

“From Solar panels on the offices to how they process the sewerage on site, Osborne has brought new and interesting alternatives to more traditional ways of working on site.

Colin Smith
Connect Plus Services



Case Study

Gade Valley Viaduct – Cleaner Greener Delivery at M25

PROJECT	Gade Valley Viaduct
CUSTOMER	Connect Plus M25
LOCATION	Kings Langley, Hertfordshire
CONTRACT	COFA Framework
COMPLETION	2022





Challenge

The construction industry is one of the largest contributors to carbon emissions in the UK and we must all focus on reduction. One area which every delivery team can directly control, is the way they generate power and operate their sites.

Our team, on a long-term, two-phase project on the M25 to strengthen a 400m viaduct spanning Gade Valley near Junction 20, were determined to think differently and be more sustainable from the outset. Supported by Connect Plus M25, they have trialled and implemented green technologies.

Solution

The site facilities for the large three-year project were extensive and served over 60 people along with generating the power and light needed for the strengthening works on the 400m viaduct. A range of sustainable alternatives were researched, piloted, and implemented throughout the project.

Solar panels and Solatainer® - In Phase 1, early research led to the installation of a separate 16-panel solar array together with a Solatainer® to replace a diesel-powered

generator. The Solatainer® system used a steel container mounted with a PV array and storage. It ran up to 12 hours on one charge, and reduced carbon emissions by 190kg a day, saving 69 tonnes of CO2 per year.



Figure 1 - Solatainer®



Figure 2- Solar panels

Generator and Battery Bank - Moving into Phase 2, an analysis of the data led to the retention of the solar panels and the addition of an energy efficient 10kW generator linked to a 50kW battery bank to store excess power. This was beneficial as during low demand the stored power could run the lighting, security cameras, small hand tools and welding equipment. The banks also compensated for power surges which enabled use of a smaller generator. Careful planning by the site team reduced fuel demand from 5,000 litres/week in Phase 1 to just 1,000 litres/week in Phase 2. A huge 80% saving.



Figure 3 – Generator and Battery Bank

HVO diesel replacement – In addition, most plant has been run on Hydrogenated Vegetable Oil as a renewable diesel alternative, reducing carbon equivalent emissions by 97%!



Hydrogen Lighting – Lighting is a major requirement for the works. By introducing mobile Ecolite-TH200 Lighting Towers, which integrate low energy LED lights with hydrogen fuel cells, there have been benefits. The fuel cell mixes hydrogen with air to create electricity, water, and heat, which means the towers are virtually silent and emit no carbon or particulates.



Figure 4 - Ecolite-TH200 Lighting Tower

EV Charging – A plug in hybrid is 6 times more carbon efficient than a standard diesel equivalent car. We have promoted electric company vehicles and installed EV charging points on site.

Wastewater Treatment – A Conder®SAF (submerged aerated filter) tank was installed to biologically treat the sewage. It works by settling, filtering, and treating the effluent within the tank. The solids are retained as humus and the clean liquid is discharged. One SAF tank has been sufficient for the 60 people on site. This saved 18,000 litres of storage and eliminated 104 vehicle movements to de-sludge the tanks. Crucially, the tank can be sold and reused on completion.

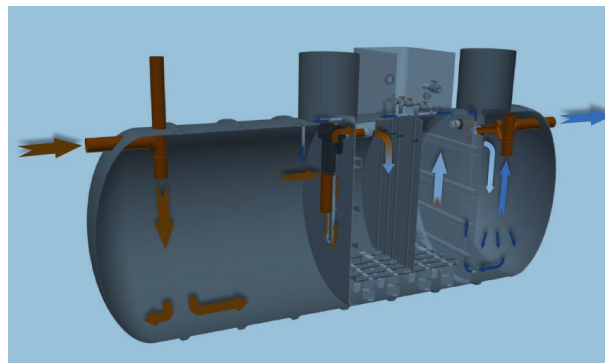


Figure 5 - Conder®SAF

Outcome

The site has implemented a range of new technologies which combined with greater awareness and careful planning, have reduced emissions and saved cost:

- Battery packs with low carbon generators have reduced fuel consumption by an enormous 80% which equates to 562 tonnes of CO2 annually.
- Solar panels and Solatainer® have saved 69 tonnes of CO2 per year.
- EV charge points have increased the number of electric and hybrid vehicles on site. Plug-in hybrids are 6 times more carbon efficient than standard diesel cars.
- HVO fuel replaced red diesel and as a result, carbon equivalent emissions have reduced by a massive 97%.
- The Conder®SAF wastewater treatment tank eliminated 108 lorry movements, with a knock-on reduction in carbon, air pollution and cost. Importantly it can be reused.

With the emphasis set on net-zero carbon, we have a responsibility to explore alternatives and as part of the Connect Plus M25 framework community, we actively share findings. Every good solution moves us a step closer to delivering projects more sustainably.