

## CASE STUDY *Melbourne Hydrographic Maintenance Services*

This project involves the operation and maintenance of 400 meteorological and hydrological stations on behalf of Melbourne Water.

Melbourne Water provides water supply, drainage and sewerage services for over 3.5 million people (for more information, visit [www.melbournewater.com.au](http://www.melbournewater.com.au)).

Melbourne Water requires real time data to facilitate the effective operation of this network to accurately monitor and manage these systems. The majority of the monitoring sites are connected to the Melbourne Water “Supervisory Control And Data Acquisition” (SCADA) system.

SCADA is software which gathers data in real time (or next to real time) from remote locations in order to control equipment and conditions.

The monitoring network can be dissected into various monitoring sites. These include:

### Rain Gauges

The rain gauge network consists of 145 tipping bucket rain gauges and 11 bulk rain gauges. Several rain gauges are at high in the catchment areas and are therefore above the snowline during some months of the year. These sites require specialist equipment to enable the accurate collection of rainfall data. The rain gauges are used to monitor the rainfall falling within the water supply catchment areas and play a key role in the overall flood warning system.

These rain gauges transmit rainfall data via radio signals, which are tracked via antennas to receiving base stations located at Melbourne Water’s Brooklyn and Preston offices. The base-station receives the amount of rainfall and the time at which it occurred at each site. The rainfall collects in a ‘check bottle’ installed in the rain gauge, and readings are taken at regular intervals to compare with the telemetry rainfall data as a quality control measure.

### Water Level Monitoring Sites

The water level monitoring network consists of 140 sites, of which over 100 are connected to the SCADA system providing real time data to assist with flood warning and mitigation.

Each of the water level monitoring sites has a level to flow rating table\* derived from regular flow gaugings using an Acoustic Doppler Current Profilers (ADCP) as well as traditional current meter gauging methods. During times of heavy rainfall, flood gaugings are performed around the clock to extend the rating tables to the higher ranges.

\*A rating table or curve is a relationship between stage and discharge at a cross section of a river/run-off channel. In most cases, data from stream monitoring sites are collected as stage data. In order to model the streams and rivers, the data needs to be expressed as stream flow using rating tables. Conversely, the output from a hydrologic model is a flow, which can then be expressed as stage data for dissemination to the public.

### Project Summary

#### Application Type

Network of 400 Meteorological and Hydrological Monitoring Stations.

#### Location

Greater Metropolitan Melbourne including water supply catchment areas, VIC, Australia.

#### Contracting Agency

Melbourne Water

#### Measured Parameters

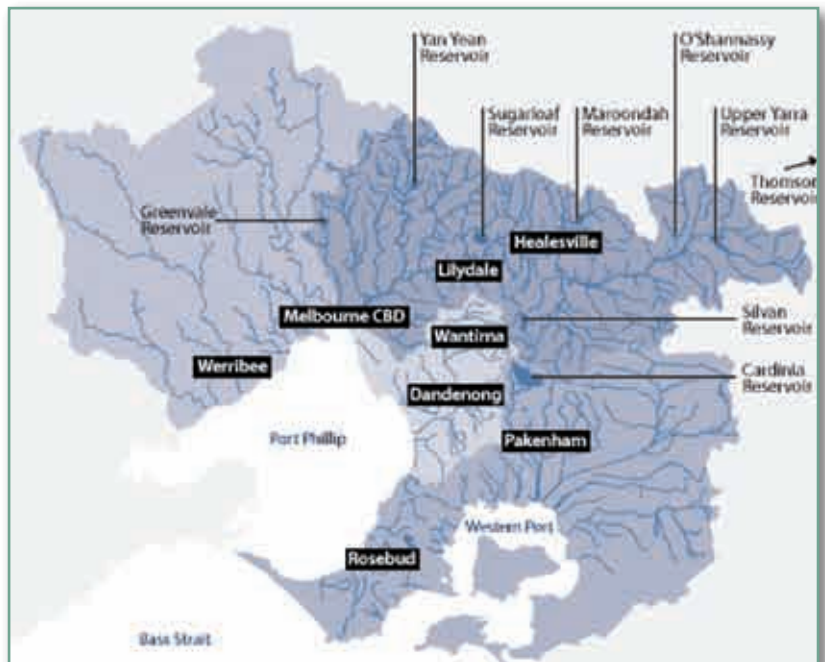
Meteorological: Wind Speed, Wind Direction, Air Temperature, Relative Humidity, Barometric Pressure, Solar Radiation, Evaporation and Rainfall

Hydrological: Water Level, Sewer Level Flow and Velocity.

Water Quality: Water Temperature, Electrical Conductivity, pH, Dissolved Oxygen and Turbidity

#### Communications

Radio Telemetry & GSM Mobile phone



A map of Melbourne's key catchment areas

## Sewer Level Monitoring Sites

Sewer level and flow monitoring is an integral part of the contract. To assist in the operation of the network, Ecowise Melbourne Hydrographic Services maintain 100 sewer level monitoring sites. All sites are connected to the Melbourne Water SCADA system.

All sites that are connected to SCADA have preset thresholds, which if exceeded, due to parameters reaching critical limits or instrument failure, send alarms to key personnel. Depending on the priority of the monitoring site and its data, response time can be as short as six hours and will require staff attending site to diagnose faults, report on the situation and take steps to rectify them. Critical sites or conditions can include sites where sewer spills or rivers reaching flood levels are a potential challenge.

## Equipment & Skills

A variety of equipment is used to monitor the required parameters including submersible sensors, shaft encoders, Mindata data loggers, ERRTS canisters, Rimco tipping bucket raingauges, Rosemount pressure transducers and Sigma Acoustic Doppler Current Profilers.

All data is further logged into the Hydstra Software package which allows our company to verify and archive the time series data before reporting to Melbourne Water on a weekly basis.

Upgrading of equipment and training of staff is undertaken on an ongoing basis to ensure the most reliable and accurate data is returned to Melbourne Water. Frequent meetings with the key contract personnel and data users ensure open lines of communications.



*A typical water level monitoring site.*