TMS-DD-108 PR24 WINEP EC supporting evidence - phosphorus historic permits

Phosphorus Programme – historic permits response

Overview - Approach

In the unconstrained – constrained options development and preferred option selection process for our Low P programme, aligned with the Environment Agency WINEP guidance documents, we have considered the asset base required to meet an existing permit or, when a site doesn't currently have a P permit, the existing asset base. Based upon the required new discharge concentration to meet ecologic quality standards, we have developed the new scope based upon the technology strategies presented in tables 1 and 2 below.

Table 1: Technology strategy for sites <1,000PE or >1,000PE with trickling filters.

New permit	Option 1	Option 2	Option 3
P≥3mg/l	1pt Chemical dosing	Integrated constructed wetland	
3mg/l>P≥1.5mg/l	1pt Chemical dosing	Reed beds with chemical dosing	
1.5mg/l>P>0.7mg/l	1pt Chemical dosing and tertiary solids removal	Nereda where new build required with 1pt chemical dosing and tertiary solids removal	
0.7mg/l≥P≥0.25mg/l	2pt Chemical dosing and tertiary solids removal	Nereda where new build required with 1pt chemical dosing and tertiary solids removal	Transfer

Table 2: Technology strategy for sites >1,000PE with activated sludge plants.

New permit	Option 1	Option 2
P≥1.5mg/l	1pt Chemical dosing	Reed beds with chemical dosing
1.5mg/l>P>0.7mg/l	1pt Chemical dosing	Bio P and tertiary solids removal (>50k PE)
0.7mg/l≥P≥0.25mg/l	2pt Chemical dosing and tertiary solids removal	Bio P and tertiary solids removal (>50k PE)

Additionally, for stretched targets below 0.20mg/l we have considered specific proprietary technologies for the tertiary solids removal. When a tertiary solids removal exists at a site, the new limit would require the replacement of the units with the specific proprietary technologies.

The technology strategies above are based upon the outcomes of the CIP2 P-TAL trials.

Ofwat have modelled the costs required assuming that a variation in permit limits would translate in a linear contribution by any existing asset base to the new permit.
However, from the tables above, it is clear that when the required increased in performance exceeds the thresholds between each category of limit, the scope has a non-linear step-change increase.

For example, for WINEP action 08TW100932a at Sherbourne St. John STW, the current P permit is 0.6mg/l and the new limit will be a stretched target of 0.2 mg/l. The difference is 0.4mg/l. In consideration of the existing asset base, the increase in performance would need to

be delivered by upgrading the site with an additional 1pt Chemical dosing and a new tertiary solids removal plant.

Differently, a similar 1pt Chemical dosing and tertiary solids removal scope is required at Witney STW (WINEP action 08TW100949a) to increase the performance from the current 2.0mg/l permit limit to the new requirement of 0.25mg/l. The difference between existing and upcoming permit limit at this site is 1.75mg/l, in excess of 4 times the difference at Sherbourne St. John STW.

At Longborough STW (WINEP action 08TW100918a) there is no existing permit limit and Ofwat assessment allows for an equivalent performance of a 6mg/l permit limit. To meet the new 1mg/l limit, a 1pt Chemical dosing and tertiary solids removal scope is required, similarly to Sherbourne St. John STW and Witney STW above. However, the modelled limit difference is 5 mg/l for the example of Longborough STW

Whilst the difference between actual or assumed existing permit limit and required new permit limit at Longborough STW is more than 12 times larger than Sherbourne St. John STW or nearly 3 times larger than Witney STW, all these three sites require a similar 1pt Chemical dosing and tertiary solids removal scheme.

Analogous examples are the schemes required at Appleton STW (WINEP action 08TW100863a) and Reading STW (WINEP action 08TW100928a). Appleton STW currently has a P permit limit of 5mg/l and the proposed permit limit is 0.25mg/l (difference of 4.75mg/l). The current and proposed permit limits at Reading STW are respectively 1mg/l and 0.25mg/l, with a difference of 0.75mg/l. Because of the proposed permit limit being at the recognised technology achievable limit of 0.25mg/l and considering existing assets, both sites require a 2-Point Dosing and tertiary solids removal upgrade scheme, irrespective of the 3-fold difference between current and proposed limits.