

Langham Parish Council Response to AW/EA Papers Forwarded to Us by CBC

The [AW Paper](#) confirms that a Pre-Application was submitted on 7th Oct 2021 to EA to commence the specification of a WRC upgrade to support an increased DWF permit limit of 500 cubic metres/day (up from the current permit limit of 420 cubic metres/day). The paper indicates a potential target implementation date of 2024 or 2025 for the WRC upgrade, but with no firm commitment possible at this early planning stage.

The AW Paper also describes some welcome recent remedial works in the local foul sewerage network aimed at reducing the amount of infiltration of surface water and groundwater into the network. We welcome these works, but agree with AW's own statement that these remedial works "will not make a significant impact on the dry weather flows received at Langham WRC."

The [EA Paper](#) reaches a different conclusion about the likely effectiveness of AW's recent remedial works in restoring dry weather flow compliance at the Langham WRC. We believe that the methodology used in the EA Paper is flawed.

The EA Paper provides a minimum baseline target of creating 8 cubic metres/day WRC headroom to restore marginal permit compliance, based on 2020 measured flow figures. The paper then purports to demonstrate that 13 cubic metres/day of headroom can be released as a result of AW's recent remedial works (as summarised in the table with columns A to D) but the methodology is flawed, for two key reasons.

Problem 1:

It is not appropriate to infer that the surface water removal/headroom creation of 13 cubic metres/day (column D) will be achieved on the driest days of the year as well as the wettest days of the year. The real flow reduction will be much higher on very wet days, and much lower on the driest days. Since the DWF permit limit relates to the driest days of the year, the average daily flow reduction represents a significant over-estimate of any real new headroom created against the DWF permit limit.

Problem 2:

Even if one overlooks the above issue and accepts a methodology based on average daily surface water removal/headroom creation, EA appear to have massively overestimated this average daily figure, as demonstrated below:

The column A figure of 1.19 litres surface water removal comes directly from AW's paper and is based on a rainfall rate of 13.744mm/hour.

The column B figure of 4284 litres surface water removal is based on this same rainfall rate continuing for the entire hour ($1.19 \times 60\text{secs} \times 60\text{mins} = 4284$ litres).

The column C figure of 103,000 litres (=103 cubic metres) surface water removal is then based on this same rainfall rate continuing for the entire day ($4284 \times 24\text{hours} = 102,816$ litres = 103 cubic metres).

Column D attempts to correct for the real world fact that (thankfully!) it doesn't rain continuously in Langham, by estimating that rain falls for perhaps 12.5% of the time ($103 \times 0.125 = 13$ cubic metres). Whilst this estimate of 12.5% of the time being "rainy" might sound reasonable, it ignores the effects of different degrees of raininess, which can range from very light drizzle up to a heavy deluge. The point EA appear to have missed is that the rainfall intensity modelled by AW (13.744mm/hour)

represents very heavy rain in an Essex context, occurring for probably only a few hours each year. If EA's estimate were correct, then rainfall of 13.744mm/hour would be occurring for 12.5% of the time, or 45.6 days of the year (365 days x 0.125 = 45.6 days). The absurdity of this is easily demonstrated by working out how much annual rainfall this would correspond to:

$13.744\text{mm/hour} \times 24 \text{ hours} \times 45.6 \text{ days} = 15,041\text{mm}$ of rain per year.

Langham's actual rainfall in 2020 was approximately 600mm according to official [Met Office records](#).

It would therefore appear that EA have overestimated the real headroom release benefits of AW's remedial work by a factor of $15041/600 = 25.1$

A more realistic estimate of the average daily headroom release from AW's remedial work is therefore 0.52 cubic metres ($13/25.1 = 0.52$ cubic metres). Even this figure of 0.52 cubic metres is likely to be a significant overestimate, because it does not consider the factors mentioned in the "Problem 1" section above.

Langham Parish Council

15th December 2021