

A person wearing a high-visibility safety vest with yellow, orange, and white stripes is crouching on a concrete ledge next to a stream. They are holding a long, thin measuring tool vertically in the water. The background shows lush green vegetation and a calm stream. A large, bright yellow circular graphic element is overlaid on the left side of the image.

Surface Water Monitoring

Assessing and improving the health
of natural and built environments

Delivering a better world

Surface water monitoring is a key part of assessing and improving the health of natural and built environments.

Monitoring and assessing the quantity and quality of surface water is key to facilitating adaptive environmental management programs, demonstrating regulatory compliance, and improving the health of natural and built environments.

Specifically, monitoring programs are indispensable to the:

- Collection of data to support short- and long-term infrastructure planning, including assessing current performance and identifying vulnerabilities
- Evaluation and improved performance of stormwater management infrastructure, both conventional (grey) and low-impact drainage (green) infrastructure systems
- Confirmation of compliance with stormwater and endangered species discharge regulations
- Assessment of watershed health through instream and contributing catchment runoff monitoring for a range of water quantity and quality parameters
- Analysis of water quality
- Tracking of real-time rainfall and flow
- Assessment of instream erosion
- Determination of peak flows, riverine scour, water balance and flooding/flood control
- Provision of data to inform responsible sediment reuse / disposal in accordance with applicable regulations.

AECOM offers the full range of surface water field monitoring and assessment services, and our experienced field teams have designed and implemented countless monitoring programs that address our client's needs while being backed by our industry leading quality assurance protocols. AECOM's robust size and considerable resources allow us to offer our client's coordinated delivery of responsive field services: we have multiple teams capable of collecting time-sensitive flow and discrete grab samples at multiple locations within any of the regions in which we operate and we have crews available 24/7 to respond to alarmed exceedances, which can be triggered through our telemetrically-enabled remote field stations.

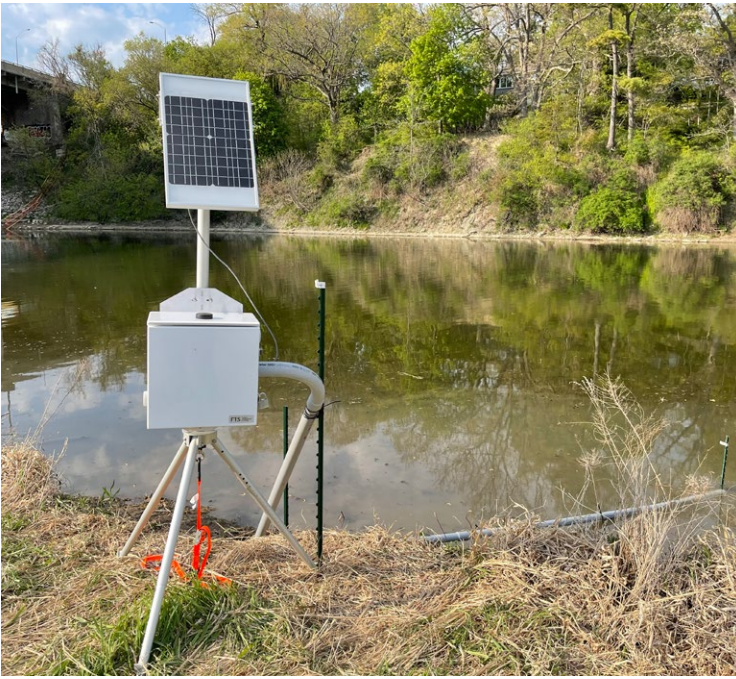
We provide:

- Continuous water level and flow monitoring
- Continuous conductivity and turbidity monitoring, complete with alarm systems to facilitate rapid response investigations
- Precipitation monitoring (three and four season), including extreme event and IDF assessment and updates
- In-pipe and open channel flow monitoring, rating curve development and mass balance assessment
- Water balance, volumetric retention, thermal mitigation and biofiltration pollutant removal performance monitoring, quantification and reporting
- Nutrient, pollutant loading and assimilative capacity studies
- Instream erosion monitoring
- Benthic biomonitoring
- Assessments of catchment scale chloride loading, and chloride impact studies
- Discrete grab sampling and in situ water quality sampling for the full range of physicochemical parameters
- Bathymetric surveying, sediment sampling and volumetric accumulation monitoring using manual, sonar and drone-based approaches.

AECOM has the full range of real time, remote capabilities:

- Real-time data acquisition, and data analytics using client-accessible web dashboard for all common industry platforms (e.g., FlowWorks, EQUIS, Arc GIS Online, etc.) for real-time visualization of key data, metrics and overall surface water conditions/SWM performance
- Remote, telemetrically-based monitoring using both cellular and satellite-based approaches
- Alert-based alarm and response systems for real-time exceedance monitoring, assessment and response.

AECOM has the breadth and depth of expertise to use monitoring data for robust capacity, flood and nutrient model validation and calibration.



Relevant project descriptions

Guelph Stormwater Management Monitoring Program



The City of Guelph required a continuous stormwater management pond monitoring program to investigate the

hydraulic performance of 15 City-owned stormwater management (SWM) facilities as well as the downstream health of receiving waters.

AECOM developed and implemented a program to monitor in-stream temperature, turbidity, and flow (including upstream and downstream of ponds discharge points), SWM pond water level and temperature, and assess water quality. Data from surface water grab samples and 1-hour rainfall events are analyzed and annual reports identify performance of the SWM facilities, deficiencies, impacts on the environment, and remedial strategies.

Region of Peel Stormwater Management Facilities Monitoring Program



Twelve sites in the Region of Peel needed a comprehensive stormwater infrastructure performance monitoring

program, which included extensive reporting for three environmental site assessment permits.

AECOM's monitoring program continuously collected data upstream and downstream of stormwater infrastructure outfalls, and in LID and conventional SWM pond facilities. Dissolved oxygen, conductivity, temperature, and water level data were collected and used to quantify SWM facility infiltration and thermal mitigation performance. Real-time flow monitoring verified the peak flow and volume reduction performance of an innovative biofiltration basin. We completed bathymetric survey and sediment volume calculations for three SWM facilities, in addition to sediment quality sampling and analysis to inform sediment reuse/disposal options.

Rural Sub Watershed Hydrologic Model Calibration



AECOM was retained by the Credit Valley Conservation Authority (CVC) to provide data analysis and processing, hydrologic model

calibration/validation and flow frequency analysis within 12 rural and semi-rural sub watersheds, with unique models for each. AECOM's work included volumetric runoff calibration of the hydrologic models in for both rain-only and rain-on-snow events. AECOM validated the calibrated models using the available data for the entire watershed.

The calibrated hydrologic models were used to develop an appropriate design storm for use in rural sub watersheds using the joint probability of both the rain and snow on the ground. These design storms were in line with the corresponding return period flow based on the flood frequency analysis completed previously using the Water Survey of Canada streamflow gauges in the watershed.

Real-Time Rainfall and Flow Monitoring Services on Trunk Sewer Systems



The City of Toronto's local flow monitoring program was initiated in 2015 to quantify the wet weather response in various local and trunk sewers.

AECOM led the installation and maintenance of over 85 continuous and temporary flow monitors in sanitary and combined sewers and relocated flow monitors based on the City's requirements.

The monitoring program involves the operation, maintenance and support of continuous and temporary monitoring including site assessment, installation and removal of rain gauges and flow monitoring locations. AECOM provides real-time, continuous, QA/QC'd and accurate storm and sanitary sewer flow and rainfall monitoring datasets and administration and management of the FlowWorks online data management and data hosting platform.

Halton Hills Stormwater Monitoring and Model Calibration



To help guide future development activities, the Town of Halton Hills retained AECOM to prepare a stormwater master plan. We developed

a comprehensive dual drainage model of the Town's stormwater management infrastructure. AECOM completed rainfall monitoring (2 rain gauges) and in-sewer flow monitoring (10 flow monitoring locations), to calibrate and validate the model.

AECOM used the model to assess both the minor and major system. Areas where significant deficiencies exist were identified and remedial measures recommended. We identified and prioritized a suite of retrofit opportunities to improve the Town's overall level of service.

