Iona Island Wastewater Treatment Plant

Richmond, BC, Canada (2019)

PRODUCT USED:
Hard-Cem®

OWNER:	ARCHITECT:	CIVIL ENGINEER:
Metro Vancouver	Stantec	Associated Engineering

ENGINEER:	CONTRACTOR:	READY-MIX SUPPLIER:
CH2M HILL Canada Ltd.	Kenaidan Contracting Ltd.	RMC Ready-Mix Ltd.

BACKGROUND

Located in Richmond, British Columbia, Canada, the Iona Island Wastewater Treatment Plant has been providing primary treatment to the wastewater of over 600,000 residents in Vancouver, the University Endowment Lands, and parts of Burnaby and Richmond since 1963.

This treatment uses various mechanical processes to remove materials that settle or float. As a result, the wastewater treatment plant can remove around 50% to 60% of the wastewater's total suspended solids and 30% to 50% of the biochemical oxygen demand. That in turn ensures that the wastewater does not carry a dangerous amount of bacteria or consume a lot of oxygen when it is eventually discharged back into the nearby Strait of Georgia. Because of that, this treatment is a key component to sanitizing the wastewater of Vancouver and surrounding neighborhoods.

However, by October 2015, this treatment was in need of an update. Metro Vancouver planned to enhance it by upgrading the plant's solids handling system. And that required the construction of four digester mixing pump buildings, which would include a primary sludge screening and de-gritting facility, a primary sludge thickener and pump building, and an odor control system. All of which needed to be constructed while the facility remained in operation.

SOLUTION

To add to the challenge of this construction project, the owner of the plant, Metro Vancouver, also wanted to find a solution that could enhance the upgraded structure's resistance to abrasion and erosion. After all, primary treatment facilities are subject to extensive abrasive and erosive wear just based on their routine activities. For instance, they experience large volumes of fluidborne abrasion and erosion at the start of their screening, where they target and remove wood, stones, plastics, and other large debris. Then, once the process has moved on to pumping, the wastewater is elevated high enough to allow gravity to move it through the rest of the treatment process.

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From there, the grit removal part of the process uses pumped air to keep organic materials suspended while forcing the sand and gravel to settle and be removed. Then, the sedimentation tanks allow solids to be removed as the heavier sludge settles to the bottom and the lighter scum floats to the top.

This entire process ensures that water with large particles is consistently pumped through the primary treatment facilities. And that exposes the concrete tanks containing the water to heavy abrasion and erosion.

There are not many solutions that could help those tanks endure such erosion for years on end. However, Metro Vancouver found one of the few quality options: Hard-Cem. As the only integral concrete hardener, Hard-Cem can be used in vertical and horizontal applications to help structures withstand the abrasive and erosive forces these tanks are exposed to. The hardener's versatility allowed for construction workers to place Hard-Cem shotcrete in the primary treatment screening tanks, providing the tank bottoms and walls with highly abrasion- and erosion-resistant concrete surfaces. For extra protection, the construction workers also added Hard-Cem to the upgraded facility's cast-in-place flatwork in key areas that were subject to mechanical abrasion.

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