

Alternative WWTP project delivery model is key to improving Mumbai's quality of life

By Sanjay Devnani and Vincent Nazareth

Alternative project delivery models are allowing Mumbai, India, to implement urgently needed wastewater treatment and conveyance upgrades. Most of the city's existing sewage, which averages 3,258 million litres per day (ML/d) and peaks at 6,624 ML/d, discharges untreated into local watercourses and the Indian Ocean. This degrades the local environment and endangers public health.

The consortium of R.V. Anderson Associates Limited, and Mott MacDonald Limited from the UK, was retained by the Municipal Corporation of Brihan Mumbai (MCBM) in 2007 to undertake capital upgrades to Mumbai's wastewater system. A changing regulatory environment and a decision from MCBM to immediately implement works that were originally supposed to be deferred, greatly changed the scope of work.

The current scope includes \$1 billion (CAD) worth of capital upgrades, including one new treatment facility; installation of primary and secondary treatment at seven wastewater treatment facilities, ranging from 37 ML/d to 849 ML/d; sludge stabilization and biosolids management facilities for all eight plants; 10 new sewage pumping stations; 19 km of new tunnel sewers; 25 km of sewer rehabilitation; and 10 km of transfer tunnels to a new 5 km ocean outfall.

A procurement strategy developed by the consortium retained to undertake the priority works determined that the WWTPs would be best procured through alternative project delivery models, specifically design-build-operate.

The design-build-operate model offers contractors flexibility in design with opportunity for innovation, which could result in significant capital and operations cost savings. More importantly, it gives MCBM time to recruit and train staff, while transferring design, construction, and operational risk to the contractor. Mumbai's operations staff have limited experience with primary or secondary treatment processes. Design-build-operate will also allow the facilities to become



Map of Mumbai sewage disposal works project stage 2 priority works.



Rendering of the 37 ML/d Colaba Wastewater Treatment Plant.

operational more quickly, as well as accelerate amelioration of past environmental impacts.

The Request for Proposal for the project's first design-build-operate contract, with a 15-year operations and maintenance requirement, will be released later this year. It will be for expanding and upgrading the 37 ML/d Colaba WWTP, which is Mumbai's smallest treatment facility.

This plant will be constructed in a highly built-up area. It will set the standard for treatment plant design and operations quality, and allow the issues to be identified and addressed, that could be of higher risk when undertaking larger projects.

Once Colaba is underway, work will begin on the next plants: Ghatkopar (503

ML/d), Bhandup (323 ML/d) and Lovegrove (493 ML/d). All design-build-operate contracts will be based on the guide from the International Federation of Consulting Engineers (FIDIC)'s Gold Form *Conditions of Contract*.

Using internationally accepted forms of contract is expected to give contractors confidence in bidding on the project. It is anticipated that bids will be received from all over the world, which should provide for a high degree of innovation.

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