

Lytchett Minster STW

new storm treatment & UV disinfection

Lytchett Minster STW, located to the west of Poole, Dorset, serves a population of approximately 8,000. To ensure compliance with a 30: 40: 50 consent standard and to meet the Bathing Waters Directive and Shellfish Waters Directive. Wessex Water has invested £1.6M in providing new storm treatment together with UV disinfection at an existing treatment works. This has been achieved on a works that had restricted space available for construction activities, surrounded by land of particular environmental sensitivity.



View of UV Installation (courtesy Wessex Water).

Lytchett Minster is a small works consisting of an inlet works, oxidation ditch, final settlement tank and storm storage. It discharges into Lytchett Bay, Poole Harbour.

Terminal pumping station improvements

The works receives influent from two terminal pumping stations (Moorland Way and Bakers Arms) and one gravity sewer. The terminal pumping station at Moorland Way is located 1km to the east of the treatment works site in Upton. Pumps within the existing pumping station have been uprated from 37 l/s to 45 l/s to reduce the occurrence of storm discharges from the station. All storm flows are screened prior to discharge. To prevent recirculation of flows in the sewerage system the rising main from Moorland Way was extended by 440 metres to discharge into the flow reception chamber at Lytchett Minster treatment works. Air valves on the section of existing rising main also required replacement. The air valves are located in heath land that is part of the Poole Harbour SSSI, SPA, Ramsar and Dorset Heath SAC. In addition, one air valve is located on land leased to the Herpetological Conservation Trust (HCT) and operated as a Nature Reserve for adders. The route of the new section of rising main was selected to minimise disturbance to wildlife and to maximise the use of existing hedgerow gaps. Directional drilling was employed to install the new main.

UV disinfection

UV disinfection of the final effluent from the treatment works was required to meet the Bathing Waters Directive and the Shellfish Waters Directive. A single channel UV system sized to treat FFT (55.5 l/s) with a measured applied dose of 45 mJ/cm² was selected having duty/assist/standby banks of low pressure, high intensity lamps. The UV channel and its associated control kiosk have been constructed at a raised level above the predicted 1 in 200 year flood level. Due to the hydraulic profile of the existing works all flows to the UV channel are pumped using duty/assist/standby variable speed submersible pumps.

Storm treatment

Additional storm treatment capacity was required at Lytchett Minster to reduce the number of storm discharges to comply with the Shellfish Water Directive. The storm treatment capacity at the works has been increased such that the combined total of storm discharges from the works and Moorland Way pumping station will not exceed 3 spills per bathing season and 10 spills per annum total. All storm discharges are screened by *Copasac* to 6mm in two directions.

The provision of additional storm treatment at Lytchett Minster was made more difficult due to operational requirements to have an



New storm tank (courtesy Wessex Water).



Route of new rising main (courtesy Wessex Water).

emergency standby final settlement tank on site. The purchase of additional land for extending the works was ruled out because of the adjacent Poole Harbour SSSI, SPA and Ramsar. Therefore, due to the limited space available within the existing site boundary the decision was made to construct a new tank that could be operated as either a storm tank or final settlement tank.

The critical duty for the new tank is as a storm tank and was therefore sized for this application. The tank was constructed from reinforced concrete and was provided with antifoatation mass concrete. The tank installation consisted of a rotating half bridge scraper, scum boards, castellated weir and auto emptying.

The tank was designed to take into account all possible conditions that can occur during its use. Particular attention was paid to the dual use of the tank in terms of return storm and sludge flows. A storm water return pumping station has been provided adjacent to the tank to return the contents to the inlet works flow reception chamber during periods of low incoming flows. When the tank is operating as a final settlement tank the valved connection to the storm return pumping station is closed and an alternative pipeline is opened to transfer return activated sludge to the existing RAS and SAS wet wells.

Extensive hydraulic modelling of the treatment works was undertaken to determine optimum levels for the new tank. Because of its dual use operating levels within the tank can vary significantly. Maximum flows through the works have been predicted to be as high as 151 l/s within the design horizon. The works was hydraulically modelled for this flow rate with the worst case downstream outfall tidal conditions (highest predicted sea level within Poole Harbour, plus an allowance of 500mm for wave action).

Construction

Work on site commenced September 2002. The new plant was constructed, installed and commissioned in time to meet the compliance date of 31st March 2003.

The alliance team succeeded in completing a fast track project by overcoming a number of challenges.

- * restricted space availability of site;
- * restricted access;
- * sites surrounded by areas of particular environmental sensitivity;
- * achieving the requirements of the project with minimum disruption to existing process units.■

Note: The work was undertaken by the Gemstone Alliance team which consists of Wessex Water and Costain who provide civil contractor and project management expertise, with Carl Bro supported by Haswell, providing design expertise. The team received support from Wessex Water Project Manager, Stephen Row

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