

Lomond Hills WTW

£7.6m project to bring water quality improvements to Fife

by
Brian Whyte

The Lomond Hills Water Treatment Works, commissioned in 1988, serves 30,000 customers in the Glenrothes and East of Fife areas. Although designed to cater for a maximum throughput of 24 MI/d, the current average throughput is only 13 MI/d. A number of drivers need to be met by March 2010 including ones for aluminium and turbidity and cryptosporidium. The Drinking Water Quality Regulator has also determined that the level of disinfection control is inadequate to ensure consistent bacteriological compliance and taste. The project aims to address poor performance of the existing filters, poor filter backwash performance and address inadequate disinfection control.



Lomond Hills WTW under construction photo shows inlet & RGF

photo courtesy Black & Veatch

Existing works

The existing works includes a process of two Enelco type filters. The design capacity of the works is 24 MI/d and recent refurbishment of the Enelco filters, each with a total media area of 101 m², allows the works to operate between 12 MI/d and 15 MI/d. The existing filters are not considered to be suitable as filter backwash performance is poor with mud-balling and limited filter run times. Aluminium concentration is consistently high and recent flow fluctuations above 15 MI/d have resulted in immediate breakthrough in the filters. Backwash water is produced almost continuously and discharged to sewer.

Residual turbidity is commonly caused by non-coagulated particles present in the raw water, colloidal fragments broken off from the deposit within a filter, post precipitation and residual soluble material.

Flow arrives at the works via a 450mm diameter pipe from the Holl reservoir and, although a 400mm diameter pipe is available for flow

from Arnot reservoir, this source is used as compensation water for the River Leven. Flow and Turbidity are continuously monitored but raw water Apparent Colour is measured only in a rudimentary fashion using a hand-held colorimeter.

Upgrade

The upgrade of the Lomond Hills Water Treatment Works project is being carried out by *Scottish Water Solutions* in partnership with *Black & Veatch* under Scottish Water's Q&S11a investment programme. The programme also includes a separate £3.1m project to connect the Lomond Hills works with the nearby community of Newburgh via an 11km pipeline.

Solution

The solution developed will see a new inlet works constructed to ensure proper mixing and conditioning of chemicals and distribution of flow to downstream units. The existing chemical delivery pipes will be re-routed and new ones installed where necessary.



RGF Pipe gallery

photo courtesy Black & Veatch

The plant's current filters will be replaced with five new rapid gravity filters. To achieve a total filter area of 183.5m² requires five filters, each 5.5m long x 6m overall width (5m bed width plus 1m wide backwash water outlet channel).

A review of filter washwater treatment with possible potential to return flows rather than to discharge to sewer and improve plant yield concluded no significant benefit in return of flows to treatment and therefore discharge to sewer will continue. The existing filters will be converted to form washwater balancing tanks prior to sewer disposal. An upgrade to chlorination equipment upgrade at the works will also be carried out.

The option developed will allow the plant to operate across the full range of throughput defined by the component based demand forecast and is likely to be from 11 to 18 MLD.

The solution will provide security of supply at required quality up to design capacity which provides more flexibility of operation for the current demand within the overall Fife Area Water Strategy. It will also reduce discharge of backwash water to sewer from current process and dispenses with old filters that did not meet capacity. The solution will also lead to a reduction in operating costs.

Construction

Start on site for the project was June 2007. The construction has posed a number of challenges, not least the need to keep the existing works operational while the upgrade took place.

One planned shutdown has already taken place with another expected before the project is complete. Two homes on the site, which used to be tied to the works, are also occupied and significant liaison with residents has been required.

The size and scale of the project has also required large excavations and the project team has liaised closely with the Scottish Environmental Protection Agency.

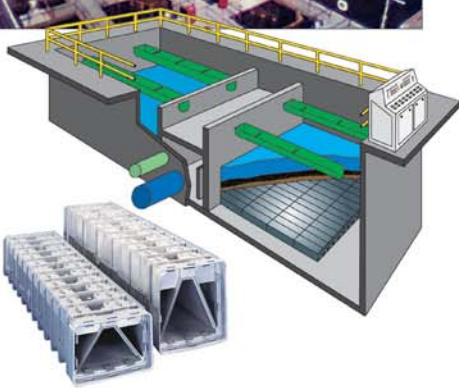
Work will also be carried out to screen the site landscaping and planting and structural steelwork will be painted green to blend in with the dam behind.

The Lomond Hills project, being carried out in partnership with Black & Veatch, is due to be completed in March 2009. Principal sub-contractors include Beattie Brothers Limited (Formwork and steelfixing), IUS (non contestable power issues), Capelrig Ltd (telemetry), Aird Walker (Electrical installation), Solway Structural Steel (Structural Steelwork) and Ramsay Access (Site Metalwork).

The principal process plant suppliers include FB Leopold (Filter Floor System), Nomenca (poly dosing), Lintott Control Systems (MCC), Street Crane Company Ltd (Overhead Cranes), Dieslec Generators Ltd (Standby Generator) and Western Carbons (Sand and Anthracite).

Note: The Editor & Publishers wish to thank Brian Whyte, Scottish Water Solutions' Project Manager for preparing the above article for publication. ■

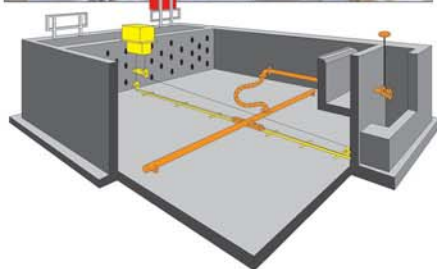
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