

DRD Water Service - Northern Ireland

Portglenone WwTW improvements

by
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Portglenone is located on the banks of the River Bann, approximately 14km west of Ballymena and 13km north of Lough Neagh. The wastewater treatment plant is located on the northern edge of the town, east of the River Bann. Both the Environment & Heritage Service (EHS) and Fisheries Conservancy Board (FCB) asked that consideration be given to reduce potential stress on the nearby River Clady which is a salmonid river. Previous to this, Water Service, Northern Division had requested that the existing treatment works serving the villages and hamlets of Innisrush, Clady and Glenone be incorporated in the overall assessment.



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courtesy Water Service Northern Ireland

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Basis of design

Population	3143	PE
DWF	1016	m ³ /d
Formula A flow	5290	m ³ /d
Flows to full treatment	2273	l/s
Project value	£2.1	M

The project required the design, supply, construction, installation, testing and commissioning of a new sewage treatment works at the existing WwTW, including preliminary treatment and sludge thickening. The new works will also receive sewage from Innisrush, Clady and Glenone.

Other considerations

As Innisrush, Clady and Glenone are located on the opposite side of the River Bann, a pumping station will also be necessary to transfer the sewage to Portglenone WwTW. The old Glenone works was considered to be the best location for this purpose, receiving sewage from Glenone, Innisrush and Clady sewers, then transferring to the Portglenone works via a rising main laid to the river bed.

Future development to the boundaries of the new Portglenone plant necessitated the requirement to designate the works an odour sensitive site. Consideration required the inclusion of odour assessment for the inlet works and waste sludge export in addition to the sludge thickening process.

During construction of the new plant, effluent discharges must remain within the consent limits, therefore, the works were undertaken in a phased sequence, utilising both old and new plant sections.

Selected process abilities

The Bio-Bubble SBR advanced aeration system included a number of benefits fitting to the criteria for the new works which included:

* Balance tanks with integrated storm tanks.

During storm periods, the Balance Tanks automatically adjust to storm tank operation with retention of over one hour at the maximum design flow of 156 l/s. The preliminary works provide full duty standby 6mm screening in addition to grit separation prior to discharge and storm retention.

After any storm period, the Balance Tank will retain excess storm waters for transfer to secondary treatment. The advantages of



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integrating the storm tanks besides removing separate tank construction includes, reduced capital costs and works footprint, negligible odour emissions (see odourless operation below), less mechanical and electrical equipment i.e. no return pumps or separate mixing equipment, instrumentation, valves or scrapers, in addition to lower operation, maintenance and power costs.

*** Odourless operation**

The Advanced Aeration process of the Bio-Bubble SBR ensures both secondary treatment and sludge thickening operate with none to negligible odour emissions. The Bio-Bubble SBR holds several international patents, one being their patented Bio-Loop process where full advantage is taken of the odour reducing qualities from a highly treated sludge being intermittently recycled to the Balance Tanks.

Therefore, although being designated an odour sensitive site, odour control has been limited to the inlet works, the screenings building and to tanker movements for sludge export, allowing further reductions to be gained in both capital and operational costs.

*** Exceptionally low sludge production**

The Bio-Bubble SBR is noted for very low sludge waste production. A reduction in sludge waste production will reduce tanker movements, lessen overall energy input and will also benefit operational management of the plant. The addition of the Bio-Bubble Sludge Thickening will add further reduction of the sludge waste by increasing the dry solid content to between 5-6%.

Plant performance

The plant was put into service receiving flows to treatment from August 2004 and 90 days performance trials were successfully completed at the end of December 2004. The consent applied by the EHS for new works at Portglenone is 30:55 (BOD: TSS as mg/l). Samples were collected from auto-samplers and overall the average sample analysis concluded the following final effluent results:

3.4 mg/l BOD (ATU)
 7.1 mg/l TSS
 0.7 mg/l NH₄+–N
 22.6 mg/l TON

During trials the plant received flows from all incoming sewers and severe storms also prevailed during this period. Omitting for errors during analysis and one period where the inlet works was polluted with what was thought to be sheep dip, 100% ile compliance was achieved throughout the trial period. Inclusion of errors and pollutant determined a 99% ile compliance achievement.

It should be noted that a BOD of 3.4 mg/l was achieved over 92% ile (± 0.9 –13mg/l) and 0.7mg/l (NH₄+–N achieved over 97% ile (± 0.7 –0.81mg/l) throughout the trial period.

The trials consolidated the success of Bio-Bubble SBR to out-perform any other biological system.

Biological growth will continue to intensify and establish over the coming months in addition to improving upon the quality of treatment and final effluent discharge.

Sludge reduction performance

To date 140 m³ of sludge has been removed from the new works. This is equivalent to 31m³/month sludge production from the Bio-Bubble SBR basins in comparison to an anticipated 330m³/month from basins of conventional systems.

Sludge thickening to 5% dry solids will reduce sludge waste by over 80%. Therefore, using a 14m³ capacity tanker for sludge removal, a conventional plant would require 85 tanker movements compared to 17 by the Bio-Bubble, or 68 fewer tanker movements per year. ■

Note: *The author of this article, Damien Mckeown, is Assistant Project Manager, Water Service, Northern Ireland.*