Information Sheet - Kemerton to Ocean Brine Pipeline

July 2020
Updated October 2020

Brine to Ocean Outfall

The brine pipeline transports brine from a water treatment plant in Kemerton operated by Harvey Water to ocean outfall 2.5 kilometres north of Buffalo Road, Leschenault.

• HW regularly monitors water in its distribution network and dam sources, and reports this information to Department of Water and Environmental Regulation (DWER) annually. The quality and quantity of brine water discharged will be subject to the same level of compliance reporting, as will the acceptance of brine inputs to the pipeline, which will be screened prior to acceptance. Parameters of particular interest include:
o total dissolved solids
o pH
o major cations and anions
o turbidity
o total suspended solids
o heavy metals
o flow rates and volumes of discharge expelled to the system.

The brine is composed of water & salts both naturally occurring from the Harvey Dam feed water and from the return water collected for recycling from the cooling towers situated in Kemerton. The cooling tower water contains biocides (to control bacterial growth in the cooling towers) and corrosion inhibitors and antiscalents (to protect the steel tower construction).
These chemicals are broken down upstream of the RO membranes for two reasons:

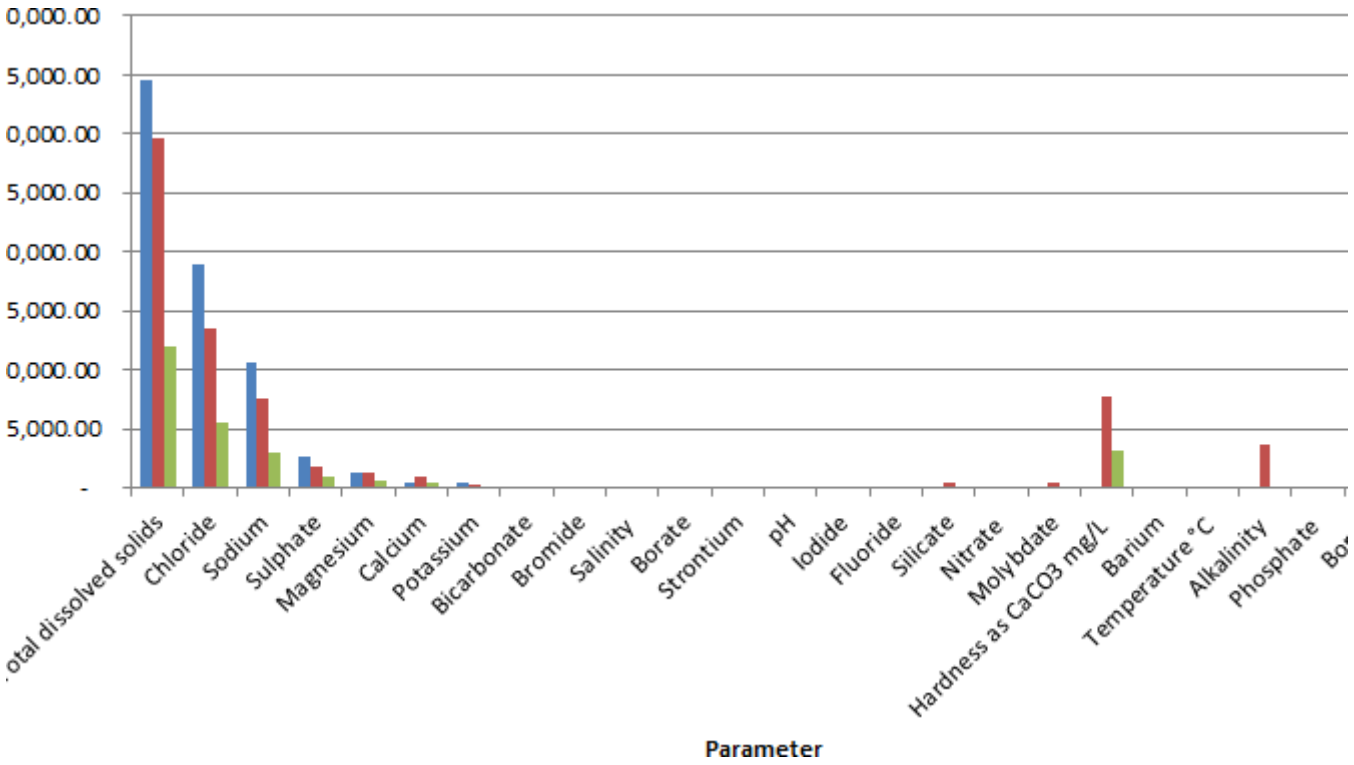
1. to ensure that chlorine and similar products are not discharged in the brine stream
2. to protect the sensitive filtration membranes from being damaged.

The resulting brine contains components of these chemicals but not in a form that is harmful to the environ- ment or classed as marine toxicants.

Modelling shows that the total dissolved solids (sum of all salts) in the brine stream is much low- er than originally forecast and the RO membrane efficiency calculations have been updated to more relaxed “squeezing” of filtered water which equates to lower concentrations of salts in the brine opposed to higher recovery rates which would produce greater TDS in brine. This requires a slightly higher dilution factor than previously predicted but means that less mass of particles is being discharged to the environment.

• Physical and chemical modelling has been undertaken for the brine proposed to be discharged to the ocean, with the aim of determining suitable dilution targets for the discharge, which is the key to managing potential marine impacts. The parameter which is likely to be found in the highest level is Total Dissolved Solids (TDS) and this is the parameter of greatest influence on salinity (see graph below). TDS sets the dilution approach.

• Modelling conducted has factored in a conservative dilution target of one part brine to 12 parts seawater, which when combined with our flow rates, more than achieves the required dilution. The predicted composition of brine to be discharged contains less than the background levels of respective salts naturally occurring in the ocean, with the exception of some parameters (Calcium and Magnesium) that are naturally present in freshwater.



• Flow monitoring stations are placed at locations along the route, these have communication equipment above ground level, and have been constructed in areas away from public recreational use.

• The pipeline has an air release chamber in the dunes before the shore. Its location has been chosen to mi- nimise any visual and recreational impacts at the beach. Its purpose is to ensure no air locking occurs in the pipeline.

• A pump station has been installed to keep the pipe under pressure, located adjacent to the treatment plant in Kemerton.

• Access and air valves have been designed along the pipe line at low and high points respectively. These allow access to important points of the pipeline for maintenance and upkeep. These fittings will remain below ground level, with no impact on visual amenity.

• For the dune and marine sections, the pipe was installed using the Horizontal Direct Drilling method. The pipe extends under the dunes, the beach and continue below the seabed out to a distance approximately 400meters from the shoreline where the water is approximately 8meter deep. The pipe terminates with a diffuser that rises on a 30 degree angle to be approximately 0.5meters above the seabed (see diagram below).

• The diffuser on the end of the pipe reduces from the 200millimetres down to 50millimetres so that the brine is released under pressure, helping to discharge over a greater distance, which increases the rate at which it mixes with seawater. Water Quality Objectives have been defined around diluting salinity (ANZECC & ARMCANZ 2000 guidelines), and adopting a conservative target for salinity.

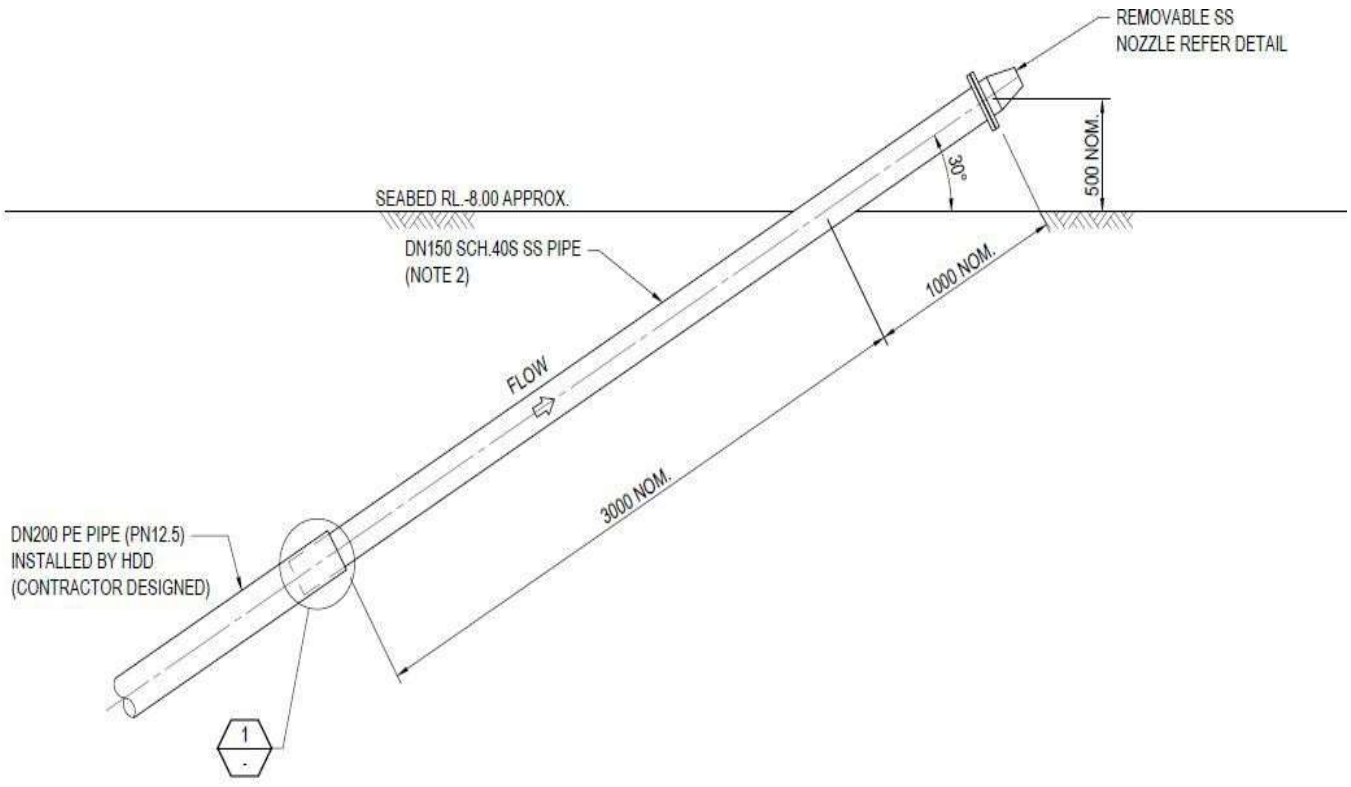



Diagram: Outfall diffuser design.