



Beckton STW - Costain

Storm Tunnel Delivery Shaft Ventilation System



What was the problem?

eight₂O were contracted to provide Thames Tideway Tunnel (TTT) and Thames Water Utilities Ltd (TWUL) works that sit outside the main TTT contract at three standalone sites across London - Shad Thames PS; Beckton STW; and Bokesbourne Street.

The works at Beckton STW consisted of the construction of a Storm Tunnel with Delivery Shaft and Discharge Shaft along with associated mechanical and electrical works.

The works associated with this Works Information are the Ventilation System Works, required at Beckton STW Storm Tunnel Delivery Shaft.

eight₂O invited OSIL to tender for the design, supply, installation, testing and commissioning of the shaft ventilation system as part of the Storm Tunnel Delivery Shaft at Beckton STW.



How did OSIL approach the challenge?

We used the information within the tender documentation to produce an initial ventilation system design and submitted a bid to Costain who were part of the eight₂O group.

OSIL were successful with this offer and were awarded the sub-contract to design, supply, install, test and commission the shaft ventilation system.

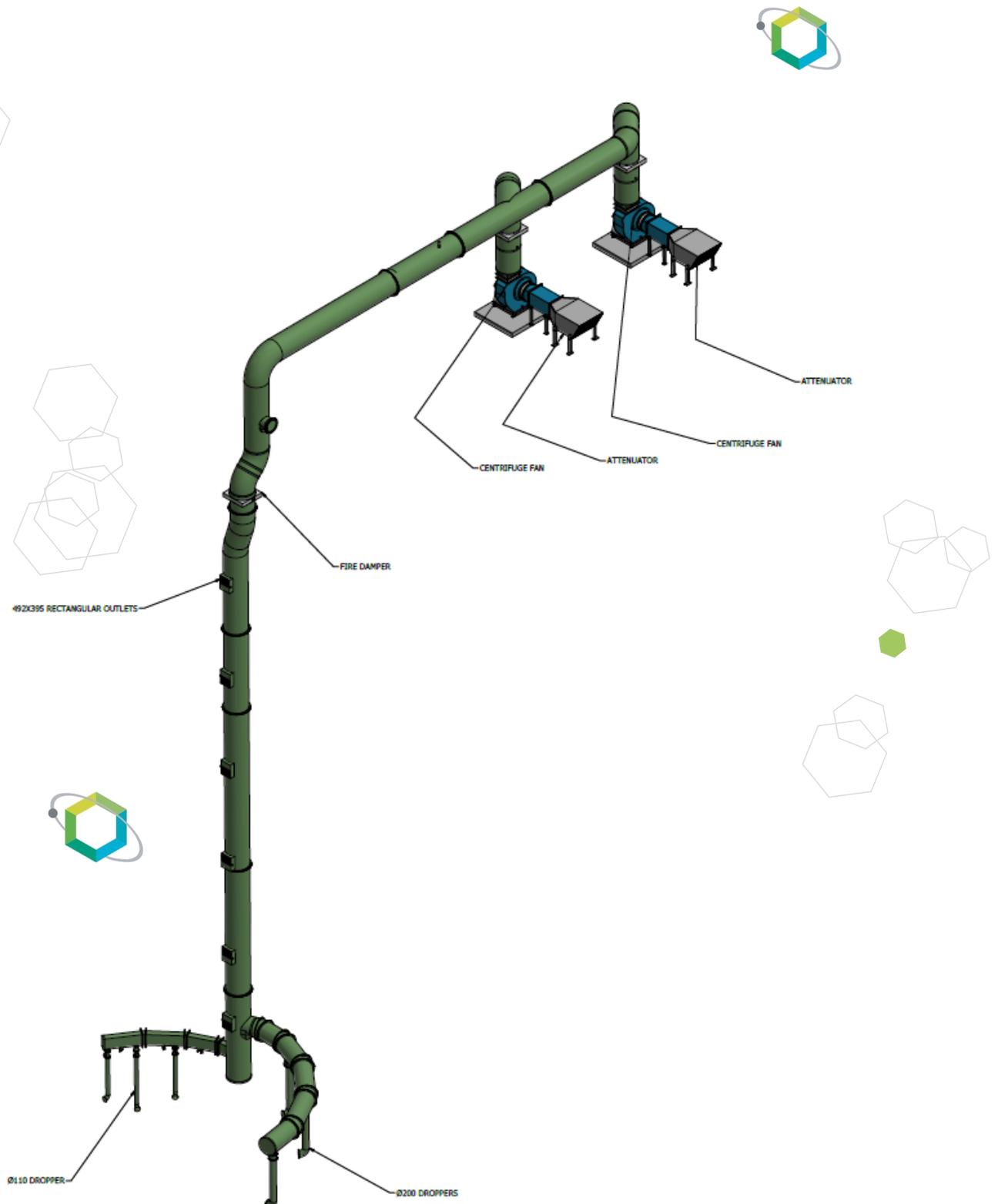
The full design of the ventilation system was completed including the fan and ducting sizing based on a fan flow output of 9500M³/hr. Our design also had to achieve a minimum shaft air change rate of 3 changes per hour with a fan flow rate output of 7125M³/hr.



Basis of the design

Airflow through the ventilation system was designed for the largest air flow of 9500m³/hr and commissioned at an air flow of 7125m³/hr.

The ventilation points are shown on the diagram below:





Performance Requirements

The following performance requirements of the ventilation in the table below summarises the flows and duct sizes.

High flow of 9500m³/hr

DUCT DIA (m)	Velocity (m/sec)	Airflow per leg (m ³ /hr)	Qty	Totals (m ³ /hr)
110	2.0358	69.65	3	278.59
200	2.0358	230.24	3	690.73
497 (*)	2.0358	1421.81	6	8530.83
750	5.973		1	9500.13



(*) 497 is the equivalent diameter for a 492 x 395mm rectangular grille

Standard flow of 7125m³/hr

DUCT DIA (m)	Velocity (m/sec)	Airflow per leg (m ³ /hr)	Qty	Totals (m ³ /hr)
110	1.627	55,67	3	167.01
160	1.52689	110.52	3	331.56
497 (*)	1.58133	1104.405	6	6,626.43
750	4.4799		1	7,125

(*) 497 is the equivalent diameter for a 492 x 395mm rectangular grille



Delivering the Solution

Our ventilation system design including a design calculation report, CFD air flow model and layout drawings were submitted to the client and approved allowing us to proceed with the manufacture and supply of all the associated ventilation equipment.

Once our plant and equipment were ready we co-ordinated closely with the eight₂O team and the other sub-contractors to install the ventilation system in 2 phases.

The first phase comprised the installation of a fully designed and approved scaffolding tower within the shaft as part of our work scope to allow us suitable access to install the shaft ducting.

The scaffolding tower was then removed to allow the customer to install the shaft concrete cover slab.

Once this slab was installed we returned to site to complete our second phase to install the surface ducting, fans and penthouse louvre.

Then once all the other sub-contracting works were completed including the electrical connections to our plant we returned to site to successfully test and commission the ventilation system to meet the specified requirements.



Delivering the Solution (Cont'd)

There were various challenges to this project including a large amount of effort to produce a full design package to meet the requirements of the works and to obtain approval of this design from the eight₂O team.

Another challenge was the installation of our ducting within a large open shaft that was over 22 metres deep below ground level. This was further complicated as we had to align our site plans with other sub-contract works activities.

To overcome this challenge on site we procured the scaffolding tower using a local Thames Water approved contractor. A full design layout and calculations of the scaffolding tower were then submitted to the client for approval before the tower could be installed. The tower was then installed in accordance with approved lift plans and RAMS, inspected and passed off before use. The shaft ducting was then successfully and safely installed.

We also successfully designed and introduced a large filter box with replaceable filters on the inlet of each fan. This ensures good quality clean dust free air is expelled within the shaft for the operators.



How did the Client win?

Costain as part of the eight₂O team for Thames Water Utilities now have a ventilation system capable of operating as intended achieving the required 3 shaft air changes per hour with the facility to increase this flow rate as the fans have been designed with extra capacity in accordance with specification requirements.

Site operatives can enter the shaft safely as fresh air is being circulated by our ventilation system on a pre-determined control operating procedure.

In addition to this OSIL supplied all the required designed and quality documentation to support this installed ventilation package.



OSIL's Comments

This project has been challenging throughout from the initial design through to completion.

There has been a lot of emphasis from the client to provide all the necessary design and technical data to ensure the final installation meets all necessary specification and operating requirements. The emphasis was then turned to ensuring all supplied and installed equipment met all the relevant quality standards in line with the site installation programme.

Our site team then worked well with the client maintaining good progress and working to local on-site controls and procedures.

The ventilation system has now been successfully commissioned meeting the designed flow output to the satisfaction of our customer.

This new ventilation system for Costain and Thames Water Utilities should further enhance our reputation for the supply of ventilation systems adding strength to our current portfolio.

I felt that through-out this project the whole OSIL team maintained a good, professional and friendly working relationship with Costain and the eight₂O team which we were more than happy to be a part of.

This can only help to build on business relationships and increase our opportunity for similar future works.

Before Image:



Site Under Construction



After Images:

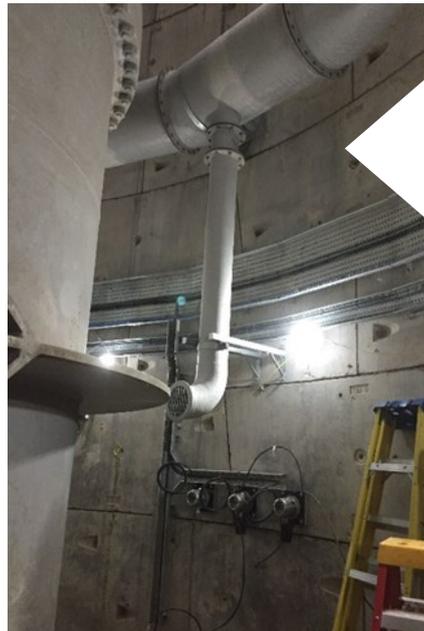
External ducting including fans, filters & flow sensor



External fire damper on top of concrete shaft cover slab with ducting through slab



Internal shaft ducting on under-side of concrete shaft cover slab and top ventilation grille



Internal shaft ducting droppers with volume control dampers at the shaft bottom



Downloadable content

[OSIL Brochure](#)

[Service & Maintenance Brochure](#)

For more information:



01543 506855



sales@osiltd.com



Odour Services International Ltd, Unit 14, Morston Court, Kingswood Lakeside, Cannock, Staffordshire. WS11 8JB
Registered in England No. 07213978.

