

CASE STUDY



Stoke Bardolph STW – Severn Trent Water

ODOUR CONTROL SYSTEM



What was the problem?

Stoke Bardolph Sewage Treatment Works is a conventional Activated Sludge Process plant serving a population of circa 620,000. The sites Sludge Treatment facility is a major regional sludge centre. Sludge is digested and dewatered on site with the biogas produced feeding 3 CHP engines plus the produced cake being exported off site.

Stoke Bardolph was then chosen as a strategic Advanced Thermal Treatment plant being part of the Severn Trent Water program alongside other chosen sewage treatment works. This new program initiative would then help to:-

- free-up digestion capacity which was previously at full load.
- recover more biogas.
- obtain a class 'A' cake product.

In addition to this the new program included for the installation of a biogas-to-grid system to export biogas and make Stoke Bardolph a sludge treatment hub by importing sludge/cake from satellite sites.

The result of this new program for the Stoke Bardolph site was the requirement for a new Odour Control Plant to treat odour from the new process plant.



How did OSIL approach the challenge?

OSIL were invited to tender for the new odour control package which included for the design, manufacture, delivery, installation, testing and commissioning of the new Odour Control Plant. The equipment comprised of :-

- 1 number LavaRok Biofilter sectional panel tank including the LavaRok media.
- 1 number Carbon Filter vessel of the radial bed design including activated carbon media.
- Duty and standby fans.

- Slab and Field ducting to all associated plant including ducting supports.
- 6M high exhaust stack.
- Instrumentation for the Odour Control system.

OSIL submitted a formal offer and were successful in receiving the award of the odour control sub-contract package.



Basis of the design

The following table summarises the flows and odour concentrations used for the sizing of the OCU.

Source of Odorous Air	Volume	Flow rate	Required ventilation rate	Required air flow rate	H ₂ S (ppm)	
	m ³	m ³ /h		m ³ /hr	ave	max
Sludge Buffer Tanks (Total vol of 2 No.)	2208	1300	Specified as 650m ³ /hr per tank	1300	50	200
3 No. G3-115 Centrifuges	-	480	Specified as 160m ³ /hr per centrifuge	480	50	200
1 No. Cake Reception Hopper	30	300	10 air changes per hour specified on 30m ³ volume	300	50	200
4 No. Conveyors	11.25	115	10 air changes per hour specified on 11.25m ³ volume	460	50	200
1 No. Centrate Tank	600	360	Specified as 360m ³ /hr	360	25	100
1 No. Centrate Pump Station	37.5	200	10 air changes per hour specified	200	10	50
2No. THP Feed Silos	500	300	Specified as 150m ³ /hr per silo	300	50	200
TOTAL AIR FLOW RATE				3400		

Performance Requirements

The design of this system was based on an odour level of 1,000 ouE/m³ at the stack with 95% reduction in odour and 99% reduction in H₂S.



Delivering the Solution

J N Bentley were the framework contractor managing the whole works including civils, electrical and mechanical plant incorporating the odour control system.

Initially, J N Bentley did experience delays from their contractors and there were also major issues arising from the COVID pandemic all of which resulted in our site start date being delayed.

There were also various challenges with the installation of the odour plant.

This forced delay to OSIL's site start date shifted the installation activities into a period of high demand resulting into our site team numbers being impacted through-out the install period. However, we were able to successfully manage this issue and complete the install within an agreed timescale.

It was also found that some of the duct support interface points of plant supplied by other contractors were not suitable therefore, OSIL and J N Bentley agreed and implemented an alternative solution to resolve this issue. In addition to this J N Bentley requested that a section of the Field ductwork needed to be re-routed towards the latter stages of the install so we altered our site layout drawing accordingly and then supplied/installed the associated new ductwork to the approval of J N Bentley.

In summary, all challenges through the install phase of the odour control package were successfully managed with J N Bentley and were to the required quality standards and all within the timeframe of the overall project.

Before Images:

Site aerial view – prior to any install of the odour control package



Site under construction



During Images:

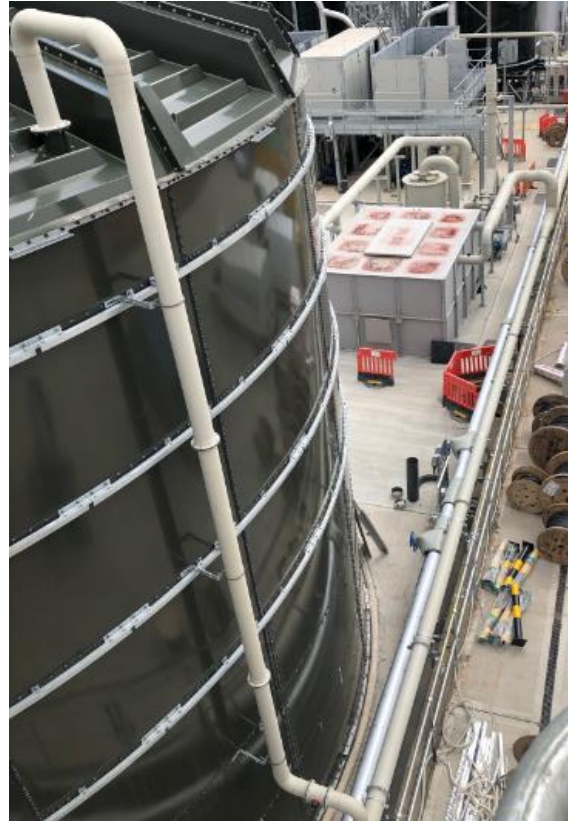
Site aerial view – install of the odour control package in progress



Install of the high-level tank connection (left) and install of odour control plant on slab (right)



Biofilter irrigation (left) and high-level tank connection to odour control plant on slab (right)



How did the Client win?

With the new system in place Severn Trent Water have increased the capability of Stoke Bardolph STW and with the new OSIL odour control system all the produced odourous gases from the site plant are treated to prevent any odours escaping to the local area.

The newly installed odour control system is fully compliant to DW154 requiring minimal maintenance with the Biofilter® LavaRok® media having a guaranteed life of 25 years and the Carbon Filter media having a life of 5 years.

Each project has its challenges and these have been overcome to ensure a successful and satisfactory completion of the Stoke Bardolph STW scheme. This was achieved by the experienced and dedicated OSIL team and the close working relationship with J N Bentley working on behalf of Severn Trent Water.

The odour control system carried out by OSIL at Stoke Bardolph STW represents the second of this type in quick succession with J N Bentley as the principal contractor. It is also another example of OSIL successfully completing the install of an odour control system at a Severn Trent facility. This shows the continual growth in OSIL reputation within the Water Industry which we are all very proud of and excited at the prospects of similar opportunities in the future.





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