

## **The Very Challenging Rehabilitation of the Northwest Arm Trunk Sewer**

The NATS Trunk Sewer was constructed in 1917 via tunneling and trench excavation along the Northwest Arm inlet.

Inspections of the NATS identified the need for rehabilitation to remove debris, restore structural integrity, eliminate exfiltration and infiltration, establish a corrosion barrier, and extend the life of the sewer.

Halifax Water (HW) is the largest water, wastewater and storm water utility in Atlantic Canada, servicing a population of more than 360,000. As part of its innovative and proactive wastewater asset renewal program, the Northwest Arm Trunk Sewer (NATS) was identified for rehabilitation to remove debris, restore structural integrity, eliminate exfiltration and infiltration, establish a corrosion barrier, and extend the life of the sewer.

The NATS began service in 1917 and was constructed using open excavation and tunneling at depths ranging from 300 mm to 5 m (11.18 in. to 16.4 ft.). The sewer runs parallel to the Northwest Arm inlet off the Atlantic Ocean ranging from 0 m to 15 m (0 ft. to 49.2 ft.) from the shore and generally located in an easement on privately owned multimillion-dollar residential properties.

The sewer's existing pipe varied in shape and materials, mainly consisting of 1200 mm (47.2 in.) diameter round poured concrete pipe or segmental clay block and 1200 mm x 1500 mm (47.2 in. x 59.1 in.) arched segmental clay with concrete bottom or poured concrete.

In order to successfully complete the rehabilitation of the NATS, it was necessary to overcome numerous significant technical challenges, including extremely limited access, bypassing flows, onerous cleaning of debris, and complex engineering design and installation of a CIPP in an arch-shaped pipe structure all on an accelerated completion schedule. This presentation will outline the challenges and solutions faced on arguably the most difficult CIPP project completed in Canada.