

City of Toronto Ashbridges Bay WWTP Standby Power Upgrades

CLIENT

City of Toronto

LOCATION

Toronto, Ontario

PROJECT DESCRIPTION

Built in 1910, Toronto's Ashbridges Bay Waste Water Treatment Plant (WWTP) is one of Canada's largest and oldest facilities of its kind. The plant is rated for 818 ML/day, providing complete wastewater treatment, including removal of suspended solids, dissolved organics and phosphorus. The plant also provides effluent disinfection and disposal of biosolids, including biosolids that are generated and transferred from the Humber and North Toronto treatment plants.

Major treatment processes include screening and grit removal, primary treatment, secondary treatment, phosphorus removal, effluent disinfection, waste activated sludge thickening, anaerobic digestion, biosolids dewatering and biosolids management. Treated effluent is discharged to Lake Ontario. Numerous auxiliary systems are required for proper operation of many plant processes, such as potable water, process water, HVAC, electrical power distribution, gas, chemicals and instrument air.

B&M SCOPE OF WORK

This project includes the supply of labour, materials, equipment, and permits necessary for the upgrade of the standby power systems within the facility. Black & McDonald's (B&M) scope of work includes the supply and installation of 11 diesel standby generators in the 500-1,000 kW range to enable selective critical load operations.

As part of the upgrades B&M also supplied and installed 15 motor control centres, programmable logic controllers, starters, transfer switches, and all cabling and control wiring to enable integration of the standby generators into the existing SCADA system.

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The system is equipped to serve ten area controls in different buildings and S/E including the biosolids building, blower building, north and south substations, dewatering/sludge disposal area, pelletizer plants, digestive tanks and aeration area. B&M also installed new Automated Transfer Switches (ATSs), transformers and panel boards.

Our work, including managed subtrades, was

- Completion of all site work including underground services, re-grading, excavation and fill, offsite disposal where necessary, asphalt paving, concrete paving, berms, landscaping, access roads and decommissioning of all unnecessary underground services
- Perimeter construction fencing and access gates
- Demolition as required for installation and modification to suit standby power project
- Removal of excavated materials and waste
- All civil and structural systems associated with this project
- All mechanical systems associated with the project including supply and install, including supply fan, air ductwork, insulation, electric unit heater, motorized dampers, controls, louvres, grilles and diffusers, breeching and stacks, flexible exhaust connectors, glycol piping and fittings, and miscellaneous equipment and accessories
- All project electrical systems and power requirements including:
 - Procurement and installation of all new electrical equipment including 11 diesel gensets and associated equipment, all conduit, wiring, grounding and bonding, 18 ATSs, 15 MCCs, outdoor enclosures, transformers, panel boards and electrical equipment
 - Excavating, material removal, backfilling, grading and landscaping
 - Modifications to existing distribution, MCCs, power and control systems
 - Performance of arc flash hazard analysis and implementing recommendations as per the requirements of CSA Z462-12, Workplace Electrical Safety
 - Testing and commissioning of gensets, ATSs, MCCs, SCADA system, reconnected equipment
 - Training of personnel
- SCADA system integration for gensets including:
 - Implementation of all software changes associated with the HMI displays of the new standby generators into the Plant SCADA system
 - Connection of all generator communication wiring to existing processors
 - All programming for new HMI generator displays as per the city's PCS standards
 - Training for all City of Toronto operators with demonstrations of genset operation and HMI displays

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BENEFITS TO CLIENT OR PROBLEM(S) SOLVED

Objectives

The owner's primary objective was to provide standby back-up power to the individual buildings which would enable a homogenous maintenance of generators and ensure an uninterrupted supply of power for continuous plant operations. The goals included:

- To have a smooth construction process and tie-in of systems without affecting plant operations
- To have a seamless transition from construction through commissioning to operations and maintenance phases
- For the project to have an exceptional safety management record
- Industry best practices to be demonstrated in the construction and commissioning phases
- Conformance to the project's schedule and budget

Complexity

The Ashbridges Bay WWTP was a complex site because of multiple projects being constructed in parallel, creating a challenging work environment where a greater level of coordination was required between the various contractors, consultants, and city staff.

Black & McDonald did its part by holding regular meetings with the city, consultants and contractors to ensure that execution was smooth and layout occurred with overlapping construction. Wastewater treatment process and operations were to continue during construction. The City of Toronto secured access to the site for personnel and vehicles, use of existing facilities, and activities within the contractors' working limits.

B&M worked with city staff using a phased approach of planned shutdowns and performed tie-ins and integration to existing distribution, instrumentation, communications and monitoring systems while maintaining plant operations.

The project schedule was managed diligently and execution had no delays. The installation costs remained on budget. Black & McDonald added features that improved plant performance, as well as monitors for the generators, improved power demands and enhanced safety features.