HydroSolutions Pty Ltd

Hydrogeological & Environmental Consultants

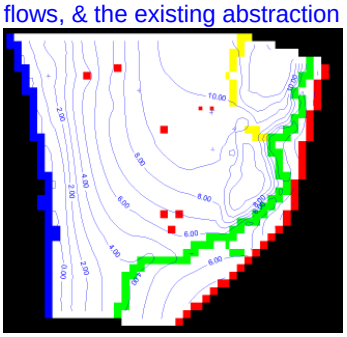
PROJECTS

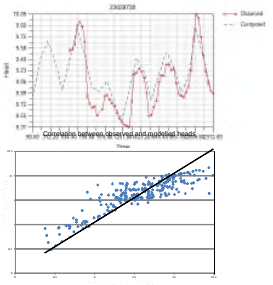
HYDROGEOLOGY

Chemical Manufacturing Plant, WA
Pumped Recovery of A Saline Groundwater Plume

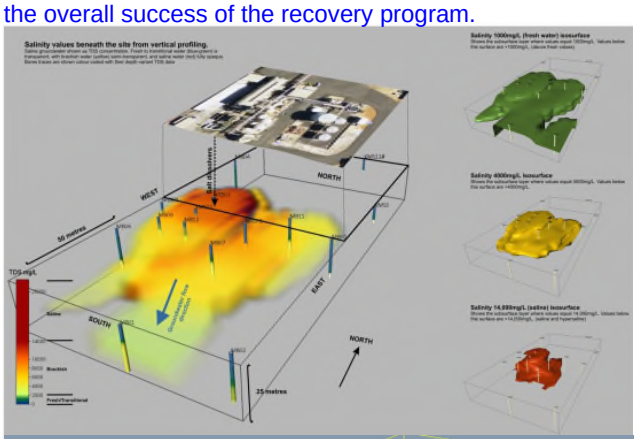
SiteRem8

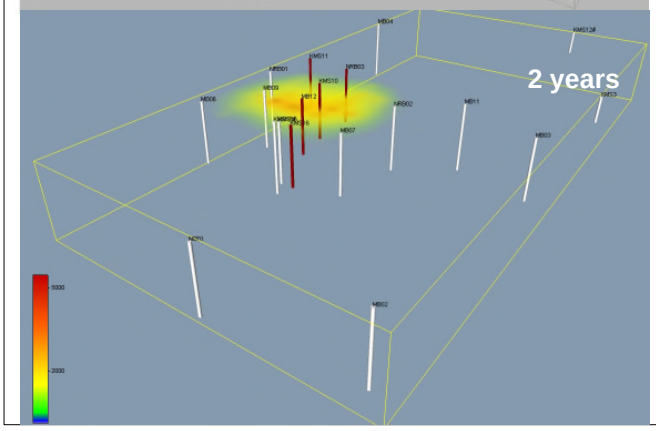
Several leakage episodes of hot process brine that have occurred a 20-year operating period has resulted in an extensive plume of saline groundwater within a shallow superficial aquifer beneath & extending downgradient to the southwest of the plant. Ongoing management through pumped recovery has been only intermittently successful, & recent salinity increases have led to questions over the efficiency of the recovery bore network. A detailed groundwater investigation determined that the saline plume is highly stratified & affected by density-driven downward flows, & the existing abstraction bore network is not efficiently recovering substantial parts of the plume.





Contaminant recovery predictions were undertaken by varying configurations, timing & pumping rates for recovery bores, including their effective depth within the stratified plume, to optimise recovery duration, volume/ rate & cost efficiency, with a detailed uncertainty analysis. Multiple recovery options were provided, depending on any future abstraction licencing constraints. Full recovery of the existing plume is predicted within 6-years, although this period may extend under the influence of new groundwater abstractions on an adjacent site. HydroSolutions continues to undertake monthly monitoring of passive snap-samplers as required by the license, & also quarterly vertical profiling to delineate the 3 and 4-dimensional extent of the plume & the overall success of the recovery program.





Numerical modelling was planned in multiple stages, from a sub-regional hydraulic model to a local scale hydraulic model, and finally to a local contaminant transport model. The sub-regional model was constructed to include significant regional features affecting the groundwater system, such as major rivers and wetlands in proximity to the site. The sub-regional model was calibrated to within an RMS error of 4.9% over the period of 2008-2014.

The transient contaminant model was run using the density/flow-coupled SEAWAT model, and included interpolated optimised parameter fields using the PEST automated parameter estimation software. Calibration was achieved against the most recent three-dimensional groundwater salinity data to within an RMS error of 3.2%.

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