



## PROJECTS

### HYDROLOGY

#### Nutrient loading to surface water & groundwater from a Waste Water Treatment Plant at a mining campsite: Major Iron Ore Miner, Pilbara, Western Australia

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A waste water treatment plant receives effluent from a large mining camp. Treated effluent is discharged by spray irrigation into a designated vegetated field, which is then lost via evapotranspiration, surface water run-off or via infiltration recharge to underlying groundwater.

The hydrogeology of the site was established through four monitoring bores. Local hydraulic parameters were established at each bore through small-scale pumping tests. The local hydraulic gradient and flow direction was established and the groundwater underflow was estimated; groundwater discharges into an adjacent tidal marine creek system.

The capacity of the aquifer system to attenuate nutrients from the effluent was estimated from the natural background groundwater concentration, the anticipated nutrient loading, and the Phosphorous Retention Index of the bore risings, to estimate the resultant nutrient load to the marine environment. It was estimated, at the camp occupancy rate, that the aquifer would be able to absorb approximately 72-years of phosphorous and 310-years of nitrate production for the WWTP. Bacteria were considered highly likely to have died-off due to the time-of-travel to the discharge point.



Discharges to the surrounding surface water courses were also quantified.

Recommendations were made to establish the influence of tidal fluctuations on groundwater and surface water flows, and for on-going monitoring to validate the model predictions and to demonstrate compliance with the camp operating license conditions.



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