# Wastewater Treatment Plant Influent Flow Monitoring

**Muscat, Oman**

TELEDYNE ISCO
Everywhereyoulook™

**Environmental Case Study**
**Expertise in Flow**

## Overview

The Signature® Flow Meter was configured with a TIENet™ 360 LaserFlow™ sensor which provided a unique solution for the challenging flow conditions of the inlet channel of the Al-Ansab Wastewater Treatment Plant. When used together, these products provided a continuous flow rate measurement for the wide range of velocity and level changes.

## Muscat, Al-Ansab WWTP

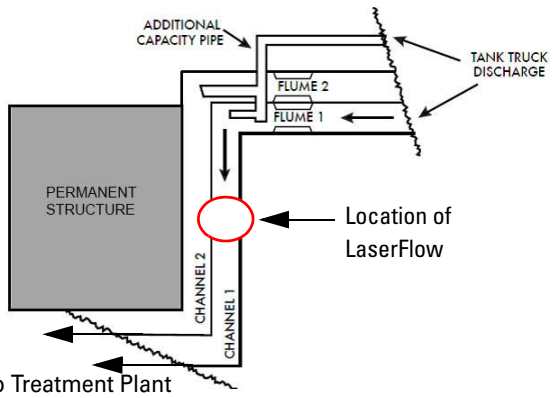
The Al-Ansab Waste Water Treatment Plant has a capacity of 53,000 $m^3$/day and is part of one of the largest engineering projects in the field of reusable treated wastewater for irrigation. It is located in the capital of Oman – Muscat, with a population of around 800,000 inhabitants. The Oman Wastewater Services Company, Haya Water, has been awarded the contract to develop, design, implement, operate, and maintain the wastewater facilities in Muscat Governorate.

Signature installation with signal and power termination

### The WWTP Inlet Section

The wastewater is transported via tank trucks to the WWTP and pumped into Channel 1. Inlet channel flow is measured using flumes. During increased tank truck traffic, the flumes are frequently submerged making the flow unmeasurable. Additional capacity pipes have been routed around the flumes directly into Channel 1 to help alleviate this issue.

Submerged flume and additional capacity discharge into Channel 1




Overhead view of the measurement area

## Achieving an Accurate Measurement

### Challenges in Flow Measurement

There were several factors that made obtaining an accurate flow measurement challenging. These challenges included: submerged flume conditions with additional capacity lines bypassing the flume, sludge buildup at the bottom of the channel, surface turbulences at low and high levels, and varying flows. All of these contribute to real site challenges in terms of long term and accurate flow measurement.

The following technologies/methodologies were considered, but found unsuitable because they did not provide the ultimate solution the user was looking for:

| Technology/Methodology | Potential Issues |
|---|---|
| Flume with Level measurement | During increased truck traffic the flume gets submerged and provides incorrect readings. |
| Contact Area Velocity sensor | Debris covering the sensor and hinder flow measurement. |
| Non-Contact Surface Area Velocity measurement | Surface turbulence results in incorrect velocity measurement. |

### Finding a Solution with LaserFlow

The LaserFlow sensor was installed in Channel 1 downstream from the flume to measure combined flow from truck discharge and additional capacity pipes. Using an ultrasonic level sensor to measure the level, the subsurface point from which to measure velocity is determined. The sensor focuses its laser beam at this point and measures the frequency shift of the returned light (Doppler shifting). Doppler shifting of the returned

light is proportionate to velocity and serves as an excellent velocity measurement method.

Additionally, the LaserFlow sensor can take velocity measurements at up to fifteen subsurface measurement points. Being able to measure at multiple points minimizes the effects of turbulence and eliminates the need for manual profiling. By producing a level measurement and an exceptionally accurate mean velocity reading, LaserFlow renders some of the most accurate area velocity results in the industry.

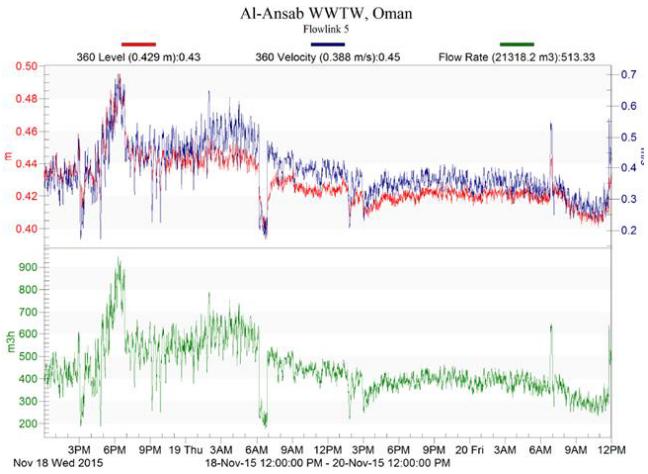
LaserFlow sensor installed in the middle of Channel 1

The ability to handle surface turbulences and sludge buildup was critical in the decision to use the LaserFlow sensor. Moreover, the advanced non-contact technology and certified performance played a significant role in the decision process.

Thanks to a good understanding of flow conditions and customer requirements, Chemistry For Life Co L.L.C succeeded in delivering the best possible solution for accuracy as well as installation and maintenance costs.

## Measurement Results and Feedback

The Signature with 360 TIENet LaserFlow sensor continues to show consistent and good measurement results despite challenging conditions at low velocities and high instantaneous fluctuations in both velocity and level. The customer, Al-Ansab WWTP, was satisfied in the performance of the Signature with the LaserFlow sensor and its capability to work accurately in varying flow conditions.




Measurement results displayed using Flowlink® software

For more information on the Teledyne Isco TIENet™ 360 LaserFlow™ sensor please visit our website: www.isco.com.

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