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PROJECT	Chilmington Green Ashford, Kent		CLIENT	Hodson Developments			
TITLE	River Beult Monitoring October 2023		REFERENCE	22074-SVY-TN-01		C01	
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1 Introduction

- 1.1 Water Environment was commissioned by Hodson Developments Ltd to undertake surface water baseline monitoring at five locations along the River Beult and tributaries to the southwest of Ashford in Kent.
- 1.2 Monitoring included the collection of water samples for laboratory chemical analysis, the recording of in field physico-chemical parameters and the flow profiles of the watercourse. General observations of visual pollution, lack of flow and other environmental factors were also recorded.
- 1.3 The monitoring schedule is set out over twelve months and occurs approximately fortnightly at five different locations, identified during a preliminary walkover survey. Sites descriptions have been included below:
 - 1- Chilmington Green Road Discharge Point (Grid Ref. TQ 98335 39335)
 - 2- Chilmington Green Road 2 (Grid Ref. TQ 98064 39400)
 - 3- Boyce Wood (Grid Ref. TQ 97043 39153)
 - 4- Bethersden Road (Grid Ref. TQ 96573 38580)
 - 5- Kiln Wood (Grid Ref. TQ 95736 38649)
- 1.4 A detailed site location plan can be found in Appendix A.
- 1.5 Monitoring results are presented in a monthly report, with a final report issued on the completion of the monitoring study.
- 1.6 The monitoring study commenced mid-October and therefore only one visit was undertaken and reported herein.

2 Monitoring and Sampling Methodology

- 2.1 Water Environment attended site on 13th October 2023. General weather conditions during the visit were dry and overcast but had been preceded by heavy overnight rains. Water was not present at site 1, and therefore no measurements or samples were taken. All other sites have flowing water present and the following measurements and samples were taken.
- 2.2 Pictures of the sites and conditions can be found in Appendix B.

Flow Monitoring

- 2.3 A SonTek Flowtracker 2 was inserted into the river at multiple locations across the width of the river to give a range of flow across the river profile. Flow, discharge and depth was determined at each transect point to calculate an overall stream profile and discharge rate. The number of transects and measurements taken at each site vary depending on river width, but a minimum of 5 was taken for each site.
- 2.4 Schematics and river profiles at each monitoring point, with flow recordings at each position are attached in Appendix C.

Water quality Monitoring

- 2.5 In-situ monitoring was conducted using a Hanna Multiparameter probe. The multiparameter probe was inserted directly into the river at the sample site location where parameters measured include conductivity, pH, temperature, dissolved oxygen and salinity. Sensor specifications, limits of detection, and accuracy can be found in the instrument Instruction Manual¹.
- 2.6 To prevent cross contamination, the multiparameter probe was rinsed thoroughly at each location using water from downstream at the next sampling point and stored in a calibration fluid.

Water quality Sampling

- 2.7 A set of 3 water samples were collected for each site: 2, 3, 4 and 5. The samples were kept in a suitable storage box whilst on and off site, and sent to an accredited laboratory for further analysis. Limits of detection (LoD) are noted within the analysis of dataset and are indicated by <X, where X is the LoD.

¹ HI98184, HI98195, HI98196 Instruction Manual, Hanna Instruments. [<https://hannacan.com/mwdownloads/download/link/id/2205/>]

3 **River Profile and Flow rates**

- 3.1 Whilst recording flow, the depth of the river channel was recorded. Site 1 was recorded as dry, site 2 had the shallowest channel (0.1 m) and site 5 had the deepest (0.7 m). A general observation is that the river channel gradually got wider and deeper from site 1 to 5 which was expected.
- 3.2 Site 5 was showed the greatest depth and width, however, the water was generally very slow moving and the flow meter recorded negative results in some cases, showing that there are other flow dynamics such as eddies present.
- 3.3 The table below summarises the flow and discharge recorded at each site, however, further data can be found in Appendix C.
- 3.4 Site 2-5 have either no detected or very low flow. Using the flow profiles from onsite monitoring, the discharge (m^3/s) has been calculated and displayed in Table 1.

Table 1: Discharge Analysis

Site	Max Flow m/s	Min Flow m/s	Discharge
1	NA	NA	NA
2	0	0	0
3	0.036	0	0.002 m^3/s
4	0.207	0	0.011 m^3/s
5	0.007	0	0.02 m^3/s

4 Water Quality- In-Situ monitoring

- 4.1 The following section summarises the in-situ water quality parameters that were recorded on site. For the purpose of reliability, the below examples consist of 2 spot samples taken after the multiparameter probe had been correctly calibrated and 'settled'.

Temperature

- 4.2 The temperature from site 2-5 were consistent, with a slight increase of 0.83°C as the day progressed. It is assumed that this observation is to do with increasing ambient temperatures. Temperature of the water in the channel ranged from between 15.76 °C (Site 2) and 16.59 °C (Site 5).

Dissolved Oxygen (DO) (mg/l and % saturation)

- 4.3 The dissolved oxygen concentrations ranged between 1.55 ppm (Site 5) and 3.50 ppm (Site 4) and 16.1% (Site 5) and 36.6% (Site 4), with the highest concentrations at Site 4 and the lowest at Site 5.

Conductivity

- 4.4 Specific conductivity was recorded between 764 µS/cm (Site 4) and 942 µS/cm (Site 5). The lowest and highest consistent readings were at Site 4 and 5 respectively. Conductivity has a linear relationship with salinity as expressed in the samples collected during the site visit.

pH

- 4.5 The pH had a noticeably small range from 7.45 to 7.72. The lower range was recorded at site 5 and the higher at site 3. This is not expected to vary significantly between sites unless there is point-source pollution or surface water runoff that influences the pH in the river.

Salinity

- 4.6 Salinity was consistent along the river, as expected. Measurements ranged from 0.38 to 0.47 psu. Salinity measurements are not expected to vary significantly.

Visual and Odour observations

- 4.7 There were no odours recorded at any of the sampling locations. The channel beds at sites 2, 3, 4 and 5 are extremely silty. Therefore, visually the water can appear to be a silted colour when walking in the channel to record flow measurements. It was ensured that any water quality samples (in-situ or laboratory) were collected upstream of the flow monitoring transect.
- 4.8 Please see table below for a summarised view of the in-situ water quality measurements.

Table 2: In-Situ Monitoring results

Site	Time	Temperature (°C)	pH	ORP (mV)	EC (µS/cm)	Sal (psu)	DO (%)	DO (ppm)
2	12:15:33	15.79	7.68	67.5	814	0.40	21.4	2.08
3	13:20:14	15.91	7.72	74.8	812	0.40	34.5	3.34
4	14:29:06	16.59	7.57	71.6	765	0.38	36.6	3.50
5	15:06:19	16.26	7.45	-23.7	938	0.47	16.1	1.55

5 Water Quality- Laboratory Chemical Analysis

5.1 The surface water chemical analysis results are summarised below. Please note that no water quality samples were taken at site 1 (point of discharge) as this was recorded as dry.

Table 3: Analytical Test Results

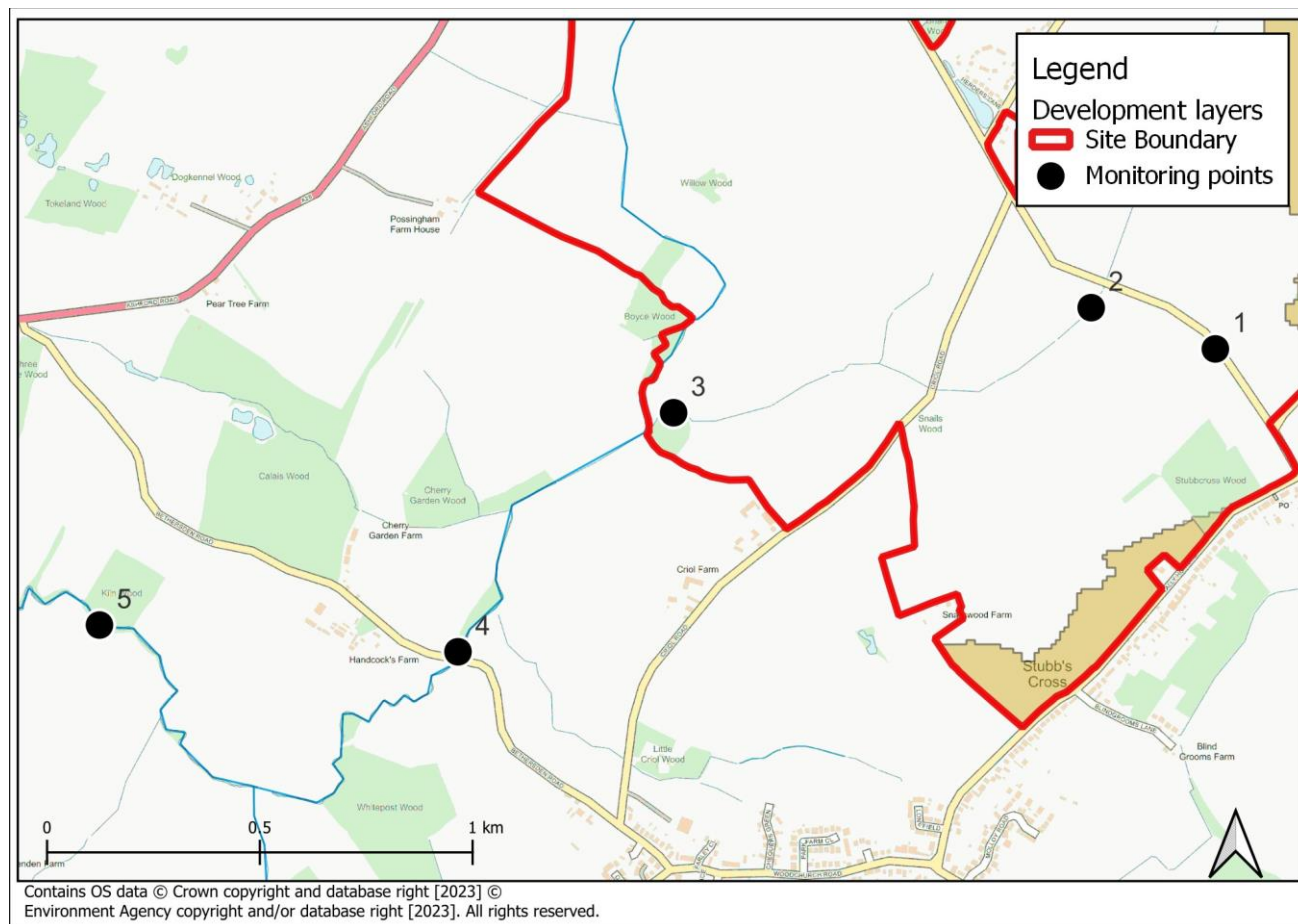
Parameter	Site 1	Site 2	Site 3	Site 4	Site 5
Biological Oxygen Demand BOD (mg/l)	NA	2	<1	<1	1
Alkalinity as CaCO₃ (mg/l)	NA	287	277	223	230
Total Suspended Solids (mg/l)	NA	<10	22	13	23
Ammoniacal Nitrogen as N (mg/l)	NA	3.06	7.16	8.06	5.08
Nitrite (mg/l)	NA	0.2	0.2	<0.1	<0.1
Nitrite as N (mg/l)	NA	0.05	0.06	<0.03	<0.03
Nitrate (mg/l)	NA	2.4	1.9	0.7	0.2
Nitrate as N (mg/l)	NA	0.534	0.429	0.149	0.047
Nitrogen, Oxidised Nitrogen (mg/l)	NA	0.6	0.5	0.2	<0.1
Total Nitrogen (mg/l)	NA	1.7	1.2	0.7	0.7
Orthophosphate PO₄ (mg/l)	NA	1.63	0.24	0.24	0.13
Total Phosphorus (µg/l)	NA	532	79	77	42

5.2 Total Nitrogen decreased considerably from site 2 (1.7 mg/l) to site 5 (0.7 mg/l). The results for Total Phosphorus showed no consistent pattern between sites, the values ranged at each site, with a notably high value found at site 2 of 532 µg/l, with the lowest value found at site 4 of 42 µg/l.

6 Summary of Monitoring

- 6.1 This was the first occurrence of a series of monitoring on the River Beult. This will assist in forming baselines that will be compared to future monitoring at the respective sites.

Appendix A: Figures



Appendix B: Photographs



Site 1: Dry roadside ditch



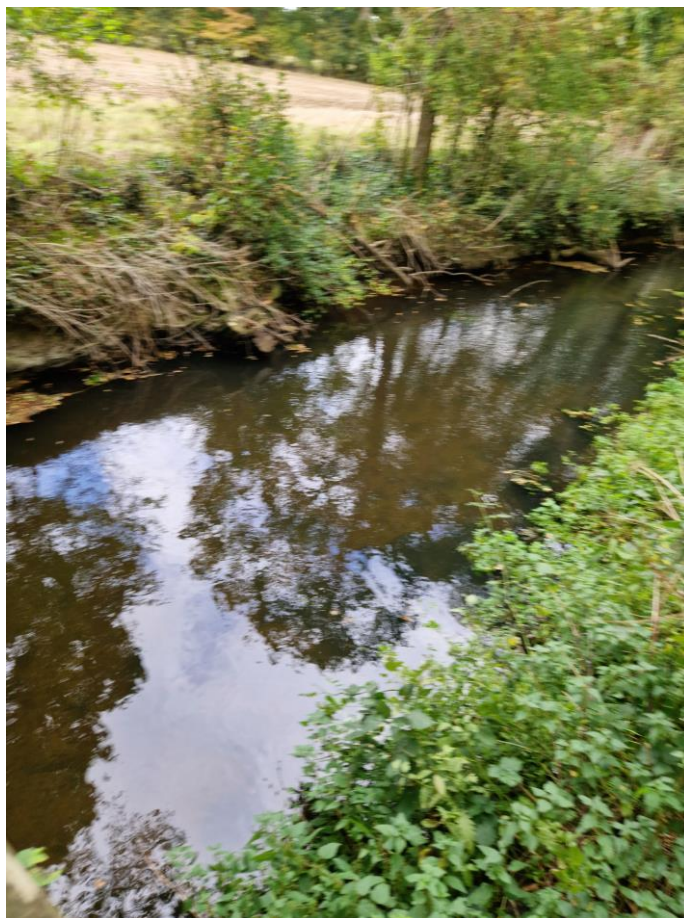
Site 2: Stream next to field hedge row



Site 3: Stream prior to joining adjacent River Beult tributary.



Site 4: Upper River Beult near Bethersdon Road



Site 5: Near Kiln Wood Public Right of Way

Appendix C: River Cross section profiles

