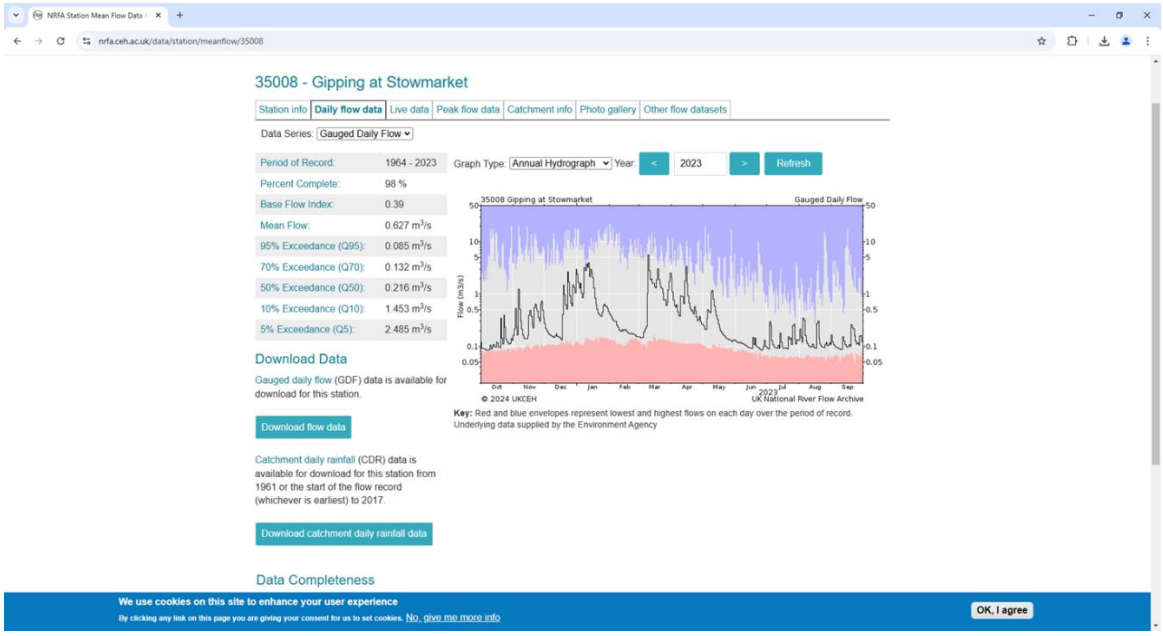
Form C2 - Q6 - Water Emissions Risk Assessment

You have provided a H1 risk assessment for the emissions of mercury, cadmium and iron, but have not completed an appropriate assessment of the increase in volume of effluent discharge that is being applied for. Provide an appropriate assessment of sanitary determinands, following the methodology set out in Environment Agency guidance H1 annex D2: assessment of sanitary and other pollutants in surface water discharges – GOV.UK, as per the guidance this should consider relevant parameters such as BOD, COD, TSS, TN and TP.

An assessment using the EA's RQP Tool has been carried out using the data available from the Ea together with the data retained by Muntons plc. Data for the River Gipping was sourced as per recommendations by Beth Wignall, Installations Senior Permitting Officer, National Permitting Service, Environment Agency as follows:

River Flow Estimates (national river flow archive): National River Flow Archive (ceh.ac.uk)
Upstream River Quality: Open WIMS data



Mean Flow for the River Gipping: 0.627m3/s

95% Exceedance (Q95): 0.085 m3/s

The Quality Data available for the River Gipping upstream of the Muntons plc site is listed as R.GIPPING U/S MUNTON AND FISONS. Analysis recorded was:

- Alky pH 4.5 - Alkalinity to pH 4.5 as CaCO3
- Ammonia(N) - Ammoniacal Nitrogen as N
- BOD ATU - BOD : 5 Day ATU
- Cond @ 25C - Conductivity at 25 C
- N Oxidised - Nitrogen, Total Oxidised as N

- NH3 un-ion - Ammonia un-ionised as N
- Nitrate-N - Nitrate as N
- O Diss %sat - Oxygen, Dissolved, % Saturation
- Orthophospht - Orthophosphate, reactive as P
- Oxygen Diss - Oxygen, Dissolved as O2
- pH - pH
- Temp Water - Temperature of Water

Muntons holds the following data for the trade effluent:

- COD mg/l - Chemical Oxygen Demand (mg/l)
- COD kg/d - Chemical Oxygen Demand (kg/24hr)
- TSS - Total Suspended Solids
- AN - Ammoniacal Nitrogen
- TN - Total nitrogen
- Fe - Total Iron
- P - Phosphorus
- pH - pH
- Temperature - Effluent Temperature at point of discharge
- Discharge - Total Discharge of Trade effluent (m3/24hr)
- Discharge - Discharge in m3/s

Therefore, the only comparative data that has been used for the RQP Tool is:

- Ammoniacal Nitrogen
- BOD: 5 Day ATU
- Total Nitrogen
- pH
- Temperature

Data used:

EA Data	Upstream Data	M&F Mean	M&F S.Dev	Muntons Data	Muntons Mean	Muntons S.Dev
Ammonia(N)	Ammoniacal Nitrogen as N	0.124	0.070	Ammoniacal Nitrogen	0.329	1.561
BOD ATU	BOD : 5 Day ATU	3.140	2.172	BOD : 5 day ATU (Eurofins)	2.995	0.820
N Oxidised	Nitrogen, Total Oxidised as N	7.180	0.598	Total Nitrogen	9.996	3.585
pH	pH	7.790	0.168	pH	7.745	0.179
Temp Water	Temperature of Water	17.300	1.346	Temperature	19.844	3.014

					m3/d	m3/s
	Mean flow	0.627		Current Flow (Mean)	1274	0.015
	95% Exceedance Flow	0.085		Max flow - current (1500m3/d)	1500	0.0174
				Max flow - proposed (2500m3/d)	2500	0.0289
				S.dev used = current flow		0.003

NB In the absence of firm data the Standard deviation for the Current Max Flow and the proposed Max flow was taken as per the existing mean flow i.e. 0.003

For the avoidance of doubt, the Muntons BOD is calculated as per [Understanding Laboratory Wastewater Tests: I. Organics (BOD, COD, TOC, O&G) | UGA Cooperative Extension] as

recommended by Bethany Wignall. This describes how to use COD to predict BOD, by calculating the mean COD:BOD ratio. The calculations are set out on the BOD tab of the Muntons Trade Effluent Data – 2023-2024 spreadsheet and is calculated on the data supplied by Eurofins Food Testing UK Ltd, a UKAS and MCERTS accredited laboratory.

	COD	BOD	COD/BOD	Projected BOD
26/01/2023	148	7	21.14	3.840
23/02/2023	149	5	29.80	3.866
30/03/2023	132	4	33.00	3.425
27/04/2023	87	4	21.75	2.257
26/05/2023	69	3	23.00	1.790
29/06/2023	62.7	3	20.90	1.627
27/07/2023	85	4	21.25	2.206
31/08/2023	143	5	28.60	3.710
28/09/2023	138	4	34.50	3.581
26/10/2023	113	2	56.50	2.932
14/12/2023	122	3	40.67	3.166
25/01/2024	183	2	91.50	4.748
27/03/2024	122	2	61.00	3.166
25/04/2024	85	2	42.50	2.206
30/05/2024	92.7	2	46.35	2.405
25/07/2024	100	2	50.00	2.595
26/09/2024	131	4	32.75	3.399
Mean	115.44	3.41	38.54	**2.995**
SD	31.61	1.37	18.05	**0.820**

Source: Eurofins Food Testing UK Ltd,
Gateway House,
Ammonite Drive,
Needham Market,
Suffolk, IP6 8EL

UKAS TESTING 2262

The output from the RQP Tool has been documented in the spreadsheet Comparative Analysis. Analysis has been done on the basis of:

- EA River Data & Muntons data for the existing Mean Flow
- EA River data & Muntons data for the current maximum permitted discharge (1500m3/24hr)
- EA River data & Muntons data for the proposed maximum permitted discharge (2500m3/24hr)

Screenshots of the RQP Tool output are also available in Screenshots - RQP Calculations

Accompanying Documents:

- Comparative Analysis
- Data Flow Data – Stowmarket
- Muntons Trade Effluent Data - 2023-2024
- R Gipping - EA Data v Muntons Data
- Screenshots - RQP Calculations

Data Analysis

Analysis of the data using the RQP Tool suggests that overall the percentage change in the quality of the River Gipping as a result of increasing the discharge from 1500m3 to 2500m3 is on overage 1.72%. This is well below the indicative 10% required by the EA as a threshold and can therefore be said that the proposal has a minimum effect on the quality of the river.

Although the full data is set out in Comparative analysis spreadsheet, this is summarised as follows:

	Upstream Mean Quality	Downstream Mean Quality	Change	Change v Original
Ammoniacal Nitrogen	0.12	0.14	14.29%	6.59%
BOD	3.14	3.15	0.32%	-0.32%
pH	7.79	7.79	0.00%	0.00%
Temperature	17.3	17.56	1.48%	0.62%
Total Nitrogen	7.18	7.46	3.75%	1.71%
		%age Change overall	**3.97%**	**1.72%**

Overall, although there is a percentage change in mean quality for Ammoniacal Nitrogen of 14.29%, all the other comparatives are below 2% change in mean quality. When considering Ammoniacal Nitrogen, the existing discharge has a 7.69% change to the upstream quality to downstream, which means that the proposed discharge would have a net change of 6.59%. This has then been averaged for all the changes analysed and shows an overall change to river quality of 1.72%

From this it can be shown that the proposal will not have a significant detrimental impact on the River.

Kit Wells, MBE,

PIEMA, CEnv, EnvDipNEBOSH, MRICS, MSc, MBA

Managing Director

Little Green Consulting Ltd

12th December 2024

On behalf of Muntons plc