



# Halcrow

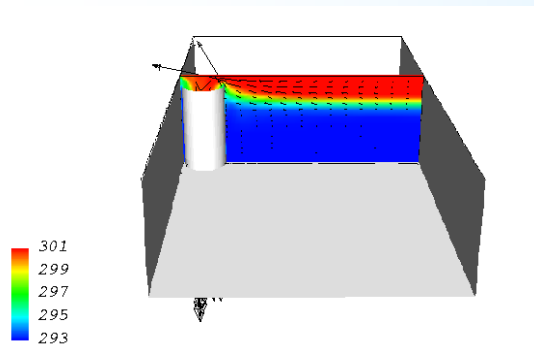
## Capability in Computational Fluid Dynamics (CFD) for the Urban Water Sector

### 1 Introduction

Computational Fluid Dynamics (CFD) is a powerful numerical modelling technique, which is increasingly used to simulate the flowfield within process plant and water systems.

Typical modelling projects include flow-splits, clarifiers, contact tanks, mixing tanks, gas dispersal, solids separation, anoxic zones, biological reactors and digesters. CFD can provide significant benefits to clients by:

- Providing quantitative analysis of plant performance
- Full flowfield visualisation for informed development of designs
- Performance optimisation
- Rapid assessment of changes in geometry
- Reducing or eliminating the requirements for physical model tests
- Integrating with other methods and experience to provide the fullest set of information on which to base design decisions



Temperatures and flow vectors within a process tank – in this case stratification leads to reduced mixing and regions of stagnant flow

### 2 Halcrow's capabilities

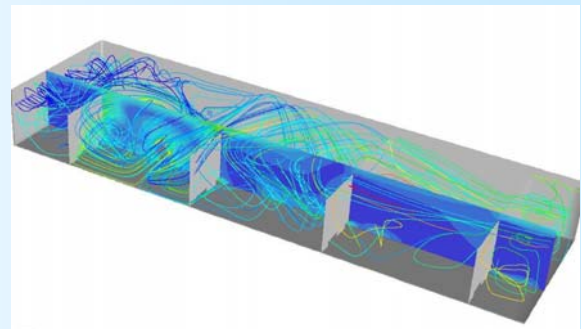
Halcrow has the experience and tools necessary to carry out detailed CFD simulations of process plant. CFX is one of the world's most widely used general-purpose CFD codes, and includes a wide range of models for flow physics, including chemical reaction and combustion; heat transfer;

turbulence; and multi-phase physics. Using the powerful ICEM mesh generator, complex geometries can be created or imported from CAD data.

Halcrow's staff have extensive experience in CFD modelling of a wide variety of process plant, as well as many other fluid flow problems, including free-surface flows; multiphase flows; chemical reactions, thermal physics and fluid-structure interaction.

### 3 Example application

A recent application of CFD was the modelling of the aeration tank within a new waste-water treatment works in Sharjah, UAE. Simple modifications to the geometry of the tank were used to optimise the mixing and retention times within the tank. In the final design, the minimum retention time was increased by a factor of four over that calculated for the initial design.



Flow pathlines in the WTW Aeration tank

### 4 Contact

For further information, please contact:

Dr Peter Woodburn  
Halcrow Group Ltd  
Vineyard House  
44 Brook Green  
London W6 7BY  
UK

Tel: +44 (0)20 8970 1306 (direct)  
+44 (0)20 7602 7282 (switchboard)  
WoodburnP@halcrow.com