

DESIGN AND ACCESS STATEMENT

Erection of a Sludge Treatment and Sustainable Energy Plant, Establishment of a Nature Conservation Compensation Area, Improvements to Means of Access, Provision of Screen Planting and Formation of a Temporary Construction Compound.

Five Fords Wastewater Treatment Works, Wrexham.

1. Introduction

- 1.1 Sewage sludge is a product of the wastewater treatment process and is normally disposed of to agricultural land, following treatment aimed at reducing pathogen and ecoli levels.
- 1.2 The existing sewage sludge lime treatment facility at Five Fords Wastewater Treatment Works (WwTW) is operating at its maximum capacity and a recent site audit has highlighted processing, asset condition and serviceability problems with this plant.
- 1.3 In addition, in response to regulatory requirements aimed at improving the quality of treated effluent discharged to the River Dee and its tributaries, additional wastewater treatment facilities are to be constructed in the near future at Five Fords WwTW, and at other WwTW in the River Dee catchment, which will increase the quantity of sewage sludge generated and requiring treatment.
- 1.4 There is an urgent need, therefore, to improve the operation of the existing sludge treatment facility at Five Fords WwTW and also to provide additional sludge treatment capacity.
- 1.5 In response to these requirements, Dwr Cymru Welsh Water (DCWW) proposes to construct a Sludge Treatment and Sustainable Energy Plant (STP) at Five Fords (WwTW). The proposed development will also include the establishment of a nature conservation compensation area, improvements to the means of access to the site, the provision of screen planting and the formation of a temporary construction compound.
- 1.6 The STP development now proposed will complement the existing sewage sludge lime treatment facility at Five Fords WwTW, which is to be retained and refurbished.
- 1.7 The proposed STP development will digest sewage sludge. Digestion (mesophilic anaerobic digestion) is a long established process of treating sewage sludge and has been tried and tested over many years.
- 1.8 The digestion process will reduce the volume of sludge to be passed forward for lime treatment. In addition, the process will produce a digester gas which will be used in a Combined Heat and Power plant (to be constructed as part of the proposed development) to generate electricity.
- 1.9 It is anticipated that the electricity generated by the STP facility will be sufficient to satisfy the electricity requirements of the WwTW and will replace electricity which is presently imported into the site from the national grid.

2. Design

a) Development Context.

Physical

- 2.1 Five Fords WwTW is situated in a semi rural area, approximately 3.5km to the south east of Wrexham Town Centre.
- 2.2 The operational area of the WwTW, as defined by the site security fence, extends to approximately 23ha and is bounded to the north by the Afon Clywedog and to the south by a disused railway line which runs on a low embankment in this locality. The land immediately to the west, north and east of the WwTW site is predominantly in agricultural use.
- 2.3 Vehicular access to the WwTW site is gained from Cefn Road to the north, via an L-shaped private access track which also serves Five Fords Farm.
- 2.4 The central part of Five Fords WwTW is occupied by Marchwiell Covert, an ancient woodland comprising a dense block of mature trees.
- 2.5 The existing wastewater treatment plant and equipment at the WwTW is located to the north and north west of Marchwiell Covert and comprises a series of process tanks structures and interconnecting pipework, together with reception and control buildings and access roadways.
- 2.6 The existing sewage sludge lime treatment facility at the WwTW is situated immediately to the north east of Marchwiell Covert and comprises a series of tanks and process buildings, vehicle hardstandings and roadways.
- 2.7 The proposed STP will be located on the eastern side of Marchwiell Covert and to the south of the existing lime treatment facility, on the site of former sludge lagoons and on an area of hardstanding. The photograph below is taken from the private access track, in the vicinity of Five Fords Farm, and shows the existing lime treatment facility and the site of the proposed STP.



- 2.8 The village of Marchwiell is located to the south and south west of the WwTW, on the south side of the disused railway line, whilst Wrexham Industrial Estate is situated approximately 800m to the north east.
- 2.9 Bedwell Road runs on a generally north-south alignment at a distance of approximately 1km to the east of the WwTW. Wrexham CBC proposes to construct a new link road between Five Fords Bridge and the A525, to the west of Bedwell Road, in order to improve vehicular access and egress to Wrexham Industrial Estate from the south.

Social

- 2.10 DCWW has a regulatory duty to dispose of sewage sludge arisings in a safe and appropriate manner.
- 2.11 Regulatory control over the disposal of treated sewage sludge to agricultural land is becoming increasingly restrictive, requiring a significantly higher level of pathogen and ecoli reduction than hitherto. These restrictions constrain the disposal of all but “enhanced treated” sewage sludge to agricultural land.
- 2.12 The proposed STP development, together with the refurbishment of the existing sewage sludge lime treatment facility, will produce an “enhanced treated” sludge cake which will be capable of satisfying existing and forthcoming regulatory requirements relating to its disposal to agricultural land.
- 2.13 Five Fords WwTW is a large and dated facility and, as a consequence, the site does not reflect current industry best practice for odour control, especially within its sludge treatment section. The proposed STP development, together with the refurbishment of the existing sewage sludge lime treatment facility, will provide an opportunity to secure a significant reduction in odour generation and, thus, will be of major benefit to the local community.

Economic

- 2.14 DCWW has reviewed a range of process options in determining the most appropriate method of refurbishing or replacing the existing sewage sludge treatment facilities at Five Fords WwTW and of treating the additional volumes of sewage sludge which are likely to be generated in the short term.
- 2.15 The process options considered were as follows:
- Liquid liming/lime stabilisation
 - Drying
 - Gasification
 - Conventional Digestion
 - Enhanced Digestion
- 2.16 In the light of this review, Dwr Cymru Welsh Water is now of the opinion that the most appropriate method of dealing with existing sewage sludge arisings and providing the additional sewage sludge treatment capacity required is to refurbish the existing Five Fords lime stabilisation plant and to complement it with the construction of a new conventional Sludge Treatment Digester and Sustainable Energy Plant (STP) at the WwTW.

b) Character of the Proposed Development

Amount

2.17 The dimensions, materials and colours of the various structures comprising the proposed STP development are indicated in the table below:

Building/plant	Size/area (m)	Height (above surrounding ground level)	Appearance /Materials	Colour
Below ground sludge reception pumping station	4m (d) internal	150mm	Concrete	Grey
Below ground return liquors pumping station	4m (d) internal	150mm	Concrete	Grey
Buried imported thickened sludge pumping station	4m (d) internal	150mm	Concrete	Grey
Strain press platform	10.8m x 7.0m slab (bund)	6.0m to platform 7.1m to top of hand railing	Steel	Dark Green BS 4800 10B25
Screened sludge storage tank thickener feed pumps & mixer	Tank 17.08m (d), 17.55m (d) slab base	10.535m to top of tank wall, 12.825m to top of roof.	Steel tank	Dark Green BS 4800 10B25
SAS Buffer tank, thickened feed pumps and mixer	5.12m (d) circular tank 5.80m. (d) base	6.335m to top of tank wall, 7.025m to top of roof	Steel tank	Dark Green BS 4800 10B25
HV & LV distribution kiosk & Hot water system	21.7 m length x 5.5m width slab	2.8m	GRP Kiosk	Dark Green BS 4800 10B25
Digester Kiosk	11.2 m x 5.5m slab	2.8m	GRP Kiosk	Dark Green BS 4800 10B25
Welfare kiosk	7.5m x 3.6m slab	2.8m	GRP Kiosk	Dark Green BS 4800 10B25
Thickeners/ poly kiosk/poly silo	31.6m x 9m slab	8.0m to top of silo, 9.1m to top of hand railing, 9.6m to top silo filter, 2.8m to top of kiosk	Steel/GRP Kiosk	Steel Dark Green BS 4800 10B25
Odour control unit	16m x 5m slab 0.5m (d)	6.0m to top of vent stack	GRP	Dark Green BS 4800 10B25
Thickened sludge buffer tank, Digester feed pumps & mixer	Tanks 8.54 (d), 9.2m (d) slab	10.535 to top of tank wall 11.680m to top of roof	Steel tank	Dark Green BS 4800 10B25
Pipe bridges	2no 9m length x 2m width	5.5m	Steel work	Silver
Transformer/ring main unit	4.3m length x 4.3m slab	2.8m	GRP Kiosk	Dark Green BS 4800 10B25
Recirculation pumps	2no. 5.3m x 4.3m bunded slabs	1.0m	Pipework	Silver
Fuel tank	7.2m x 3.2m slab	2.5m	Steel tank	Dark Green BS 4800 10B25
2no. CHP in containers & Hot water boiler	13m x 9.2m slab	2.9m to top of container 4.0 to top of hand railing	Steel	Dark Green BS 4800 10B25
Generator set (enclosure)	9.7m x 4.0m slab	3.5m	GRP	Dark Green BS 4800 10B25
Heat exchangers	9.5m x 6.0m slab	2.0	Pipe work	Silver
Digesters and mixers	Tank 16.22m (d), 18.85m slab (d)	19.673m to top of tank wall 21.850m to top of roof	Steel tank	Dark Green BS 4800 10B25
Post Digestion Tank, Transfer Pumps and Mixer	Tank 8.54m (d), 9.2m (d)	10.535m to top of tank wall 11.680m to top of roof	Steel tank	Dark Green BS 4800 10B25
Gas Holder	15m (d) diameter, 13.5m (d) slab	11.0m	Fabric	Dark Green BS 4800 10B25
Waste gas destructor	8.2m x 5.6m slab	7.9m	Steel	Silver
Exhaust flue	3m x 4m slab	17.1m	Steel	Silver
Polymer silo	6.0m x 6.0mm slab	8.0m to top of silo 9.10m to top of hand railing, 9.6m to top of silo filter	Steel	Silver

Layout

- 2.18 In order to function efficiently, it is essential that the constituent stages of the proposed development are laid out in a sequential manner.
- 2.19 In the raw sludge stage, indigenous sludge from Five Fords WwTW is received via pumping mains and imported sludge is delivered to the sludge import facility by road tankers. The raw sludge is screened and transferred to a buffer tank.
- 2.20 In the pre-treatment stage, the blended sludge is passed to belt thickeners, where it is thickened. The thickened sludge is then fed to the digestion stage.
- 2.21 In the digestion stage the sludge undergoes anaerobic digestion in two heated tanks where volatile compounds are converted to digester gas and water. The digester gas is passed forward to a gas holder, which forms part of the energy recovery stage. The digested sludge and water are held in a post digestion tank.
- 2.22 In the lime stabilisation stage, the digested sludge from the post digestion tank is mixed with lime solution to raise the pH and kill bacteria in the sludge. Lime is fed into the sludge and the combined product allowed to mature for several hours in consolidation tanks. Following maturation the sludge is fed to centrifuges for dewatering.
- 2.23 In the dewatering stage, the limed digested sludge and water is fed to three centrifuges for dewatering. The resultant liquors are returned to the inlet works of the WwTW for treatment, whilst the sludge cake is stored within the dewatering building and then removed off-site for disposal to agricultural land.
- 2.24 In the energy recovery stage, the digester gas is used in a combined heat and power plant to fuel gas engines which generate heat and electricity. The heat generated by the gas engines is used to heat water for maintaining the temperature in the digestion plant.

Scale

- 2.25 The purpose of the proposed buildings and structures is to enclose and protect new process and control equipment and to contain sludges, digester gas and liquors associated with the sewage sludge treatment process. The sizes of the proposed buildings and structures are as small as is reasonably practicable in order to accommodate the new process equipment and to hold sufficient volumes of sludges, gas and liquors.
- 2.26 The dimensions of the proposed development are indicated in the table above.
- 2.27 The proposed STP development itself will occupy a site of approximately 1.3ha.
- 2.28 The scale of the proposed STP development is broadly in keeping with that of the existing sewage sludge lime treatment facility, located immediately to the north, and with other tanks and structures that are present on the WwTW site.
- 2.29 In addition the proposed STP development will be viewed in the context of the existing mature trees at Marchwiell Covert and on the land to the south.

Appearance

- 2.30 The general appearance of the proposed STP development is dictated, to a large degree, by the operational requirements of the proposed plant.
- 2.31 However, in order to assimilate the proposed development into its surroundings, the various buildings, tanks and structures will be dark green in colour (BS 4800 10B25) and, in the main open views from the east, will be seen with the trees in Marchwiel Covert in the background.
- 2.32 The use of a dark green colour for the proposed buildings, tanks and structures and the presence of a dark background to the main open views will help to ensure that the proposed STP appears as a recessive feature in the landscape. The photomontage below, which is taken from Bedwell Road, illustrates how the appearance of the proposed development will be recessive in the landscape in views from the east.



Landscaping

- 2.33 The existing planting around the periphery of the proposed STP site will be retained.
- 2.34 Native hedgerow and hedgerow tree planting is proposed along existing field boundaries to the east and north east of the proposed development and alongside a section of the disused railway line.
- 2.35 In addition, earth bunding with native planting will be provided immediately to the east and to the south of the proposed STP development.
- 2.36 Whilst the proposed bunding and planting will not screen the proposed STP, it will nevertheless filter views of the development and will assist with its integration into the surrounding landscape.

c) Environmental Sustainability
Landscape Setting.

- 2.37 The proposed STP site is not subject to any statutory landscape designation.
- 2.38 The overall landscape landform, scale and context will be unaffected by the proposals, as the development will appear as largely the same built form and character to that which exists immediately adjacent at present.
- 2.39 As the general landscape is generally well wooded and contained, it has the ability to absorb the proposed STP development without a wider landscape implication. Thus, the landscape impact of the proposed development will be limited to the immediate locality.
- 2.40 The zone of visual influence for the proposed development is restricted, in the main, to views from the east and south east of the site. Views from other directions are restricted by the topography and by the presence of existing vegetation, including the vegetation associated with the Afon Clywedog and the disused railway line, hedging, field trees and hedgerow trees.
- 2.41 The photomontage below, which is taken from the private access track in the vicinity of Five Fords Farm, illustrates how the proposed development will be assimilated into the landscape.



Bio-diversity and the Local Environment

- 2.42 An area for ecological compensation is proposed within the southern boundary of the operational area, between Marchwiel Covert and the disused railway line.
- 2.43 The compensation works will include the planting of a mixture of native trees, scrub and hedgerows and the enlargement and enhancement of an existing pond.
- 2.44 The compensation area will provide and/or enhance a number of habitats that are important Bio-diversity Action Plan habitats, which will benefit a number of protected species found in the area, including great crested newt, birds, badger, reptiles and bats.
- 2.45 The Marchwiel Covert ancient woodland will be unaffected by the proposed development.

- 2.46 In addition, there will be no impact on the features of the designated River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid Special Area for Conservation, or on other designated wildlife sites, as a consequence of the proposed STP development.

Energy Efficiency

- 2.47 In order to reduce its carbon footprint, Dwr Cymru Welsh Water intends to develop and utilise renewable energy sources.
- 2.48 The proposed STP will digest sewage sludge to produce a mixture of digested sludge and water, together with a digester gas.
- 2.49 The digester gas will be used to power a series of gas engines which will, in turn, be used to generate electricity. Surplus heat generated by the operation of the gas engines will be used to maintain the temperature of the STP digesters, thereby enhancing the effectiveness of the digestion process.
- 2.50 It is anticipated that the electricity generated from renewable sources by the STP facility will be sufficient to satisfy the electricity requirements of the WwTW and will replace electricity which is presently imported into the site from the national grid. This will help to reduce the carbon footprint of the WwTW. Any surplus electricity generated will be exported from the site to the national grid.
- 2.51 Any external lighting associated with the proposed development will be restricted to the minimum necessary to satisfy Health and Safety and operational requirements and will be utilised during the nighttime period only, thereby resulting in additional energy savings.

Sustainable Materials

- 2.52 The proposed development will utilise robust materials which are likely to have a long operational life. This will help to reduce the need for subsequent maintenance and repair work, resulting in “whole life” sustainability benefits.

Water

- 2.53 The proposed STP site is not within a Flood Risk zone and is considered to be at no risk of fluvial flooding.
- 2.54 Clean surface water, comprising the run-off from the roofs of the proposed buildings, will be discharged to ground by means of soakaways.
- 2.55 All potentially contaminated water within the STP site will be contained within bunded, hard surfaced areas and will be transferred to the inlet works of the WwTW for treatment.

Sustainable Building Design

- 2.56 Since the buildings, tanks and structures associated with the proposed STP development and intended to house operational plant and equipment, sludges, digester gas and liquors only, the requirements of MIPPS 01/2009, which deals with BREEAM standards and the mandatory credits for the reduction of CO2 emissions, does not apply to the proposed development.

Movement to, from and within the Development

- 2.57 Vehicular access to the proposed STP will be gained by means of the existing access to Five Fords WwTW, which is gained from Cefn Road, to the north, via an L-shaped private access track.
- 2.58 The junction of the private access track with Cefn Road will be improved by the replacement of existing soft verges with new carriageway; in addition, edge of carriageway marking will be carried out. Vehicle passing places will also be constructed along the private access track.
- 2.59 Two existing damaged trees will be removed from the roadside to improve visibility from the existing Cefn Road junction to the east.
- 2.60 A series of traffic calming measures are proposed along Cefn Road and comprise “no overtaking” double white lines, the relocation of existing and the provision of new signage and the introduction of dual language “slow” marking and red surface treatment on the Cefn Road carriageway on the approaches to the junction.
- 2.61 By using larger road tankers and operating on a six day week, the number of road tankers entering and leaving Five Fords WwTW, following the construction of the proposed STP will remain within the existing daily range of traffic movements.
- 2.62 There is no public transport access directly to the application site, although public transport services do serve Wrexham Industrial Estate.
- 2.63 The STP site is accessible on foot or by cycle and this will not be affected by the proposed development.

Community Safety

- 2.64 The proposed development will be secure with no open tanks. There will be no public access to the application site and the proposed development is unlikely to have any material implications for community safety.
- 2.65 The proposed STP development, together with the refurbishment of the existing sewage sludge lime treatment facility, will produce an “enhanced treated” sludge cake which will be capable of satisfying existing and forthcoming regulatory requirements relating to its disposal to agricultural land.

d) Development Plan Policy

- 2.66 The Development Plan for the area within which the proposed development is located comprises the Wrexham Unitary Development Plan 1996 – 2011, which was adopted by the CBC in February 2005.
- 2.67 Strategic Policy PS2 requires that development must not materially detrimentally affect countryside, landscape/townscape character, open space or the quality of the natural environment. The proposed development will not materially prejudice the local environment, will result in significant environmental benefits both locally and regionally.
- 2.68 Strategic Policy PS3 seeks to direct development to previously used brownfield land comprising vacant, derelict or underused land in preference to the use of greenfield land wherever possible. The proposed STP development is consistent with this policy since it involves

development on previously used brownfield land, comprising hardstandings and former sludge lagoons.

- 2.69 Strategic Policy PS10 indicates that priority in waste management will be given to minimising the volume of waste generated, followed by maximising the re-use and re-cycling as much waste as possible. Energy recovery from waste will be favoured where re-use or recycling is not feasible, and waste will be managed at, or as near as practicable, to the location where it is initially produced. The proposed development involves waste minimisation, recycling and energy recovery, as part of the re-cycling process. In addition, the majority of the waste to be treated by the proposed development will be generated by the operation of the adjacent WwTW.
- 2.70 Strategic Policy PS11 indicates 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. The proposed development incorporates proposals aimed at promoting biodiversity and includes proposals for the provision of an area for ecological compensation.
- 2.71 Strategic Policy PS12 confirms 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. The development now proposed involves the generation of renewable energy and will not have significant adverse impacts upon the local environment.
- 2.72 Environment and Conservation Policy EC4 confirms that development proposals should provide for the conservation and management of hedgerows, trees, orchards, woodland, wildlife and other natural landscape and water features, and include new planting in order to enhance the character of the landscape and townscape. The proposed development provides for the conservation and management of hedgerows, trees and woodlands and makes provision for additional planting as part of the proposed screen planting mitigation.
- 2.73 Environment and Conservation Policy EC6 indicates that development either within or close to sites of biodiversity interest will only be permitted where it can be clearly demonstrated that the need for the development outweighs the need to safeguard the intrinsic nature conservation value of the site. There is a clear and demonstrable need for the proposed development and the proposals will enhance biodiversity in the area by promoting the development of a compensation area for nature conservation.
- 2.74 The proposed development is consistent with the provisions of Minerals and Waste Policy MW12 which confirms that waste management facilities will be located having regard to:
- (i) The best practicable environmental option
 - (ii) The waste hierarchy
 - (iii) The proximity principle
 - (iv) Regional self-sufficiency
- 2.75 Minerals and Waste Policy MW13 deals with waste disposal and indicates that the disposal of waste will take place, inter alia, *“at purpose built treatment and disposal facilities which comply with the principles set out in Policy MW12”*. The proposed development is consistent with the provisions of Policy MW13 and, as indicated above, complies with the principles set out in Policy MW12.

2.76 The proposed development is, therefore, consistent with and supportive of the provisions of the Development Plan.

3. Access

a) Public Access

3.1 There will be no public access to the application site and to the proposed development. The access provisions of the proposed development have focused, therefore, on the likely requirements of DCWW employees and other operational visitors to the site.

b) Vehicular Access

3.2 The existing vehicular access to the WTW site will be unaffected by the proposed development and will involve the continued use of the existing access to Five Fords WwTW, which is gained from Cefn Road, to the north, via an L-shaped private access track.

3.3 Within the application site, new sections of internal site access road are proposed in order to facilitate the movement of both pedestrians and vehicles between the different component parts of the proposed development.

c) Vehicle Parking

3.4 On-site vehicle parking is proposed in order to meet the operational requirements of DCWW employees and to avoid the need for parking on the public highway.

d) Public Footpaths.

3.5 The proposed development will not affect any public footpaths.

e) Disabled Access

3.6 The proposed development comprises operational plant and equipment with various walkways and changes of level. Under these circumstances it is considered to be inappropriate to seek to provide disabled access in this instance.

f) The Development Plan

3.7 The proposed development accords with the provisions of Transport Policy T6 of the Wrexham Unitary Development Plan since it will not prejudice the safe and free flow of traffic on the primary and core highway network.

3.9 The level and location of proposed vehicle parking on the application site accords with the requirements of Development Plan policy T8, since it satisfies the reasonable operational need of the proposed development and does so in a sympathetic manner.

g) Maintenance of Features which Ensure People's Access to the Development

3.11 Vehicular access to the proposed STP will be gained by means of the existing L-shaped private access track to Five Fords WwTW from Cefn Road, which will be retained.

- 3.12 The proposed development will not affect any public rights of way and, thus access rights which are presently enjoyed in the general area around the WTW site will be maintained.
- 3.13 There is no public transport access directly to the application site, although public transport services do serve Wrexham Industrial Estate and will not be affected by the proposed development.
- 3.14 The STP site is accessible on foot or by cycle and this will not be affected by the proposed development.