

Within the variation application for the Kidderminster STW, EPR/AP3437QJ/V002, there is a request to add additional air emission sources to the currently permitted CHP engine at the site.

For clarity, the site has 5 potential combustion emission sources (all values refer to thermal inputs):

- Emergency flare. As this is for emergency use only, it is not modelled;
- CHP engine, 1.3MW, currently permitted under MCPD;
- Boiler 1, 0.5MW, currently unpermitted;
- Boiler 2, 0.5MW, currently unpermitted; and
- Boiler 3, 0.5MW, currently unpermitted.

All three boilers at the site are dual fuelled on natural (mains) gas and biogas.

In total, this is a thermal input of 2.8MW, of which 1.3MW is currently permitted.

Operationally, the primary user of biogas at the facility, is the CHP engine. This combusts biogas to provide both electricity to the site and national grid, and heat, which provides supplementary heat to the anaerobic digesters located at the site, should they require it, due to the prevailing temperature.

In the event that the digester temperature cannot be maintained using the heat from the CHP engine, one or more of the boilers would then be used to provide additional heat. In addition, should the CHP engine be unavailable, for example during periods of maintenance, the boilers would be operated to control biogas levels.

The operational hours of the CHP engine are around 8,760 hours per annum. The boilers will be run at a more limited rate. Although the application states under 4,000 hours per annum for each boiler, in reality these units are typically run for around 1,000 hours per annum. The higher value in the application is to allow for cooler periods and any prolonged period of unavailability for the CHP. The boilers have been located on site for a number of years, with an installation date of pre 2010, and are scheduled to be permitted under MCPD by 2029, unless they are subject to replacement before that date.

In total, the normal operational hours for combustion units at the site will be in the range 11,760 – 20,760 hours per annum, with 8,760 hours (CHP engine) being currently permitted.

The closest habitats site to the sewage works, is the Wilden Marsh and Meadows SSSI, which is under 100m from the eastern site boundary. This SSSI comprises several units, not all of which are in physical continuity.

The background levels for NO_x and SO_x at the site are 11.7µg/m³ and 6.3µg/m³ respectively, and these values will include any contribution from the boilers as they are existing units. These values are under 50% of the UK air quality standard for NO_x of 40µg/m³.

The CHP engine was permitted during 2019 under MCPD, as part of which, ADMS modelling was undertaken on its emission. The modelling included the impact at three habitats sites, all SSSI, which are within the relevant distances from the site for consideration, including the Wilden Marsh and Meadows SSSI. The CHP engine is slightly closer to the SSSI than the location of the boilers.

The modelling concluded that that the CHP engine was unlikely to result in any unacceptable impacts on air quality at any sensitive human receptors or at the sensitive ecological receptors included in the assessment. The habitats assessment considered the annual and maximum daily means for the NO_x and SO_x deposition at habitats sites.

For the annual mean NO_x, the modelling showed that the for Wilden Marsh and Meadows SSSI, which is in close proximity to the site, the Process Contribution (PC) is above 1% (with a maximum predicted PC of 2.0%) but the

Predicted Environmental Concentrations (PECs) are less than 70% of the critical level and the emission is not likely to have a significant effect. The PECs ranged from 40-48%. For daily average NO_x, the highest PC was just below 10%, but the PECs ranged from 36-41%. For the annual mean SO_x, the PEC was under 1% and the highest PEC was 15.1%.

Therefore, there is headroom within the modelled results for additional deposition, prior to exceeding the PEC of 70% for any of the modelled species. The boilers will add to the PEC from the site, however, the additional thermal input, on a limited operational hours basis, would not lead to a PEC exceedance.