



The Harbour Area Treatment Scheme transfers sewage from preliminary systems in the city to a secondary system on Stonecutters Island.

SEWAGE ISSUE NOT OF SECONDARY IMPORTANCE

Modern sewage-treatment systems consist of both primary and secondary systems.

A primary system can be regarded as a giant septic tank.

The process starts with a screening system, which removes large floating objects. The sewage then passes through a grit chamber, removing sand or gravel and other smaller solids.

A sedimentation tank is then used to cause the suspended solids to sink to the bottom for removal.

With the slower flow, not only does that enable sediments to sink, but it also gives bacteria time to decompose sewage, allowing the treated sewage to be discharged without causing too much of a nuisance downstream.

We used this primary system for years and managed to arrest most of the unwelcome contents of human waste before they were discharged into the harbor.

In the 1980s, the Strategic Sewage Drainage System started using long pipes to discharge wastewater further down the Pearl River estuary but only served to channel the problem downstream and was viewed as unacceptable.

The drainage services department then developed the Harbour Area Treatment Scheme, collecting all sewage into a primary and a secondary treatment system, to cater for the much larger volume with the ever-increasing population, meeting the more stringent standards expected of a modern city.

The secondary system adds a biological process of bacterial digestion to the physical screening and sedimentation performed by the primary system.

The layout of this system significantly slows down the flow, forcing the sewage to trickle through an assembly of plates of synthetic materials acting as baffles, to allow time for more effective bacterial attack to decompose the contents of the sewage.

However, this system requires a lot of space and time to work effectively, and for



a congested city like Hong Kong, this may not be the most efficient solution.

A more effective way is to pump air into the sewage tank to accelerate the bacteria digestion process.

This is called the activated sludge process, which aerates the sewage sludge to catalyze the process of breaking down organic matters into harmless by-products.

The actual operating system is invariably much more complex, utilizing a recycling system of the sludge for more effective digestion and facilitating a smaller footprint for the secondary plant.

Further refinement of the system may include injection of chlorine for disinfection.

However, the residual chlorine, when passed to a harbor or river estuary, may affect its ecology, affecting marine life.

Other forms of disinfection, such as ultraviolet light systems, are more acceptable.

The use of a primary and secondary system may be effective for treating sewage comprising mostly human waste but it cannot deal with industrial waste.

Harmful pollutants – such as heavy metals, chemical compounds and toxic substances that may be in industrial effluents – must be removed in in-factory facilities before they can be allowed to be discharged into the city's sewage system.

Fortunately, there are not many industrial operations in Hong Kong and those remaining are stringently controlled by the environmental protection department.

Public hygiene is vital for any modern city, and we are fortunate that our sewage treatment system is of a high standard to protect the health of residents of this city and our neighboring regions.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over Hong Kong's iconic infrastructure