Quarry dewatering compliance with a Greyline AVFM flowmeter.

In 2002 Louis W. Bray Construction Ltd. received approval from the Ontario Ministry of Environment to operate the Bray Quarry in Eastern Ontario. Their permit stipulated effluent limits plus monitoring, sampling, and flow measurement of wastewater discharged from the site to the South Raisin river. The Ontario Water Resources Act requires flow monitoring for any quarry dewatering greater than 50,000 liters (13,209 gallons) per day. So the regulation affects most quarries operating in the province.

Filtration after dewatering, the Bray Quarry uses a system of three settling ponds. Water is pumped from the quarry into the first settling pond and then flows by gravity through each pond in succession via connecting culverts. Final discharge flows through a 914.4 mm (36 in) diameter culvert and finally into the South Raisin river. Consulting engineers Genivar proposed a Greyline AVFM Area-Velocity Flow Meter from Pulsar Measurement as a suitable technology to monitor and data log flow in the partially filled culvert.

The AVFM was installed at the bottom of the culvert about 1 m from the open discharge, with the water levels rising to about 300 mm (11.8 in) with a velocity of 300 mm/sec (11.8 in/sec) during pumping periods. Once submerged, the ultrasonic sensor measures water level, velocity, and temperature with the accompanying controller able to read, totalize, and data log flow rates of up to 70 l/sec (18.5 gal/sec).

The instrument electronics are installed in an insulated shed 25 m (82 ft) from the sensor location. The cable from the sensor to the electronics is watertight and run underground in PVC conduit. The Greyline AVFM includes a thermostatically controlled enclosure heater, flow rate display, totalizer, programmable control relays, three 4-20mA outputs, and a data logger.

Using the included logger software, Bray Quarry personnel Kevin Jans (Quality Control) and Stuart Thomson (Quarry Manager) can generate one-click flow reports including daily total, minimum, average, and maximum flow with times of occurrence.