a “series of rich rush pasture with neutral grassland and associated wet ditches” (Ref 3).

Cog Moors SINC was further assessed in 2010 against National Vegetation Classification (NVC) habitat types as M23 (rush-pasture) with the most notable feature being a small population (at least 10 plants) of Tubular Water-dropwort (*Oenanthe fistulosa*) (a rare plant species in Wales and listed on Section 7 of the Environment (Wales) Act 2016 as a priority species for the conservation of biodiversity) in the south of the site (Ref 4). No precise location information is given but it is considered most likely that this lies outside of the proposed Development footprint given the absence of any suitable damp hollows and depressions within the area surveyed (Ref 1 and 2).

As the Preliminary Ecological Appraisal was undertaken outside of the optimal Phase 1 habitat survey period, it was recommended that the SINC should be visited between May-September when plants are in flower to update the botanical species list for this part of the site and determine whether the site still meets the necessary criteria to qualify as a SINC. The survey should include a specific search for Tubular Water-dropwort between July and September (when the plant is in flower) to determine distribution within the SINC.

3 Legislation and Policy

SINCs are non-statutory sites that are identified to protect areas of substantive nature conservation value at the local level (Ref 3).

Policy MG21 of the Local Development Plan (Ref 5) states that:

“Development proposals likely to have an adverse impact on SINCs or Priority habitats and 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.”

Section 6 of the Environment (Wales) Act 2016 places a duty on public authorities (including statutory undertakers) to ‘seek to maintain and enhance biodiversity’ and to ‘promote the resilience of ecosystems’. DCWW have also committed to act in a responsible and sustainable way to maintain and enhance biodiversity (Ref 6).

Where development is permitted which would damage the nature conservation value of the site, such damage must be kept to a minimum. The use of conditions and/or planning obligations to provide appropriate compensatory measures will be considered (Ref 3).

4 Methodology

4.1 Field Survey

A botanical survey was undertaken on the 15th May 2017. This comprised a walkover survey to map Phase 1 habitats present within the site following the standard survey methodology (Ref 7). Plant species lists were compiled (Appendix A), including a note of dominant plant species, uncommon species or species indicative of particular habitat types. Botanical names follow Stace (Ref 8) for higher plants.

The Guidelines for the Selection of Local Wildlife Sites in Wales (2008) (Ref 9) was also referred to, to assess habitats with Cog Moors SINC for its SINC quality.

The survey was undertaken by suitably experienced Arcadis ecologists. The outputs of the surveys include a Phase 1 habitat plan which is illustrated on Drawing 4798-S-202-HYD-XX-XX-DR-NX-08023, associated Target Notes (TNs) illustrated in Appendix B and a Photographic Record which can be found in Appendix C.

5 Results

The habitats within the proposed Development site of Cog Moors SINC comprised species-rich semi-improved neutral grassland, marshy grassland, broad-leaved plantation woodland, dense scrub and tall ruderal habitat. All of the ditches within the SINC were dry at the time of the survey.

5.1 Broad-leaved Plantation woodland

The survey area contained broad-leaved plantation woodland on embankments as illustrated on Drawing 4798-S-202-HYD-XX-XX-DR-NX-08023. Trees were semi-mature in age and comprised Ash (*Fraxinus excelsior*) and Silver Birch (*Betula pendula*) predominantly, with small numbers of willow (*Salix* sp.), oak (*Quercus* sp.), Field Maple (*Acer campestre*) and Hazel (*Corylus avellana*) with little understorey. Several mature oak trees were recorded throughout the woodland located in the northern part of the site.

The ground flora within the woodland areas was extremely sparse and comprised species not typically/solely associated with woodland. These included Hart’s-tongue (*Asplenium scolopendrium*), Ground Ivy (*Glechoma hederacea*), Common Nettle (*Urtica dioica*), Creeping Thistle (*Cirsium arvense*), Herb-Robert (*Geranium robertianum*), Wild Teasel (*Dipsacus fullonum*), White Clover (*Trifolium repens*), Broad-leaved Dock (*Rumex obtusifolius*), Common Reed (*Phragmites australis*), Hogweed (*Heracleum sphondylium*) and

Bramble (*Rubus fruticosus* agg.). The woodland located towards the eastern boundary of the site contained several pine trees (*Pinus* sp.) with a denser scrub understory than other woodland on site.

5.2 Dense Continuous Scrub

An area of dense continuous scrub was located along the western, eastern and southern boundaries of the site. Species identified included Bramble and Hawthorn (*Crataegus monogyna*). Several mature Hawthorn and willow shrubs were located along the northern boundary.

5.3 Species-rich Semi-Improved Neutral Grassland

Approximately 0.8 hectares of species-rich semi-improved neutral grassland was located at the centre of the site on a plateau surrounded by young landscape planting (broad-leaved plantation woodland). The grassland supported a large number of herb species but with limited diversity. The sward was approximately 50cm in height and uniform across the field with damper areas around the sloping sides which supported Meadowsweet (*Filipendula ulmaria*), Creeping Cinquefoil (*Potentilla reptans*) and scattered Hard Rush (*Juncus inflexus*) and sedges (*Carex* sp.).

The most abundant grass species identified include Yorkshire-fog (*Holcus lanatus*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Red Fescue (*Festuca rubra*) and Rough Meadow-grass (*Poa trivialis*) with Cock's-foot (*Dactylis glomerata*), Meadow Foxtail (*Alopecurus pratensis*) and False Oat-grass (*Arrhenatherum elatius*), Yellow Oat-grass (*Trisetum flavescens*), and Lesser Quaking-grass (*Briza minor*) being locally frequent or occasional.

Other species identified include Common Vetch (*Vicia sativa* subsp. *segetalis*), Meadow Vetchling (*Lathyrus pratensis*), Grass Vetchling (*Lathyrus nissolia*), Tufted Vetch (*Vicia cracca*), Hoary Ragwort (*Senecio erucifolius*), Meadow Barley (*Hordeum secalinum*), Soft Brome (*Bromus hordeaceus*) Cut-leaved Crane's-bill (*Geranium dissectum*), Smooth Tare (*Vicia tetrasperma*), Hemlock Water-dropwort (*Oenanthe crocata*) Common Knapweed (*Centaurea nigra*), Bugle (*Ajuga reptans*), Common Fleabane (*Pulicaria dysenterica*) Silverweed (*Argentina anserina*), Germander Speedwell (*Veronica chamaedrys*), Ragged-Robin (*Lychnis flos-cuculi*), Great Willowherb (*Epilobium hirsutum*), Redshank (*Persicaria maculosa*), Curled Dock (*Rumex crispus*), Field Horsetail (*Equisetum arvense*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Greater Bird's-foot-trefoil (*Lotus pedunculatus*) Lesser Pond-sedge (*Carex acutiformis*), Common Spotted-orchid (*Dactylorhiza fuchsii*), Agrimony (*Agrimonia eupatoria*) and Pepper Saxifrage (*Silvaum silaus*). Other 'weed' species identified include Bristly Oxtongue (*Picris echioides*), White Clover, Dandelion (*Taraxacum officinale* agg.), Creeping Cinquefoil, Creeping Buttercup (*Ranunculus repens*) and Ribwort Plantain (*Plantago lanceolata*). One southern Marsh-orchid (*Dactylorhiza praetermissa*) was identified within the north-eastern corner of the grassland.

Rush species identified include Soft-Rush (*Juncus effusus*), Hard Rush, and Field Wood-rush (*Luzula campestris*) and were scattered along the boundary of the grassland/woodland.

5.4 Marshy Grassland

Marshy grassland was located along the western area of Cog Moors SINC. Species identified include Soft-Rush, Hard Rush and Field Wood-Rush and comprised large amounts of dense continuous scrub around its boundaries.

5.5 Tall Ruderal

Tall ruderal habitat was located within a north-eastern section of the SINC. Species identified within this area include Common Nettle, Wild Teasel, Common Reed (*Phragmites australis*), Rosebay Willowherb (*Chamerion angustifolium*) and Dog-Rose (*Rosa canina* agg.).

5.6 Dry Ditches

Dry ditches were recorded along the woodland boundaries to the north and west of the site, along the boundary of the tall ruderal habitat to the east and along the boundaries of the marshy grassland to the west of the site. The plant species identified within and surrounding the ditches (Common Reed, Soft-rush, Hard Rush) would suggest that the ditches are periodically wet (Ref 1).

5.7 Protected/Notable Plant Species

Pepper Saxifrage, a rare plant species in Wales and listed as a Local Biodiversity Action Plan (LBAP) species on the Vale of Glamorgan LBAP (Ref 3), was identified within the SINC during the field survey in May 2017.

Cog Moors SINC citation also highlights the presence of Tubular Water-dropwort, a rare plant species in Wales within the SINC (Ref 4). It is possible that this plant species is present within the footprint of the proposed Development in wetter areas e.g. marshy grasslands.

No records of other notable/rare plant species were identified as part of the desk study.

5.8 Invasive Plant Species

Indian (Himalayan) Balsam (*Impatiens glandulifera*) was identified scattered within the woodland in the northern-western part of the site (see Target Note 1). This species is included in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) (Ref 10). Section 14 of the Act makes it an offence to plant or otherwise cause these plants to grow or spread in the wild.

6 Discussion

The proposed Development site contains part of Cog Moors SINC which is designated as a “Purple Moor-grass and Rush Pasture” habitat. However, the botanical survey found this part of the SINC supported broad-leaved plantation woodland, scrub, species-rich semi-improved neutral grassland, marshy grassland and tall ruderal habitat.

SINC guidance criteria (Ref 9) states that Purple Moor-grass and Rush Pasture mainly comprise varying combinations of communities M22-M25 of the National Vegetation Classification (NVC) (Blunt-flowered Rush-Marsh Thistle fen-meadow, Purple Moor-grass-Meadow Thistle fen-meadow and Purple Moor-grass-Tormentil mire). Only eight of the 133 indicator species (Quaking Grass, Lesser Pond-Sedge, Common Spotted and Southern Marsh-orchid, Meadowsweet, Greater Bird's-foot-trefoil, Common Fleabane and Ragged Robin) listed for Purple Moor-grass and Rush pasture within the SINC criteria were identified on site and no Purple Moor-grass was recorded within the survey boundary. The current study indicates that the habitats recorded within the boundary of the proposed works do not qualify as being “Purple Moor-grass and Rush Pasture”.

The current study indicates that the grassland may be of neutral grassland/ lowland meadow grassland SINC quality as it contains 15 of the 103 indicator species for this habitat (Agrimony, Bugle, Quaking Grass, Common Knapweed, Common Spotted-orchid, Meadow Fescue, Grass and Meadow Vetchling, Common Bird's-foot-trefoil, Field Woodrush, Hoary Ragwort, Pepper Saxifrage, Red Clover, Tufted Vetch, and Yellow Oat-grass). Guidance published by the South Wales Wildlife Sites Partnership (Ref 9) indicates that species-rich semi-improved grasslands should be considered as Wildlife Sites. Species-rich grasslands are those that contain at least 8 indicator species listed within the Wildlife Site Guidance.

Cog Moors SINC was assessed in 2010 (Ref 4) against NVC habitat types and appeared to be closer to M23 (rush-pasture) than MG10 (lowland meadow). Soft-Rush and Hard-Rush were dominant species at the time of the assessment, with Common Fleabane, Greater Bird's-foot-trefoil, Glaucous sedge (*Carex flacca*), Creeping Bent and Creeping Buttercup being abundant.

The assessment identified that the SINC may have undergone some agricultural practices in the past to improve the vegetation as Perennial Rye-grass (*Lolium perenne*), Meadow Foxtail and White Clover were identified within grassy areas on site. Tubular Water-dropwort (a rare plant species in Wales) is reportedly present within the SINC. No Tubular Water-dropwort was identified within the proposed Development area during a survey for the plant undertaken by Arcadis Ecologists on the 29th June 2017 and no wet depressions or ditches suitable for this species were recorded on site.

The grassland within the part of Cog Moors SINC surveyed does not fall into the SINC categories Calcareous or Lowland Dry Acid Grasslands as it contains limited or none of the key indicator species listed within the Wildlife Site Guidance.

The scrub habitat on site is not of SINC quality as it is not species-rich and has limited structural diversity (Ref 9).

The broadleaved-plantation woodland on site does not qualify as Wood Pasture and Parkland or Native Woodlands SINC. The plantation woodland predominately consists of young immature trees, with sparse ground flora consisting of common species not solely associated with woodland.

Approximately 0.4 ha of broad-leaved plantation woodland (located on the western boundary of the site) within Cog Moors SINC will be lost to the proposed Development and approximately 0.4 ha of species-rich, semi-improved neutral grassland will be affected by placement of a temporary compound during the construction phase.

Given the small area of species-rich semi-improved neutral grassland affected by the proposed works, the recommendations of restoration and enhancement of Cog Moors SINC post-construction, and recommendations for enhancement of the existing WwTW, the effect of the proposed Development is not considered to be significant.

A large proportion of the broad-leaved plantation woodland requiring removal is unmanaged with a dense canopy that reduces the ingress of light into the woodland, reducing the species diversity of ground flora. Although the proposed Development will lead to fragmentation of the woodland to accommodate a buried high voltage (HV) cable, the works footprint has been minimised to ensure a tree line/woodland strip will be retained around the top of the embankment to maintain connectivity. Due to the nature of the habitat loss the effect of the proposed Development is not considered to be significant, and compensatory planting within the site is proposed.

It is noted that the site supports Indian (Himalayan) Balsam, within areas of broad-leaved plantation woodland, which if left unmanaged is likely to result in the deterioration of the existing habitats and decline in botanical species diversity, over time. Any development within the site would need to ensure that the Schedule 9 species recorded are not disturbed and/or spread, and that eradication is achieved where possible (in accordance with best practice guidance).

7 Conclusion

A range of habitats have been recorded within the boundary of Cog Moors SINC including broad-leaved plantation woodland, species rich semi-improved neutral grassland, marshy grassland, dense continuous scrub, tall ruderal habitat and a number of dry ditches. The impacts from the proposed Development will include loss of broad-leaved plantation woodland habitat and species-rich semi-improved neutral grassland.

The site is currently designated as “Purple Moor-grass and Rush Pasture” SINC habitat. Although the current study of the SINC habitat located within the proposed Development area has concluded that it is not this habitat type, it may nevertheless be of SINC quality as neutral / lowland meadow grassland. Any proposed Development would need to be in accordance with local policy, in addition to national policy and legislation.

The Vale of Glamorgan Local Development Plan Background Paper (Ref 3) states that *‘Planning permission will not be granted for development which has a significant adverse effect on local nature conservation/geological interests or integrity of landscape features, unless the importance of the development outweighs the value of the substantive interests present.*

Where development is permitted which would damage the nature conservation value of the site, such damage will be kept to a minimum. The use of conditions and/or Planning Obligations to provide appropriate compensatory measures will be considered’.

As such, the ecological value of the site will be maintained and any effect from the proposed Development will be reduced or removed by appropriate mitigation and / or compensation / enhancement measures’ in line with the Vale of Glamorgan Local Plan.

8 Mitigation and Enhancement

The following mitigation and enhancement measures will be implemented to reduce the scale of the impact of the proposed Development on biodiversity:

- Where any habitats are lost for the proposed Development, these habitats will be reinstated and/or their loss mitigated for through the enhancement of existing habitats within the site and/or creation of new habitats of nature conservation value within the site. This will be achieved by:

- planting trees within the area of Cog Moors SINC to be used as a temporary compound that does not conform to its current citation of “Purple Moor-grass and Rush Pastures”. This will provide compensation for the trees lost within the woodland. Tree planting will be restricted to areas disturbed during the construction phase to avoid unnecessary damage/loss to areas of SINC quality grassland;
- improving long-term management of retained areas of woodland to improve biodiversity;
- aligning the HV cable along the woodland edge where possible. This area will be restored as grassland to create a woodland ride effect; and
- improving long-term management of amenity grassland within the existing WwTW site to improve biodiversity;

These mitigation/compensation measures are shown on Drawing 4798-S-202-HYD-XX-XX-DR-NX-06127.

- Mitigation measures will be required within the area of species-rich semi-improved neutral grassland during and post-construction to protect the grassland (e.g. track mats laid down to ensure minimal damage to the topsoil from vehicles).
- Remaining habitats within the SINC and existing WwTW will be subject to long-term management (to be documented within a Habitat Management Plan) to maintain and enhance their nature conservation value. The Management Plan will set out suitable prescriptions for the long-term management of retained and newly created habitats post development. Measures will also be detailed of any monitoring that may be required post development, i.e. to provide information on changes in habitat condition and any remedial measures that may be required.
- Where possible, opportunities will be sought to create additional habitats within the site, which enhances its ecological value, and/or through management to enhance the ecological value of existing/retained habitats (e.g. improved management of ditches for amphibians, provision of bat and bird boxes and habitat piles for reptiles).
- Adequate resources will be made available by the client, for the long-term maintenance and management of the retained habitats, in line with the objectives and prescriptions set out in the Habitat Management Plan.
- Mitigation measures will be put in place to ensure that the remainder of Cog Moors SINC is protected and ecological connectivity is maintained. For example: fencing to prevent vehicles/machinery straying into retained habitat and the implementation of standard good site practices and pollution control measures during site clearance and construction would ensure that the watercourses are not adversely affected by dust, uncontrolled surface water run-off, inappropriate storage of materials and inappropriate refuelling of machinery.
- Indian (Himalayan) Balsam was identified on site. The location of the plant has been mapped and described within the Preliminary Ecological Appraisal (Ref 1). Indian (Himalayan) Balsam within the working areas will be managed in accordance with current best practice guidelines and legislation to ensure that it is not spread during construction. Long-term management will aim to achieve eradication of Indian (Himalayan) Balsam.

9 References

Ref 1: Arcadis Consulting (UK) Ltd (2017). Cog Moors WwTW - Proposed Advanced Anaerobic Digestion (AAD) Plant. Addendum Preliminary Ecological Appraisal (Rev 4) (Report number 4798-S-202-HYD-XX-XX-RP-NX-10406).

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

Ref 3: Vale of Glamorgan Council (2013). Vale of Glamorgan Local Development Plan 2011-2026. Identification of SINC's and Priority Habitats (Background Paper).

www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP-2013/25_LDP_Identification_of_SINCs_2013.pdf [Accessed online June 2017]

Ref 4: Soltys Brewster (for Vale of Glamorgan Council) (2010). Identification of SINC's and Priority Habitats – Appendix 1.

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Ref 7: Joint Nature Conservation Committee (JNCC) (2010). Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit.

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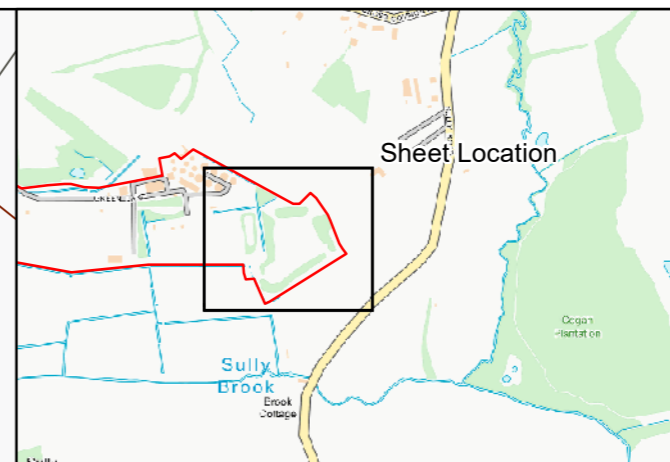
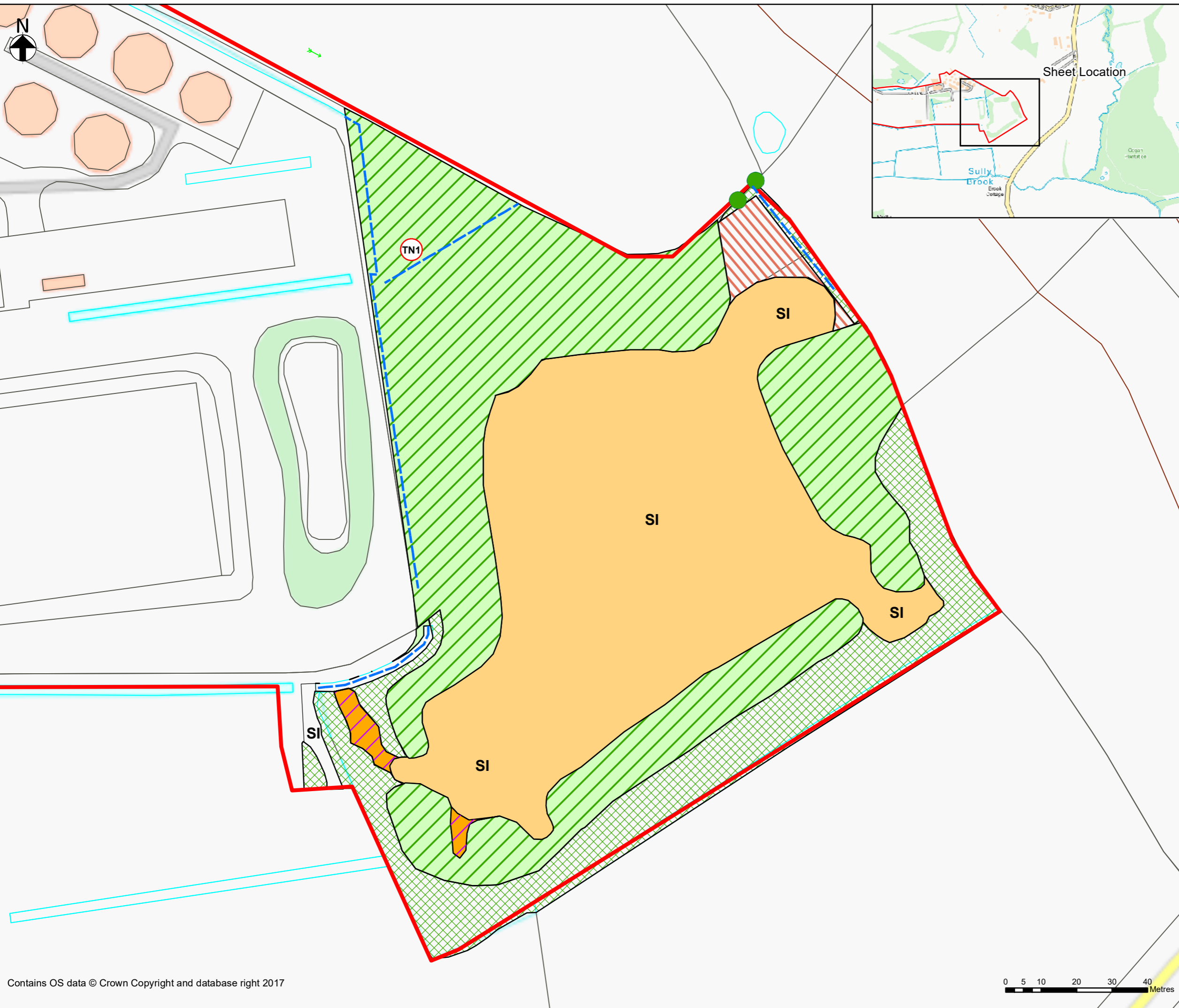
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Ref 10: The Wildlife and Countryside Act, 1981, HMSO.

Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

DRAWINGS

**Drawing 4798-S-202-HYD-XX-XX-DR-NX-08023 - Phase 1 Habitat Plan
Cog Moors SINC**



- LEGEND**
- Dry Ditch
 - Scattered Tree
 - Planning Application Boundary
- Habitat Type**
- Tall Ruderal
 - Dense Scrub
 - Marshy Grassland
 - Broadleaved Woodland - Plantation
 - Neutral Grassland - Semi-Improved
 - SI Poor Grassland (Semi-Improved)

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



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

Project Name: Cog Moors WwTW

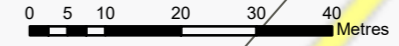
Drawing Title: Cog Moors WwTW Phase 1 Habitat Survey - SINC

Suitability: For Information Suitability Code: S2

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

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

Drawing Number: 4798-S-202-HYD-XX-XX-DR-NX-08023



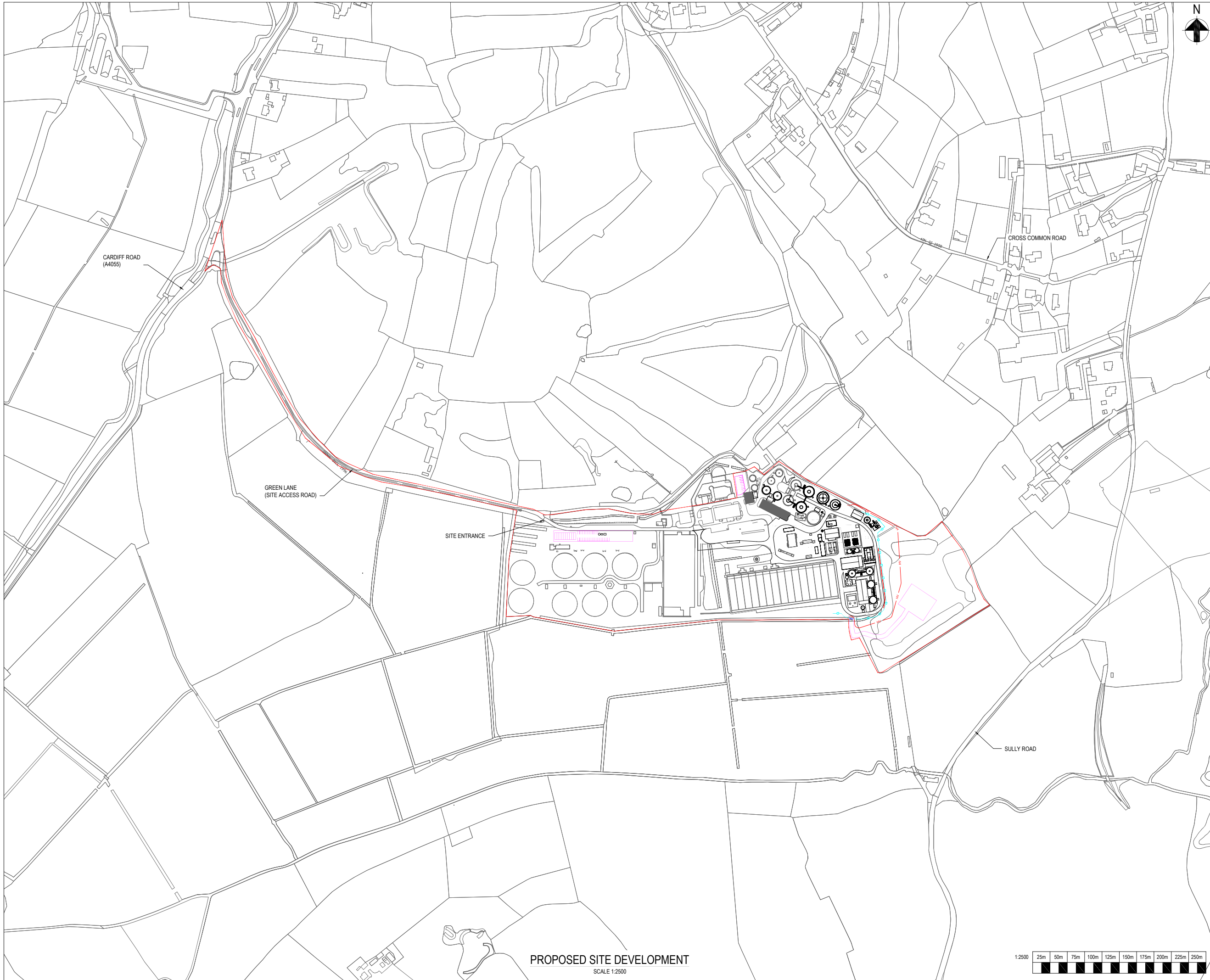
Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

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

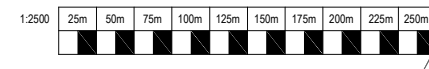


- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
 2. ALL LEVELS ARE IN METERS ABOVE GROUND LEVEL.
 3. DO NOT SCALE FROM THIS DRAWING.

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



PROPOSED SITE DEVELOPMENT
SCALE 1:2500



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.	Appd.	Date.

Capital Delivery Alliance
Cynghair Cyflawni Cyfalaf

Ty Awen, Spooner Close, Coad Kernew, Newport, NP108FZ

Project Name: **COG MOORS WwTW AAD**

Drawing Title: **PROPOSED SITE DEVELOPMENT**

Suitability: **ISSUED FOR INFORMATION** Suitability Code: **S2**

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

Internal Project Number: **UA007902** Scale: **1:2500** Rev: **P02**

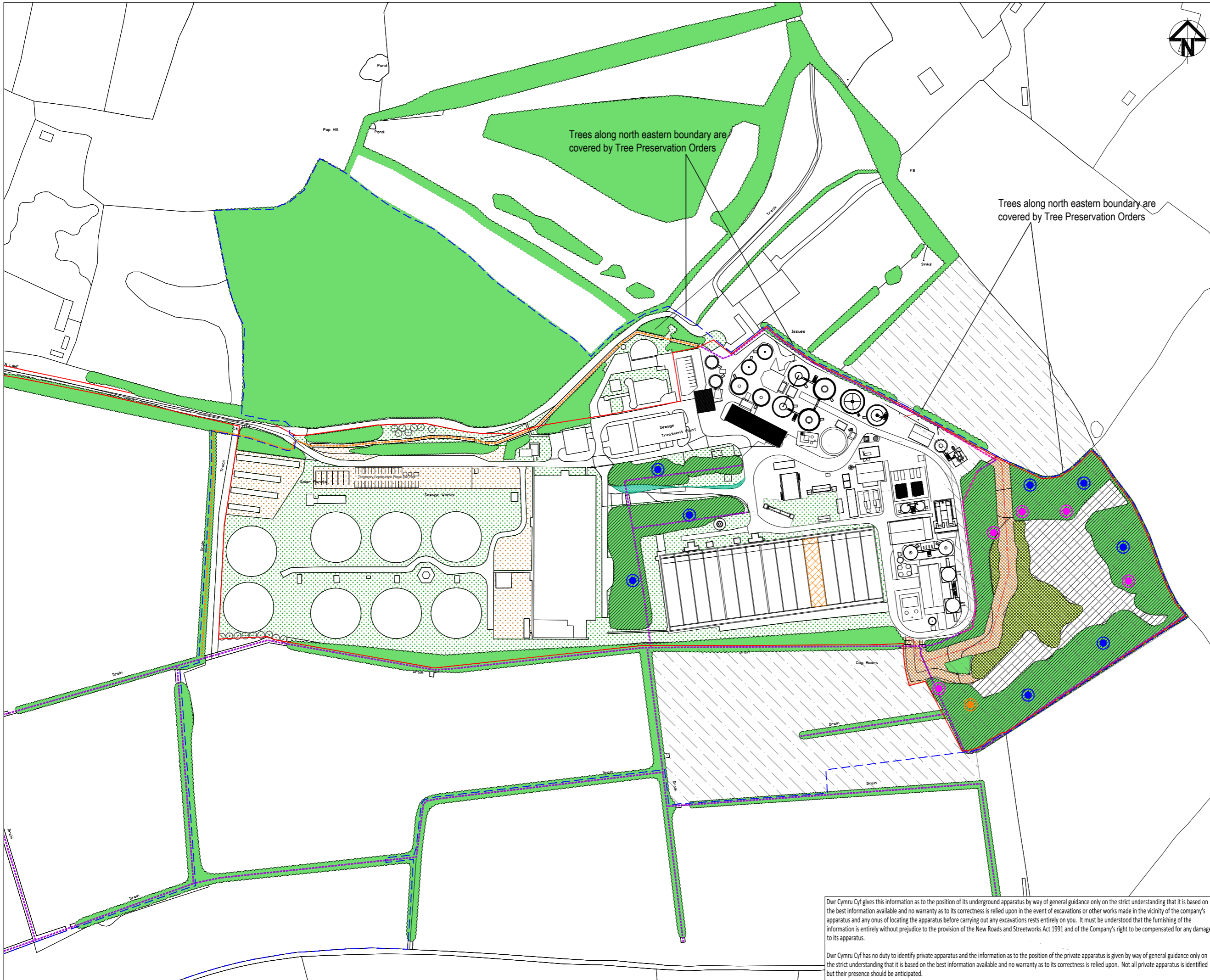
Drawing Number: **4798-S-202-HYD-XX-XX-DR-XX-06120**

Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Drawing 4798-S-202-HYD-XX-XX-DR-NX-06127 – Figure 10 - Landscape Mitigation Plan Screening



- LEGEND:**
- Planning Application Boundary
 - - - DCWW Land Ownership Boundary
 - 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
 - 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



Trees along north eastern boundary are covered by Tree Preservation Orders

Trees along north eastern boundary are covered by Tree Preservation Orders

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 Kernew, Newport, NP108FZ

Project Name: **COG MOORS WwTW AAD**

Drawing Title: **FIGURE 10
LANDSCAPE MITIGATION PLAN**

Suitability Code: **S2**

Originator: R.G.	Designer: S.F.	Date: 21.06.17
Internal Project Number: UA007902	Scale: 1:1250@A1	Rev: P02
Drawing Number: 4798-S-202-HYD-XX-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 – Plant species list

Plant Species	Latin
Broadleaved Plantation Woodland	
Ash	<i>Fraxinus excelsior</i>
Silver Birch	<i>Betula pendula</i>
Grey Willow	<i>Salix cinerea</i>
Oak	<i>Quercus</i> sp.
Field Maple	<i>Acer campestre</i>
Hazel	<i>Corylus avellana</i>
Hart's-tongue	<i>Asplenium scolopendrium</i>
Ground-ivy	<i>Glechoma hederacea</i>
Common Nettle	<i>Urtica dioica</i>
Creeping Thistle	<i>Cirsium arvense</i>
Herb-Robert	<i>Geranium robertianum</i>
Wild Teasel	<i>Dipsacus fullonum</i>
White Clover	<i>Trifolium repens</i>
Broad-leaved Dock	<i>Rumex obtusifolius</i>
Common Reed	<i>Phragmites australis</i>
Hogweed	<i>Heracleum sphondylium</i>
Bramble	<i>Rubus fruticosus</i> agg.
Scrub	
Hawthorn	<i>Crataegus monogyna</i>
Dog-rose	<i>Rosa canina</i>
Neutral Grassland	
Hoary Ragwort	<i>Senecio erucifolius</i>
Tufted Vetch	<i>Vicia cracca</i>
Soft-brome	<i>Bromus hordeaceus</i>

Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Plant Species	Latin
Smooth Tare	<i>Vicia tetrasperma</i>
Common Reed	<i>Phragmites australis</i>
Red Bartsia	<i>Odontites vernus</i>
Oxeye Daisy	<i>Leucanthemum vulgare</i>
Lesser Quaking-grass	<i>Briza minor</i>
Yellow Oat-grass	<i>Trisetum flavescens</i>
Creeping Bent	<i>Agrostis stolonifera</i>
Common Fleabane	<i>Pulicaria dysenterica</i>
Grass Vetchling	<i>Lathyrus nissolia</i>
Bristly Oxtongue	<i>Picris echioides</i>
Greater Bird's-foot-trefoil	<i>Lotus pedunculatus</i>
Common Spotted-orchid	<i>Dactylorhiza fuchsii</i>
Lesser Pond-sedge	<i>Carex acutiformis</i>
Yorkshire-fog	<i>Holcus lanatus</i>
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>
Common Vetch	<i>Vicia sativa</i> subsp. <i>segetalis</i>
Common Bird's-foot-trefoil	<i>Lotus corniculatus</i>
White Clover	<i>Trifolium repens</i>
Red Clover	<i>Trifolium pratense</i>
Cut-leaved Crane's-bill	<i>Geranium dissectum</i>
Meadow Vetchling	<i>Lathyrus pratensis</i>
Cock's-foot	<i>Dactylis glomerata</i>
Rough Meadow-grass	<i>Poa trivialis</i>
Southern Marsh-orchid	<i>Dactylorhiza praetermissa</i>
Red Fescue	<i>Festuca rubra</i>
Ribwort Plantain	<i>Plantago lanceolata</i>
Meadow Buttercup	<i>Ranunculus acris</i>



Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Plant Species	Latin
Curled Dock	<i>Rumex crispus</i>
Redshank	<i>Persicaria maculosa</i>
Agrimony	<i>Agrimonia eupatoria</i>
Meadowsweet	<i>Filipendula ulmaria</i>
Meadow Foxtail	<i>Alopecurus pratensis</i>
Field Horsetail	<i>Equisetum arvense</i>
Hogweed	<i>Heracleum sphondylium</i>
False Oat grass	<i>Arrhenatherum elatius</i>
Creeping Cinquefoil	<i>Potentilla reptans</i>
Field Wood-rush	<i>Luzula campestris</i>
Meadow Fescue	<i>Festuca pratensis</i>
Common Knapweed	<i>Centaurea nigra</i>
Bugle	<i>Ajuga reptans</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Silverweed	<i>Argentina anserina</i>
Ragged-Robin	<i>Lychnis flos-cuculi</i>
Great Willowherb	<i>Epilobium hirsutum</i>
Soft-rush	<i>Juncus effusus</i>
Hard-rush	<i>Juncus inflexus</i>
Tall Ruderal	
Common Nettle	<i>Urtica dioica</i>
Wild Teasel	<i>Dipsacus fullonum</i>
Common Reed	<i>Phragmites australis</i>
Rosebay Willowherb	<i>Chamerion angustifolium</i>

Appendix B - Target Notes

Target Note	Photograph
<p>Target Note 1 – Himalayan Balsam found scattered throughout the broad-leaved plantation woodland</p>	


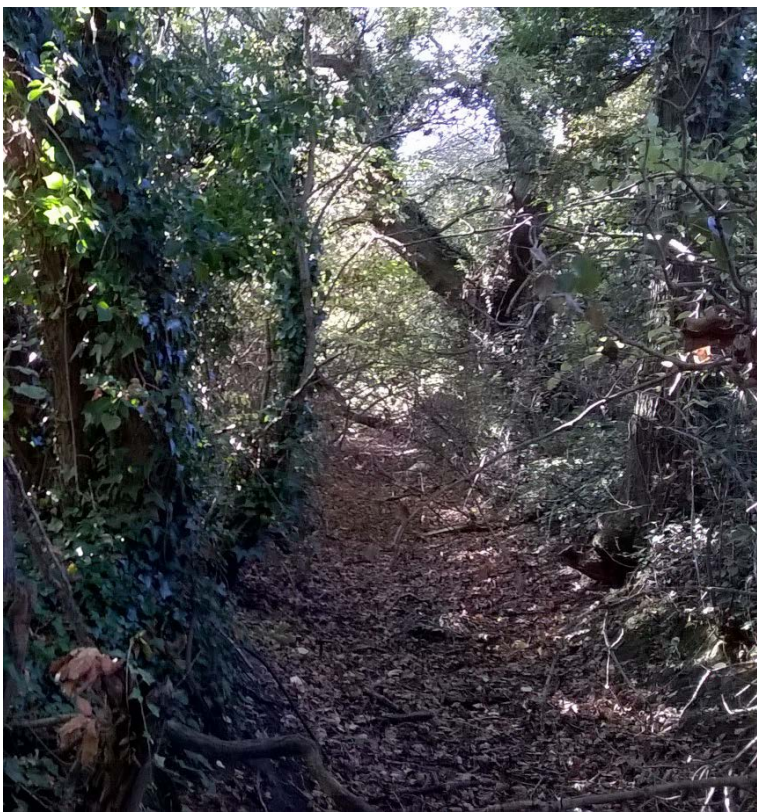
Appendix C - Photographic Record

Habitat	Photograph
Broadleaved Plantation Woodland	 A photograph showing a dense stand of broadleaved trees, likely alders, with a field of tall grasses and wildflowers in the foreground.
Species-rich semi-improved grassland	 A photograph showing a wide expanse of species-rich semi-improved grassland with various green plants and flowers under a blue sky with light clouds.

Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Habitat	Photograph
Tall ruderal habitat	 A photograph showing a dense thicket of tall, green, leafy plants, likely ruderal species, growing in a field. The plants are tall and have large, serrated leaves. The background shows a line of trees and a clear sky.
Marshy Grassland	 A photograph of a marshy grassland area. The foreground is dominated by tall, green grasses and wildflowers. The background shows a dense line of trees and a clear sky.

Cog Moors WwTW – Proposed Advanced Anaerobic Digestion (AAD) Plant

Habitat	Photograph
Scrub	
Dry ditch	

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