



# Gisborne Wastewater Treatment Plant

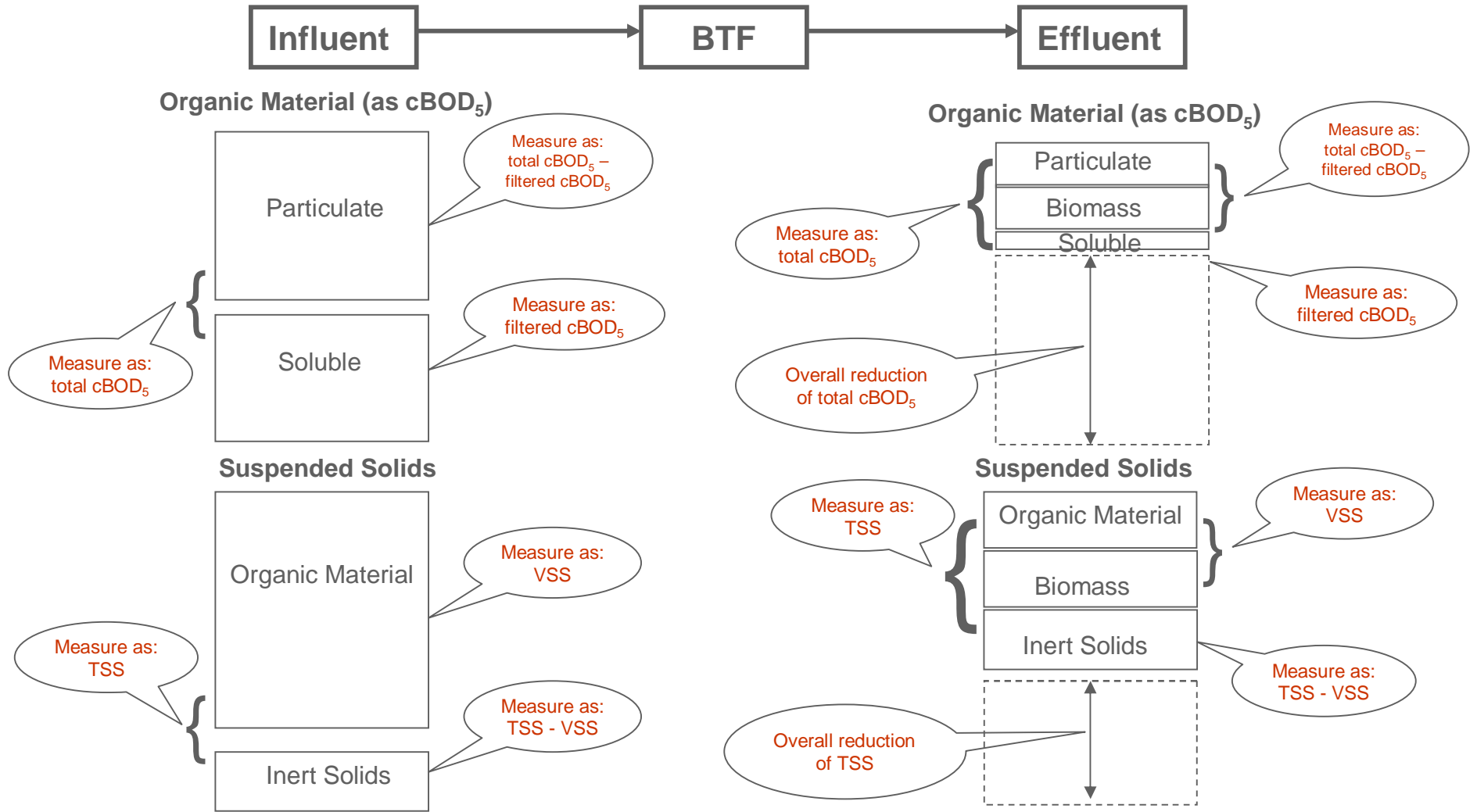
Initial Thoughts on Monitoring Programme to Assess the Degree of Biological Transformation Achieved

# How Can We Define & Measure Biological “Transformation” of Human Waste?

---

- § Would it be acceptable to demonstrate a reduction of organic material (measured as BOD or COD) AND that there is biological activity taking place?
- § We understand human waste to consist of a wide range of materials including faecal matter, blood, hair, etc.
  - Due to wide range of material, there is no single parameter that can be used to “measure” human waste.
  - As such discussion would be required to develop any alternative route to assess the degree of transformation achieved in the BTF.
  - Setting up a monitoring programme with input from all key stakeholders has been included as a condition of the proposed variation to the consent.
  - Provisional additional monitoring for cBOD<sub>5</sub>, filtered cBOD<sub>5</sub>, total suspended solids (TSS) and volatile suspended solids (VSS), as outlined overleaf, has been included in the application for variation to consent and is seen as a starting point for future discussion.

# BOD and Suspended Solids Basis



# Possible Measures of Biological Activity

---

At this stage the list below represents an initial brainstorming of possible ways to demonstrate that biological processes are occurring. It may not be practical, cost effective or even possible to measure these parameters or any results may not be meaningful in practice. The parameters would show that there has been biological activity taking place but would not in themselves quantify “transformation”.

- § Microscopic Analysis – Visual indication that solids in effluent are “biological” in nature
- § Oxygen Uptake Rate (OUR) – if biomass leaving BTF is viable, OUR should be higher for effluent than influent. May not be measurable difference between influent and effluent if biomass in effluent is “dead”
- § Soluble Microbial Products (SMP) – soluble protein and carbohydrate substances in liquid film around biomass – has been used to indicate shocks to biomass but may not detect between influent and effluent
- § Particle size / fractal dimensions – quantify differences in nature of solids that could be seen visually by microscopic analysis
- § DNA? – Can any differences between influent and effluent be identified?
- § CO<sub>2</sub> under cover – record concentration difference between the air inlet to the BTF and the foul air take off to the biofilter. CO<sub>2</sub> is produced by biomass as a product of breakdown of organic material