

Flowmeter Troubleshooting



Dean McDonald, Waterworks Manager
Township of North Glengarry

An Ontario municipality deploys Portable flowmeters to solve flow rate discrepancies between sewage pump station effluent and lagoon influent flowmeters

Faced with suspension of construction permits due to flow rate uncertainty, the Township of North Glengarry called on Greyline Instruments to help troubleshoot two permanently installed flow meters.

The Problem...

The forcemain meter at the pump station read five times higher than the open channel flowmeter at the lagoon 2 km away. The Township needed to determine which of the two flow meters was reading incorrectly.

Troubleshooting Forcemain Flow...

First step was to evaluate performance of the 12" magmeter at the sewage pump station. The cost to remove the magmeter for calibration was prohibitive so Greyline supplied a clamp-on [PDFM 5.0 Portable Doppler Flow Meter](#) to verify readings and testing began. This battery-powered unit displays, totalizes and data logs flow in any size pipe with a single-head ultrasonic transducer.



Greyline PDFM 5.0 Portable Doppler Flow Meter
With Ultrasonic Sensor on 12" Sewage Forcemain

The forcemain is fed by four pumps. In normal operation only two pumps run at the same time. The two pumps located closest to the wall of the wet well create severe turbulence at the ultrasonic sensor mounting location and flowmeter readings were erratic. But results were conclusive when the two more distant pumps were operated. The Greyline PDFM 5.0 Portable Doppler Flow Meter corresponded exactly with 30-32 gpm rate displayed by the magmeter.



Greyline Stingray Level-Velocity Logger
Temporarily Installed at Sewage Lagoon



Stingray Ultrasonic Sensor Installed in
North Glengarry 16" Sewage Lagoon Inlet

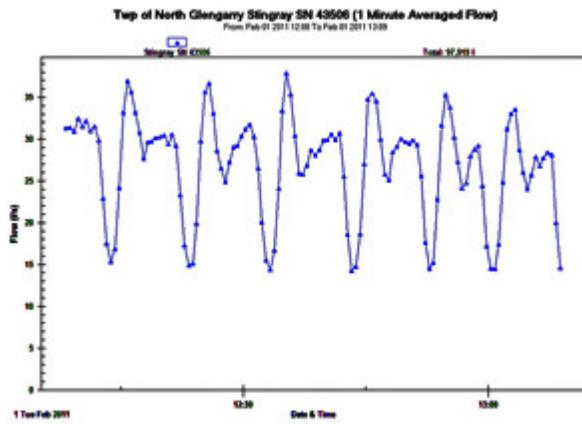
Troubleshooting Open Channel Flow...

The investigation shifted to a second site 2 km from the pump station where the forcemain discharged to an open channel and then to a sewage lagoon. The existing open channel flowmeter had been installed for several months measuring flow to the lagoon through a 24" Rectangular Weir. The open channel flowmeter was reading much lower than the magmeter back at the pump station.

To compare readings from the pump station magmeter and the open channel flowmeter the Township of North Glengarry needed a data logging flow monitor for temporary installation. Dean McDonald the Waterworks Manager and Jose Castro, Greyline engineer installed a portable Greyline [Stingray Level-Velocity Logger](#) in the 16" pipe between the Rectangular Weir and discharge to the sewage lagoon. The Stingray uses a submerged ultrasonic sensor mounted at the invert of the partially filled pipe to measure water level, velocity and temperature for flow calculation. They installed a stainless steel bracket in the invert of the pipe to secure the sealed ultrasonic sensor in position. The Greyline Stingray was operated for one month and logged data was downloaded to a computer and opened in the Greyline Logger software program. Flow cycles from the pump station were clearly illustrated in the log file and totals from the Stingray and magmeter corresponded within 1 gpm.

Conclusion...

The results were clear. The Greyline clamp-on PDFM 5.0 Portable Doppler Flow Meter and Stingray Level-Velocity Logger both corresponded exactly with the magmeter. By process of elimination the Township was able to conclude and document that the permanent open channel flow meter at the lagoon site was malfunctioning. It has since been repaired and put back in service. The Township continues to use their Greyline Stingray for



troubleshooting and spot checks in other open channel flow applications.

Screenshot of Greyline Logger file showing Lagoon Influent Pumped from Township of North Glengarry