



Five Fords WwTW Advanced Anaerobic Digestion

Sustainability Report

May 2016

Dŵr Cymru Welsh Water

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Contents

Chapter	Title	Page
	Executive Summary	i
1	Introduction	1
1.1	Introduction	1
1.2	Site description	1
1.3	The Proposals	1
2	Sustainability Statement	3
2.1	Water Demand Management	3
2.2	Materials	3
2.3	Surface Water Runoff	3
2.4	Waste	4
2.5	Pollution	4
2.6	Ecology	4
2.7	Transport	5
2.8	Energy Efficiency	5
3	Conclusion	7

Executive Summary

This Sustainability Report is written in relation to the proposed Advanced Anaerobic Digestion plant (AAD) at the existing Five Fords Wastewater Treatment Works (WwTW), near Wrexham. The proposed works ('site') is located within the administrative boundaries of Wrexham County Borough Council (WCBC)

The proposed AAD plant will treat sewage sludge to produce methane gas which will be fed into the national supply grid via the Gas-to-Grid facility already operating at the site. It is intended that this plant will continue to accept solid sewage sludge from other DCWW sites in order to provide sufficient feedstock for the plant's economic operation.

The proposed development has been assessed against the criteria within the Planning Application Validation Requirements, with reference to the Local Planning Guidance Note No.30 - Design. This guidance note outlines the Council's requirements for sustainable buildings. This statement has also taken into account development plan policies on encouraging good design (in particular policies PS2 and GDP1 of the adopted Wrexham Unitary Development Plan).

This statement seeks to demonstrate how sustainability has been addressed in the proposed development making reference to the following:

- Water Demand Management;
- Materials;
- Surface Water Runoff;
- Waste;
- Pollution;
- Ecology;
- Transport; and
- Energy Efficiency

1 Introduction

1.1 Introduction

Wrexham County Borough Council's Planning Application Validation Requirements requires developments to demonstrate the practical delivery of sustainable standards through a pre-assessment statement or registration with an accredited body.

This Sustainability Statement is written in relation to the proposed work at the existing Five Fords Wastewater Treatment Works (WwTW), near Wrexham.

Whilst the Building Research Establishment's Environmental Assessment Method will not apply to the proposed development as it will not involve the construction of buildings or structures that are likely to be occupied for any significant period of time, a sustainability statement has been produced to demonstrate how the proposed development has taken account of key sustainability considerations, as outlined in policies PS2 and GDP1 of the adopted Wrexham Unitary Development Plan (UDP).

1.2 Site description

The proposed Advanced Anaerobic Digestion (AAD) plant will be located adjacent to the existing treatment works. The national grid references for the northern and southern extents of the proposed site are SJ 36445 48176 and SJ 36445 48010.

The location for the proposed plant is primarily on land previously farmed, but recently was used in 2015 as a contractor's compound for the construction of the Gas-to-Grid and solar array projects which are located to the south and north/east of the proposed AAD site respectively. Some items of the proposed development are within the existing operational site boundary of the WwTW. The site is approximately 420m northeast of the northern edge of Marchwiel village and 3.7km southeast of Wrexham town centre.

The existing WwTW infrastructure forms the western and southern boundaries of the proposed development. The land immediately adjacent to the east and north forms the solar array which was recently constructed. The site location is shown on drawing DCWW-4791-S-201-MMB-16-XX-DR-TR-08004.

The Afon Clywedog forms the northern boundary of the whole WwTW some 240m north of the proposed development. Marchwiel Covert, an area of designated ancient woodland, is located immediately to the west of the site but will not be affected by the proposed works. There is a public right of way along the alignment of a former railway running along the southern boundary of the site; the public right of way continues along a track running parallel to the east of the site.

1.3 The Proposals

The provision of AAD at Five Fords utilising a Thermal Hydrolysis Process (THP) with a total capacity of 18,000 tonnes dry solids per year.

A primary motivation for the AAD project is to promote the sustainable treatment and recycling of sewage sludge. The following are the key sustainability elements of the project:

- The production of biogas that will be upgraded and exported from Five Fords as biomethane with consequent positive impacts on increased energy capture and reductions in carbon emissions.
- The export of biomethane from Five Fords into the national grid displaces natural gas reducing carbon emissions from the burning of natural gas. This reduction is greater than the carbon emissions associated with transport of untreated sludge to Five Fords.
- Continuation of the recycling of treated sewage sludge, with associated nutrients, to agriculture.
- Increase in acceptability of treated sewage sludge by total pathogen kill and reduction in noxious compounds.
- Overall reduction of the volume of treated sludge being recycled to agriculture.

The proposed AAD comprises a number of new tanks and buildings which will be constructed primarily on a strip of land to the east of the existing WwTW. Demolition of and modifications to some existing plant within the WwTW will also be required. The proposals are shown on drawing DCWW-4791-S-201-MMB-06-XX-VS-XX-19101 and DCWW-4791-S-201-MMB-06-XX-DR-XX-19107, which illustrate the works described below.

1.3.1 Construction

The construction site will be accessed along the existing private road to the Five Fords WwTW from Cefn Road. During the construction phase, plant and equipment will be retained on site. MMB as design and build contractor will follow best practice pollution prevention measures. A construction compound is proposed immediately east of the construction site. Construction activities will take place during the site's usual operating period with construction anticipated to last approximately 36 months.

Construction works will follow the sequence outlined below:

- Establish site compound, fence the sides of the construction site to limit trespass and prevent any conflict with the normal site operation;
- Strip topsoil from the site and store in stockpiles;
- Undertake service diversions, as required;
- Excavate and place soils to the required ground profile;
- Pile foundations for structures (where required);
- Construct above ground infrastructure (a mixture of bespoke units built on site and proprietary units brought to site as components);
- Decommission redundant plant and demolish redundant structures;
- Construct landscape bund along eastern site boundary;
- Decommission contractor's compound.

1.3.2 Operation

Vehicles will continue to use the existing access road off Cefn Road.

2 Sustainability Statement

2.1 Water Demand Management

Policy EC14 states that a “development which would have an unacceptable adverse impact upon the capacity, flow, quality or availability of controlled waters and associated land will not be permitted.”

The proposed development will result in an increased use of potable water and will also use treated water from the WwTW. All process water will ultimately be discharged to the Afon Clywedog via the consented discharge. There will be no adverse effect on the quality of the Afon Clywedog.

MMB will monitor and report their own and their subcontractor’s potable water consumption during the construction process, and utilise any recycled water possible to reduce potable water use.

2.2 Materials

Policy MW1 refers to minerals and materials and aims to minimise use of virgin raw materials and encourage the recycling of materials and secondary aggregates wherever possible, by reducing (a) reliance on primary aggregates; and (b) the need to work new reserves.

A Site Waste Management Plan will be adopted to limit the amount of waste generated. The proposals include the reuse of some existing plant.

MMB will endeavour to make use of local labour and to purchase construction materials from local suppliers where possible. When purchasing materials the contractor will be encouraged to minimise packaging – this will be incorporated into the Site Waste Management Plan. Opportunities will be sought to return packaging to the supplier for reuse. Only legally sourced site and construction timber will be accepted at this development, and MMB will provide documents to evidence this.

2.3 Surface Water Runoff

Policy EC13 of the UDP states that a “Development which would result in an unacceptable adverse impact on the water environment due to additional surface water run-off will not be permitted.” The Afon Clywedog runs to the north and the footprint of the proposed new works are in flood zone A, indicating little or no risk from flooding. The size of the development is greater than 1ha and as such triggers the need to consider any potential increase in flood risk arising from the drainage system.

The proposed drainage system is described in Five Fords AAD Surface Water Management¹. All surface water will be collected and channelled to the WwTW inlet works where it will pass through the treatment system before being discharged into the Afon Clywedog via the consented discharge. There is sufficient capacity within the WwTW to accept this additional water. Sending the water through the WwTW will provide storm flow attenuation to the Afon Clywedog.

¹ 4791.S.201.MMB.06.XX.RP.NX.19038

A soakaway drainage system will be installed for the compound car park area if possible; otherwise surface water from this area will be channelled to the WwTW. Best practice pollution prevention methodologies will be adopted within a Construction Environment Management Plan (CEMP).

2.4 Waste

Policy PS10 states that “priority in waste management will be given to minimising the volume of waste generated, followed by maximising the re-use and recycling as much waste as possible. Energy recovery from waste will be favoured where re-use and recycling is not feasible, and waste will be managed at, or as near as practicable, to the location where it is initially produced.”

The AAD and THP system allows for improvements in process control and monitoring. The improvements promote the adoption of industry-wide standards such as the biosolids assurance scheme. This removes sludge from being defined as a waste into a product with positive implications on the availability of the treated sludge for use in agriculture.

A Site Waste Management Plan will be adopted to limit the amount of waste generated during construction. The proposals include the reuse of some existing plant. Best practice pollution prevention methodologies will be adopted within a Construction Environment Management Plan (CEMP).

2.5 Pollution

MMB will mitigate all pollution aspects of the development:

- Noise: all best practice measures will be required to minimise noise at site during construction. Appropriate sound insulation will be specified to achieve ambient indoor noise levels within the design ranges given in BS 8233: 2014.
- Water: pollution prevention best practice measures will be instigated.
- Air: MMB will further be required to apply best practice guidance in regards to minimising the production of air pollutants and dust during site works.
- Odour: The elements of the proposed process with the potential for causing odour problems will mostly be enclosed within buildings with incorporated odour control units; however tanks with covers and plant within enclosures will also be sources for potential odour problems. An Odour Assessment has been carried out to determine the impacts of odour; the results are pending however with the correct mitigation measures employed it is not anticipated that there will be any significant adverse impacts arising during operation of the AAD.

2.6 Ecology

Policy PS11 states that “encouragement will be given to proposals which improve the biodiversity value of sites and to the establishment of local nature reserves where the nature conservation and landscape interest of the land will be protected and enhanced.”

The proposed AAD plant is proposed to be built on land that has recently been used as a construction compound. Following a Preliminary Ecological Appraisal, it was found that there is suitable habitat on site for ground nesting birds and reptiles and the surrounding area supports great crested newts. Mitigation measures will be implemented to avoid any potential negative impacts. The site is not considered suitable for any other species with ecological importance and construction within the existing site is likely to present little ecological risk. Construction will be undertaken in accordance to a Reasonable Avoidance Method Statement to ensure great crested newts are not adversely affected with ecological supervision during ground works.

2.7 Transport

Policy PS8 states that “the transport network will be developed by providing an integrated range of travel options to and from principal residential, commercial, employment and education centres by making the best use of the existing road and rail network, including, where necessary, the provision of facilities for both passenger and freight interchange and by the encouragement of public transport, cycling and walking.”

There is proposed to be an increase in traffic movement in the order of 8 vehicles per day (on average) at Five Fords. This increase has been kept to a minimum by dewatering the sludge at local sludge treatment centres (STCs) and transport in a fleet of dedicated vehicles. There will be an increase in the numbers of vehicles exporting treated sludge from Five Fords, in the order of 13 trailers per day (average). The increases in vehicle movements at Five Fords are balanced, to some extent, by the cessation of export of treated sludge at the local STCs.

2.8 Energy Efficiency

Policy PS12 states that “proposals for the generation of energy from renewable sources will be supported provided that the wider environmental benefits are not outweighed by any detrimental impacts of the proposed development (including any electricity transmission facilities needed) on the landscape, public safety, and the local environment.”

The proposed THP allows for more efficient digestion of the sludge resulting in an increased recovery of energy from the sewage sludge by increased production of biogas. The Five Fords site has a Gas-to-Grid plant installed that upgrades biogas to a quality suitable for injection into the national gas grid. The Gas-to-Grid plant allows biogas in excess of that required for the process requirements to be exported. The alternative use of the excess biogas (generation of electricity in Combined Heat and Power (CHP) plants) will only export approximately 30% of the energy content of the biogas as electricity.

The emission of carbon as CO₂ has recognised climate change implications. The increased efficiency of the digestion process and export of excess biogas as biomethane replaces fossil fuel natural gas in the national grid with positive impacts on CO₂ emissions. The carbon benefits of export of biomethane significantly exceed the impacts of the emissions from the transport associated with transporting sludge to Five Fords.

Overall, the addition of AAD at Five Fords will allow more efficient energy recovery from the sewage sludge. The increased biogas production will be upgraded and exported into the national gas grid displacing fossil fuels and reducing carbon emissions. This contributes to DCWW and Welsh National sustainability objectives.

3 Conclusion

This Sustainability Statement has assessed how the proposal will address each of the main sustainability topics highlighted in policies PS2 and GDP1 of the adopted Wrexham UDP.

It is concluded that the proposal is in line with Wrexham County Borough Council's sustainability requirements: each of the sustainability topics will be addressed. The proposed measures will achieve the required standard and will go beyond both construction and operational stages.

Due to the nature of the proposal it does not fall within the remit of a BREEAM assessment however sustainable measures have been considered and will be implemented for the construction and operation of the AAD and THP plant.