# URINE AND WASTEWATER TREATMENT SYSTEM

## CROSS-REFERENCE TO RELATED APPLICATION

**[0001]** This application claims the benefit of and priority to U.S. Provisional Application No. 63/222,738, titled "URINE AND WASTEWATER TREATMENT SYSTEM," filed on July 16, 2021, the entire contents of which are hereby incorporated herein by reference.

## BACKGROUND

**[0002]** An estimated 4.5 billion people worldwide do not have access to safe, affordable sanitation systems. High levels of child death and disease have been linked to oral fecal contamination where pathogen laden fecal matter enters the food or water supply. Non-sewered sanitation systems are needed where traditional sanitary sewer systems are unavailable or impractical.

## SUMMARY

**[0003]** According to a first aspect of the present invention, there is provided a liquid waste treatment system, the system comprising:

an ultra-filtration stage comprising:

an ultra-filtration filter configured to separate the liquid waste into a first permeate and a first concentrate, and

a diffuser positioned at an inlet to the ultra-filtration filter, the diffuser connected to an air blower and configured to introduce air into the liquid waste to reduce the density of the liquid waste and to generate a crossflow within the ultra-filtration filter; and

a reverse osmosis stage configured to receive the first permeate from the ultra-filtration stage and separate the first permeate into a second permeate and a second concentrate, the second permeate being a non-potable water for use or re-use.

[0003a] According to a second aspect of the present invention, there is provided a method for treatment of liquid waste, the method comprising:

blowing air into a liquid waste to reduce the density of the liquid waste and to generate crossflow;

filtering the liquid waste in an ultra-filtration stage to separate a first permeate and a first concentrate;

discharging the first concentrate;

filtering the first permeate in a reverse osmosis stage to separate a second permeate and a second concentrate; and

discharging the second permeate as a useable water.

**[0004]** Other systems, methods, features, and advantages of the present disclosure will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the present disclosure, and be protected by the accompanying claims. In addition, all optional and preferred features and modifications of the described embodiments are usable in all aspects of the disclosure taught herein. Furthermore, the individual features of the dependent claims, as well as all optional and