

Further information regarding discharge of condition 4 (P2016/0878)

Summary of proposal

It is proposed that the barn conversion utilises an existing foul drainage system, which will be upgraded as per building regulations, Natural Resource Wales and the General Binding Rules.

An exemption application for this system has been submitted to NRW (10/3/20).

Please refer to information and plans already submitted regarding the discharge of this condition. Specifically Maps 1-5. Map 4 shows the scaled proposal of the site.

Please see the information below regarding, the type of system, size of system plus technical specifications.

Type

- Vortex Sewage Treatment Plant (supplied by WTE Ltd).

Size

- Based on 9 bedrooms, the manufacture/supplier recommends the Vortex 12.

Specifications

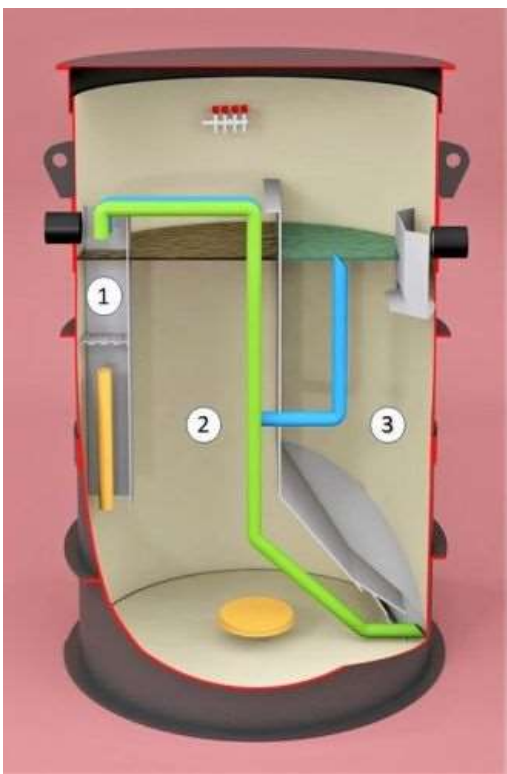
- The VORTEX® Eco Electric sewage treatment plant is the only adjustable sewage treatment system in the UK. It can be set to work with varying populations simply by turning it either up or down on a hand-turn valve. It is approved by the Environment Agency and is on the British Water Certified List.



- Extremely clean effluent - up to 98.9% pollutant reduction.
 - Fully adjustable to suit the number of people using it.
 - The lowest electricity consumption of any electric plant
 - Odourless - complete aerobic digestion throughout the sewage treatment plant.
 - One piece tank construction - not sectional - no leaking seals.
 - Very small size enables economic installation in tight spaces.
 - The VORTEX has a unique debris screen - The Vibro-Screen™ keeps tampons, wipes, etc. out of the plant but lets organic solids through.
 - The VORTEX recycles its own waste products resulting in less sludge to remove.
 - No Primary Settlement Tank - No Primary Tank Odour.
 - Simple maintenance - one piece construction ensures no structural weakness..
 - Top Quality linear motor compressor - these compressors are much more expensive than cheaper compressors used by other manufacturers, but they are almost silent, use very little electricity and can be repaired.
 - 10 year tank warranty- no metalwork to corrode inside or outside the tank.
 - Versatile inlet depths - Vortex sewage treatment plants can be supplied for different inlet invert levels.
 - Can be manufactured with the inlet and outlet on the same side at no extra cost for difficult sites.
 - EN 12566-3 2005 Test Report available on request.
 - Unbeatable ammonia reduction - incredibly down to 0.4mg/L. Very important for sensitive watercourses.
 - Accepted by the Environment Agency for discharge to watercourses and ditches, without the need for a permit, if the installation complies with the [General and Binding Environment Agency Rules](#).
 - The Vortex sewage treatment plant range is 4, 6, 9, 12, 16, 21 and 30 person sizes.
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How the VORTEX® Wastewater Treatment Plant Works

- Most sewage treatment plants struggle to work when they are under-loaded. A good rule of thumb is that if a plant is working below 50% of its design capacity, there is not enough 'food' from the toilet solids to either grow, or maintain, a working bacterial population. The Vortex has solved this problem by having a simple hand-turned valve that can turn the amount of air required either up, or down, depending on the number of people using it. .
- The Vortex™ has advanced activated sludge features not found in any other sewage treatment plant in the UK.
- The ONLY electrical component is a small, external linear motor compressor which operates all the process stages. There are no pumps, motors or any moving parts within the plant.



The Vortex Treatment Process (Schematic diagram only - airlines are not shown)

Wastewater from the building enters to Vibro-Screen (1). Here coarse air bubbles, coming from the yellow pipe below, are used to physically break down solid matter and form a mixed liquor with the water.

The mixed liquor flows into the Aeration Chamber (2). A bacterial culture is present in the Aeration Chamber which digests the pollutants in the wastewater. The bacterial culture must have a constant oxygen supply and this is provided by a fine bubble diffuser at the base of the tank.

UNIQUE FEATURE - The last red air valve on the control module allows the air to be regulated, more or less, to the diffuser. This enables the plant to be adjusted to work at maximum efficiency if it is underloaded. This is a very valuable feature, e.g. for a 5 bedroom house (which needs a minimum 7 person plant) with only 2 people resident. This feature is not available on any other plant.

The mixed liquor then flows into the Clarification Chamber (3) where it is able to separate into clear, treated effluent and sludge. The clear effluent is able to flow through the scum baffle and out of the tank



The Sludge Management System (SMS)

In the Clarification Chamber sludge accumulates at the bottom (settled sludge) and top (floating sludge) of the tank.

Settled Sludge is 'Live' sludge that contains Live Bacteria that were washed into the clarification chamber with the effluent from the Digestion Chamber.

Floating Sludge is 'Dead' sludge that is composed of dead bacteria, which rise to the top, like dead fish do - plus floating solids and fats.

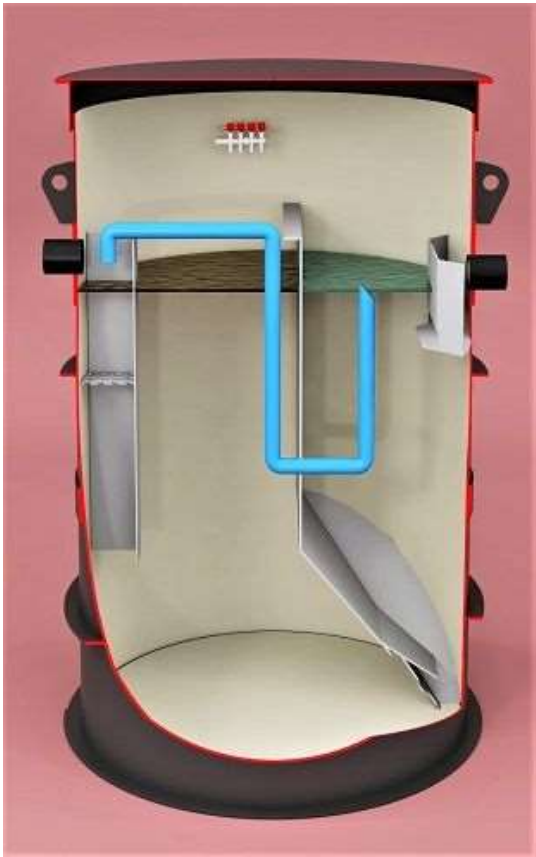
Air from the blower spurs from the regulator to two sludge return pipes, The diagram on the left shows the **Settled Sludge Return Pipe**.

This creates a vacuum that sucks the sludge from the bottom of the Clarification Chamber and transfers it back to the Vibro-Screen.

This has several advantages for the treatment system.

It provides additional '**Food**' for the bacteria in the digestion chamber and allows the plant to re-digest a lot of its waste products, enabling a longer period between emptyings.

It '**Seeds**' the incoming sewage with the correct type of bacteria needed to digest the sewage.



Unique Automatic Floating Sludge Return (FSR), included with all models

In all Activated Sludge Process (ASP) sewage treatment plants, dead, floating sludge accumulates at the top of the Clarification Chamber. This sludge must be periodically returned to the Aeration Chamber, or it will become so deep that it will be taken into the bottom of the outlet baffle and contaminate the final effluent

If this happens, it will block the drainfield; which is VERY expensive to replace, or pollute the watercourse that the sewage treatment plant discharges into.

With ALL other ASP plants, this has to be done by hand by the owner and it is not a pleasant task!

All Vortex plants come with the **Automatic FSR fitted as standard.**

The Automatic FSR enables the Vortex to automatically recycle the floating sludge in the Clarification Chamber back to the Vibro-Screen without the need for the owner to do anything.

No other ASP sewage treatment plant has this ability to manage its own sludge.

The FSR kit can also be fitted retrospectively to existing, older Vortex plants very easily.

Principles of the treatment process

Incoming sewage is screened to prevent accidental non-degradable products entering the digestion chamber. The Vibro-Screen™ allows organic sewage solids to enter the tank without problems.

The screened sewage is aerated and a microbial 'soup' develops that digests the pollutants and organic matter in the sewage. These beneficial microbes are constantly topped up with the microbes that settle out at the bottom of the final settlement tank, ensuring a constant supply of bacteria for the digestion process. There is no need to add extra bacteria at all, as is the case with some other plants.

The treated sewage then enters the final settlement chamber where activated sludge bacteria settle out at the bottom. These beneficial microbes are constantly returned to the digestion chamber, via the Vibro-Screen, to boost the treatment system performance.

The bacterial scum or crust that forms on the top of the effluent in the clarification chamber is returned through a pipe to the Vibro-Screen via the FSR pipe. This is an innovation unique to the Vortex™. Other activated sludge plants need this crust removing, by hand, at regular intervals.

Technical specifications

Model	Tank O/D(mm)	Total Height (mm)	In Ground Depth (mm)	Base to Inlet (mm)	Base to Outlet (mm)	Inlet Invert (mm)	Outlet Invert (mm)	Weigh t (Kg)	Air Blower	Power (W)
Vortex_12_0.20	1,850	1,718	1,650	1,450	1,400	200	250	231	JDK 120	95