Meopham U3A – How Things Work Group

Visit to Thames Water Sewage Treatment Works at Long Reach Dartford 18th January 2022

20 Members of the Group visited the Works. After passing through the security entrance, we drove to the Education Centre where we were met Greg Baker, Education Co-ordinator for Thames Water. After an introductory talk we were kitted out with hard hat, hi-vis jacket and gloves and taken on a tour of the works with an excellent commentary by Greg. On returning to the Education Centre, we had a talk on the sewerage system generally, touching on the new Thames Tideway Tunnel, a sewer running under the Thames the diameter of 4 London buses running from Acton to Beckton where there is a new super-size sewage treatment plant. This was followed by a video "What is Water" which was very enlightening. It seems that water was not originally found on Earth, it came here on asteroids and is considered as alien. It does not follow the general rules of chemistry, in its solid form it is less dense than as a fluid, its molecular make up is very difficult to breakdown and hot water freezes quicker than colder water! Water that we drink today has previously been drunk by many others including animals and even dinosaurs.

The sewage treatment process comprises:

1 Taking the wastewater away - Whenever you flush the toilet or empty the sink, the wastewater goes down the drain and into a pipe, which takes it to a larger sewer pipe under the road. The sewer then joins the network of other sewers and takes the wastewater to a sewage treatment works. At the sewage works, the wastewater is passed through several cleaning and filtering processes so that it can be returned safely into rivers. In London, a team of sewer flushers regularly inspect the large Victorian sewers to help keep our capital's waste moving.

2. Screening the wastewater - First, large objects are removed that may block or damage equipment or pollute our rivers. This includes items that should never have been put down the drain in the first place, such as nappies, wet wipes, sanitary items and cotton buds, and sometimes even things like bricks, bottles and rags.

3. Carrying out primary treatment - Wastewater still contains organic solid matter – known as waste. The waste is separated from the water by putting it into large settlement tanks, where solids sink to the bottom. The settled solids are called 'sludge'. Large arms or scrapers help to push the sludge towards the centre, where it's then pumped away for further treatment. The cleaner water passes over a wall near the top of the tank ready for the next stage of the treatment process. Sludge is used to generate renewable energy, which powers the sites. In 2019 over 23% of Thames Water's electricity needs were self-generated. .

4. Secondary treatment - Although the visible bits of sludge are removed, it is necessary to take out some of the smaller and sometimes invisible organisms as well. At larger sewage treatment works, the wastewater is put into rectangular tanks called 'aeration lanes', which pump air into the water. This encourages the useful bacteria to break down and eat the harmful bacteria. The more the useful bacteria eat, the more they grow and multiply, until all the nasty bugs have gone. There are over 350 sewage treatment works, 4,600 million litres of sewage from 15 million customers, are treated every single day. .

5. Carrying out final treatment - The treated wastewater is passed through a final settlement tank, where the useful bacteria sink to the bottom. This forms more sludge, which is recycled back to the secondary treatment stage. The clean water then passes over a wall near the top of the tank. At this point, it may be necessary to carry out one additional treatment – filtering the water slowly through a bed of sand, which catches any remaining particles. .

6. Generating power - Sludge collected at the start of the process is treated so that it can put to good use. Most of it is recycled to agricultural land for farmers to use as fertiliser but it is also used to generate energy. This is done in several different ways: -

a). Combined heat and power: The sludge undergoes a process called 'anaerobic digestion'. This heats the sludge up to high temperatures, encouraging the bacteria inside to break down the waste. This creates biogas that can then be burn to create heat, which in turn creates electricity.

b). Thermal destruction: The sludge is dried into blocks called 'cake', which are then burned to generate heat. The heat is captured and turned into electricity.

7. Returning water to the river and solids to land - Once the wastewater is clean, it can be returned safely to local rivers and streams. Putting clean water back into the river is very important, as it helps to keep water flowing and wildlife thriving. The Environment Agency strictly regulates the quality of the cleaned wastewater, and it is tested it to make sure that it meets their high-quality standards. The 'sludge cake' which remains after the energy production is put to good use. It is recycled to agricultural land for farmers to use as fertiliser.


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