

## **What is Effluent?**

Effluent is the term used in the wastewater treatment industry to describe wastewater discharged to surface waters (oceans, lakes, rivers, or streams). In the case of the City's effluent, it is extensively treated and disinfected prior to discharge.

## **How long has the City discharged effluent to the river?**

The City has had a permit to discharge treated effluent to the Kettle River in its current location since June 13<sup>th</sup>, 1969. At the time sanitary waste was treated by a combination of aerated and facultative lagoons mainly focused on the removal of organic and settleable solids. Later, as regulations became more stringent, a chlorine contact chamber was added to disinfect the effluent prior to discharge to the river.

## **How does the City treat wastewater now?**

Technology and regulations have changed a lot since the City first started treating wastewater. Now we use a multi step process:

1. When wastewater arrives at the treatment plant (referred to as influent) it first enters a grit chamber and screen to remove plastics, sand and other non-organic materials that would hinder the downstream treatment.
2. The water enters the extended aeration bioreactor where organic material is broken down by microorganisms and settles into a sludge for further processing in the aerobic digester. In 2020 a new dewatering and solids handling facility was brought on line to more efficiently process sludge waste from the treatment process.
3. From the bioreactor the wastewater enters the clarifier where the wastewater is given time for any sludge or other settleable solids to be separated from the wastewater.
4. Next the wastewater enters the original facultative lagoon that now serves as a finishing pond. Here the wastewater continues to react with microorganisms and solids continue to settle.
5. Finally, the wastewater is disinfected by ultraviolet (UV) light. The chlorine contact chamber was replaced with UV disinfection after the contact chamber structure was compromised during the 2018 flood.
6. After disinfection the wastewater, at this point called effluent, is discharged to the Kettle River

Key features of the City's wastewater treatment facility are shown in Figure 1.



*Figure 1: Key Features of the City's Wastewater Treatment Facility*

**With the addition of the extended aeration bio reactor are the lagoons still necessary?**

Although the aerated bioreactor is capable of and, in almost all cases, treats the wastewater to a level that is safe for discharge as effluent, the availability of the lagoons adds an invaluable level of operational redundancy and flexibility. This flexibility allows the City's operators to react to upstream and downstream conditions more effectively. For example, if contamination that cannot be treated is discovered in the influent flow it can quickly be diverted to the lagoons for storage and disposal or further treatment. Operators can also lower lagoon levels in anticipation of either an increase in influent flow, like during freshet, or if we need to decrease effluent flow for equipment or pipe repairs. The City used these capabilities in the fall of 2024 when we completely stopped flow to the river for three weeks during the replacement of the effluent outfall pipe under the new dike. Withholding wastewater from the river for three weeks would be impossible without the storage volumes of the lagoons.

**Is the effluent safe? How does the City ensure safety?**

The City takes the quality and safety of the wastewater effluent very seriously. Some of the steps taken to ensure safety and regulatory compliance include:

1. The temperature, pH, and flowrate are continually monitored.
2. The turbidity (clarity), dissolved oxygen, and specific conductance are monitored by City staff on a weekly basis.
3. The levels of suspended solids, ammonia, nitrate, organic nitrogen, phosphorus, phosphate, chloride, surfactants, fecal coliforms, and E.coli are tested by a third party 6 times per year.

4. As a final check, once per year a third party confirms that treated effluent poses no risk of mortality to fish and wildlife.

### **What is the concrete structure in Kettle River behind Rockwool?**

During the flood in 2018 the end of the effluent pipe in the river sustained damage. That section of riverbed pipe was installed in the 1980s, and the pipe upstream of it under the riverbank was even older. Although it continued to function adequately, the construction of the new dike in 2024 presented an opportunity to replace this ageing piece of critical infrastructure. The new pipe is heavy-duty, thick-walled polyethylene and is surrounded by concrete from the river bank out to the discharge point. The concrete discharge structure itself is what can now be seen protruding from the water during low flow. It is designed to protect the end of the pipe from damage where it sticks out of the riverbed.