Enniskillen WwTW

£13.5m investment with a 2030 design horizon

The new Enniskillen Wastewater Treatment Works (WwTW) was designed to replace the old Silverhill WwTW. The old Works was constructed in the 1970's and was in need of modernisation. Before the new Works was built, the land was used as a sludge drying bed and as a storage yard for NI Water plant and equipment. The old, now demolished Silverhill WwTW, consisted of Preliminary, Primary, Secondary (surface aerated process), final settlement tanks and a sludge dewatering plant. The outfall of the existing plant combined with a surface water outfall on the shore of Lough Erne.

Enniskillen WwTW *Courtesy of WDR & RT Taggart*

Objectives/Need

The old Works was in need of modernisation and required upgrading to provide a treatment facility that complies with European Union legislation. The existing plant was undersized for the current and future populations, and unable to meet the more stringent discharge consent standards imposed by the Northern Ireland Environment Agency (NIEA).

In addition the existing plant included the following key deficiencies:

- No provision of dedicated storm water storage/treatment facilities on the site with provision provided by means of oversized primary settlement tanks;
- Inadequate sludge storage capacity to cope with indigenous and imported sludges;
- Inadequate degritting at the inlet works allowing grit to carry over to primary and secondary treatment process units;
- Use of mains water for wash down of plant and equipment an unsustainable approach.

Solution

The £13m Enniskillen WwTW was built on the existing site previously occupied by sludge drying beds and an equipment storage area and involved the construction of a new WwTW works and Regional Sludge Reception and Processing Facility for the catchment of Enniskillen. It has been designed to a 2030 design horizon, which will accommodate a population equivalent of 35,830.

The plant replaces the old Silverhill WwTW and is designed to meet future flows (Including the new Erne Hospital), loadings and more stringent discharge consent standards set out in the Water Order Consent regulated by the Northern Ireland Environment Agency.

The plant was designed and constructed by The Lagan Enpure JV on behalf of NI Water as part of their ongoing commitment to provide a 21st Century Infrastructure for Northern Ireland. WDR & RT Taggart were the Project Managers for the scheme providing professional consultancy services to NI Water throughout the feasibility, design, procurement and constructions phases including administration of the ECC NEC 3 Option C Design and Build contract.

The scheme has sought to bring value and innovation to NI Water without compromising water quality standards, meeting the latest NIEA discharge consent standards and the Urban Wastewater Treatment Directive, the Water Order Consent and other permits under which NI Water must operate.

At Enniskillen, the new process consists of Inlet screw pumps, preliminary treatment (screening grease and grit removal), Storm overflow and holding tanks, primary settlement tanks, Interstage pumping station, secondary treatment in the form of an activated sludge plant, final settlement tanks, a long outfall with diffusers.

The plant is capable of treating the following flows:

- Screw Pumps and Inlet Screens – 71.3 ML/day (Equivalent to a 1:20 year storm event;
- Preliminary Treatment of Formula A flow of 29.3 ML/day;
- FFT of 12.5 ML/day.

Parameter	Standard mgl^{-1}	Compliance	Upper Tier mgl^{-1}
Biochemical Oxygen Demand	20	95%ile	50
Suspended Solids	30	95%ile	75
Ammonia as N	10	95%ile	35
Total Phosphorus as P	1	ann. av.	n/a

The plant is based around an activated sludge process and is capable of meeting the consent standards above, along with a total N standard.

In addition to waste water treatment the plant includes a sludge reception, storage and treatment facility which forms part of NI Water's Sludge Disposal Strategy. The constructed facility acts as a regional sludge reception centre where imported sludges are mixed with indigenous primary and surplus activated sludges before undergoing thickening and dewatering to produce a cake with 27% Dry Solids content which is exported to the sewage sludge incinerator at Duncrue in Belfast.

Green Apple Award

In 2009, the plant was awarded a Green Apple Award for Environmental Best Practice in recognition of its rainwater harvesting element. In order to provide a sustainable source of wash water for the plant, the design incorporated the use of recycled final effluent and rainwater harvesting for automated washing of screens and process equipment. This solution directly addressed one of the Key Deficiencies of the old Silverhill WwTW in a cost effective and sustainable way.

Rainwater from the roofs of the sludge treatment buildings is harvested and stored in a holding tank before being mixed with recycled effluent and distributed via the wash water system to individual plant items.

The Green Apple Awards are organised by the Green Organisation who concentrate on the positive aspects of environmental endeavour and make awards for environmental best practice, and for enhancing our built environment and architectural heritage. NI Water are delighted to be recognised by these awards which are held annually and are an international campaign recognising, rewarding and promoting environmental best practice around the world.

This award for Environmental Best Practice recognises the commitment of all involved in the Enniskillen WwTW scheme to innovation and sustainable solutions to engineering challenges.

Conclusion

This new state-of-the art facility represents a significant investment by NI Water to ensure the ongoing development of the Enniskillen area including the new Erne Hospital while safeguarding the environment in which the plant has been constructed. The plant will also improve the water quality in Lough Erne.

NI Water is committed to investing in projects that will deliver the best innovative solutions and benefit the local community, economy and environment.

As one of Northern Ireland's most important environmental stewards, NI Water invests significant resources and measures in safeguarding it. Improving the wastewater infrastructure in Northern Ireland is a major priority for NI Water and by 2013 we plan to invest in excess of £300 million on improvements to our sewerage network system and wastewater treatment works.

Aerial photograph of Enniskillen WwTW *Courtesy of WDR & RT Taggart*

Flow metering chambers with one of the primary settlement tanks in the background *Courtesy of WDR & RT Taggart*

Enniskillen WwTW was officially opened in June 2010 by Regional Development Minister Conor Murphy MP MLA.

Note: ***The Editor and Publishers thank Northern Ireland Water for providing the above article for publication.***■