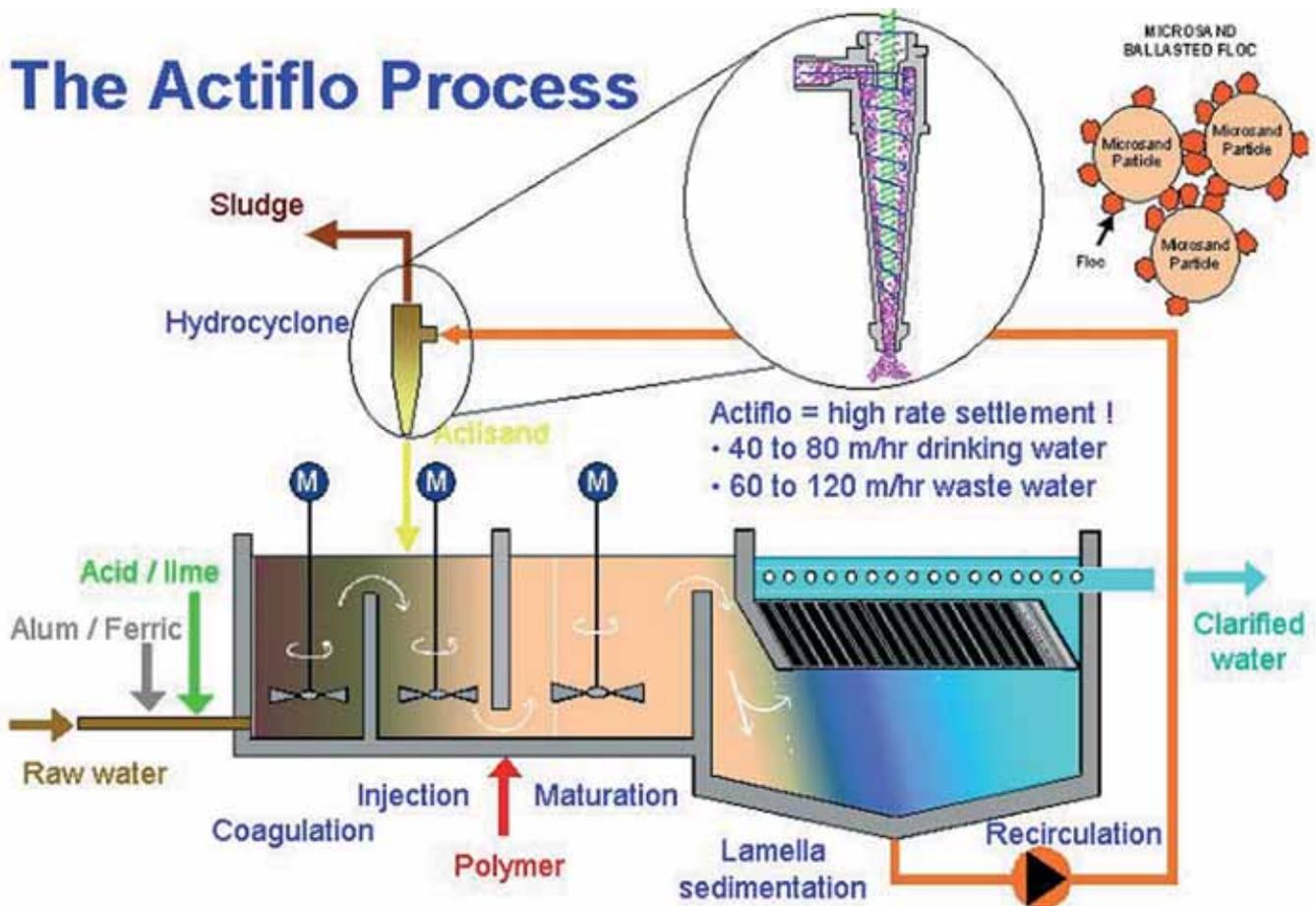


Hazards Green WTW - £8.6m WTP

adding treatment line to meet environmental challenges

by
Tim Humphreys BSc, CEng, MChemE, MCIWEM

Hazards Green WTW, located between Herstmonceux and Battle, in East Sussex, consists of a 12MLD rated plant comprising conventional upward flow clarifiers, sand filters and GAC unit processes with centrifuge sludge treatment. In September 2006, a 78-week programme for installing an additional 12 MLD treatment line began, comprising twin package Actiflo® clarifiers, conventional rapid gravity filters, washwater/sludge processing, a sludge dewatering press system, new high lift pump station and wholesale redevelopment of the existing chemical dosing plant. One of the key challenges to this project is strict adherence with environmental regulations protecting local endangered species, notably the Great Crested Newt.



Hazards Green: The Actiflo® Process

Project objectives

Hazards Green site has been operating since 1908, originally taking water from the site borehole. River water from the Waller's Haven has been abstracted since 1947, initially treated by slow sand filtration.

Hazards Green WTW, as it stands today, was constructed in the 1960's and redeveloped in the 1970's and 80's to comprise conventional upward flow clarifiers and rapid gravity sand filters catering for up to 12MLD. A Granulated Activated Carbon plant was added in the late 1990's.

The current project is instrumental to South East Water's water resources plan and is a key part of the Bewl-Darwell-Hazards Green transfer scheme. This will enable treatment of water from the

Darwell reservoir, which is fed in turn from Bewl reservoir, to supplement the existing source of Waller's Haven and an on-site borehole.

Whilst it is anticipated that the existing clarifier stream will continue to preferentially cater for existing water sources, the new *Actiflo*® treatment stream will be required to treat water from Darwell, Waller's Haven or any blend. In addition, the project will address the need to enhance the performance of the existing overloaded washwater and sludge processing systems to cater for the maximum output for the whole of the works, without the need to divert any flows to the existing lagoons.

Process challenges

The key process issues on this scheme relate to algae peaks from



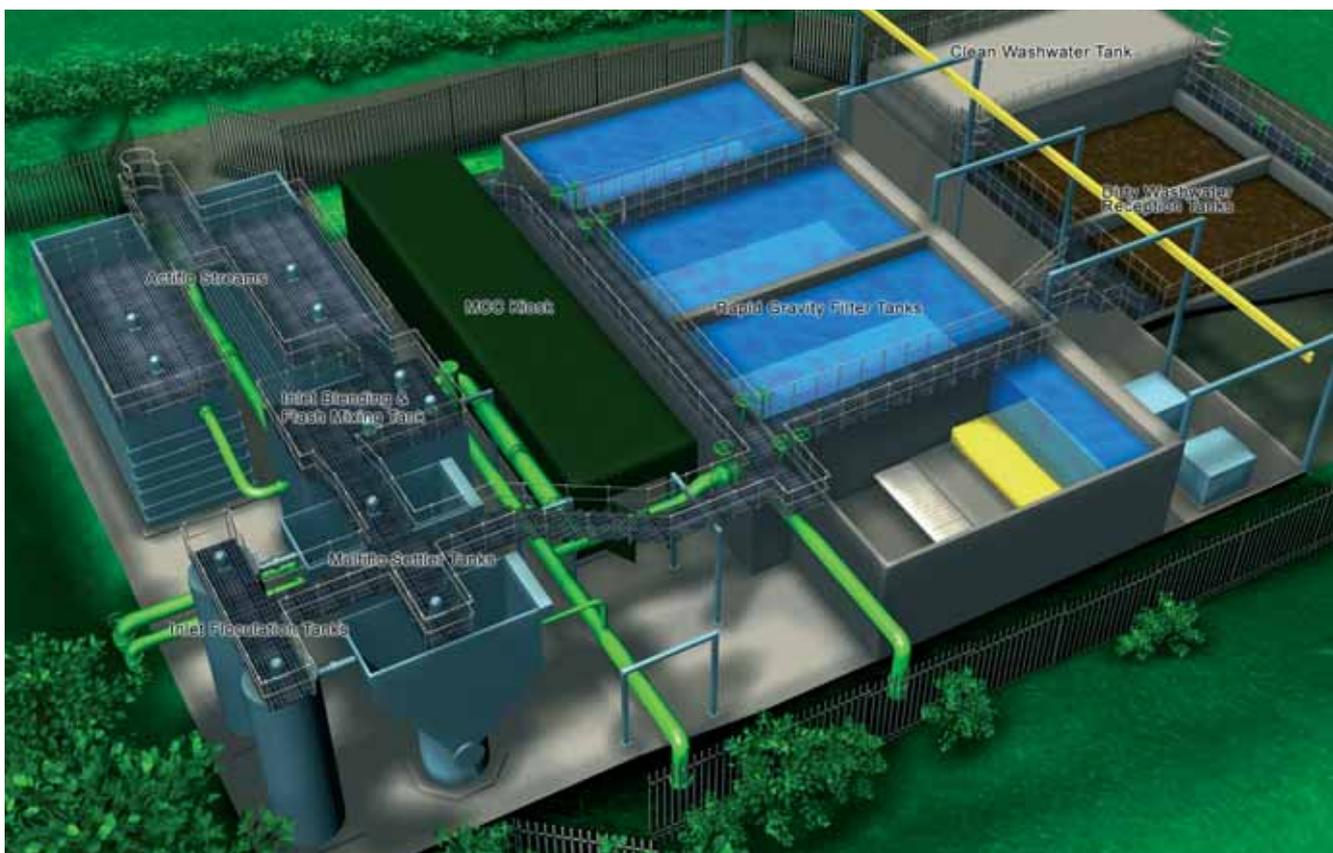
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Hazards Green WTW

graphic of the Actiflo® clarification & RGF process streams

Waller's Haven and Darwell Reservoir, turbidity peaks from Waller's Haven, and high pH from the Darwell Reservoir. The new clarification stream had to be designed with the flexibility to respond to changes in the mix of waters to be treated without incurring high operating costs; more conventional technologies such as standard clarifiers and DAF were not considered capable of reliably dealing with this challenge. The target treated water quality is less than 2 NTU on a 95%ile basis.

OTV's process solution centres upon the *Actiflo*® process, which is ideally suited for difficult-to-treat waters such as rapidly fluctuating sources or extreme conditions. *Actiflow*® is patented, extremely versatile, high rate, sand ballasted clarification system that effectively removes suspended solids present in surface water by coagulation/flocculation and lamella settling, achieving extremely low levels of outlet turbidity. Microsand (known as *Actisand*) is utilised as a seed for floc formation, providing surface area that enhances flocculation and acts as a ballast or weight. The resulting sand ballasted floc enables clarifier designs with high rise rates and short retention times, having a typical footprint between 5 and 20 times smaller than conventional clarification systems of a similar capacity.

Actiflo® is a proven technology with over 130 references worldwide, many of which operate with similar raw water characteristics to Hazards Green.

Environmental challenges

The principal environmental challenge on this project involves following strict environmental regulations to protect local endangered species, in particular the Great Crested Newt. This has placed a significant duty upon all parties to ensure compliance, otherwise construction progress could have been severely compromised, as well as ensuring compliance with the legal obligations.

Prior to construction commencement, South East Water installed a

perimeter newt exclusion fence and implemented a trapping process to ensure safe collection and relocation of the newts. Construction started at the end of October 2005, immediately prior to the newt hibernation period, therefore, top soil had to be carefully stripped from all areas that would be subject to construction activity over the winter period. This included a detailed fingertip search under supervision of the licensed site environmentalist.

Project execution

The fundamental requirement of this project, representing a challenge equal to both process and ecological, is to ensure continuation of existing treatment operations at all times and integration of the new plant with the existing control system. Meticulous planning will be necessary during the changeover of existing dosing systems on a piecemeal basis per chemical stream, and replacement of the existing dewatering centrifuge for a plate press. These construction operations will require provision of temporary plant to enable the existing chemical and dewatering buildings to be redeveloped to accommodate the new plant. Likewise, pipeline connections will have to be achieved with only limited and agreed shutdowns to reduce to an absolute minimum the periods when the existing works will have to be taken off line.

Meica installation works are due to commence during May, with phased changeover of the chemical system starting in June. Commissioning of the new water stream is scheduled for November with Takeover due next March.

Project team

The project team includes South East Water (Engineering), OTV, the lead (process) contractor responsible for process design and construction; with *Trant* as their partner undertaking civil construction.

Note: The author of this article, Tim Humphreys, is the scheme Contract Manager for OTV. ■

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