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PROJECT	Chilmington Green Ashford, Kent		CLIENT	Hodson Developments			
TITLE	River Beult Monitoring November 2023		REFERENCE	22074-SVY-TN-02		C01	
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REV	COMMENTS			DATE	AUTH	CHKR	APPR
C01	Final issue			17/04/2024	GS	GL	GL

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 This report will summarise one round of sampling as one site visit was undertaken in November.

2 Monitoring and Sampling Methodology

- 2.1 Water Environment attended site on 23rd November 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.

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 (1.08 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 showed the greatest depth and width, however, the water was generally very slow moving, showing that it was a stagnant section of the river.
- 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	0.077	0.021	0.010 m^3/s
3	0.098	0.042	0.033 m^3/s
4	0.201	0.014	0.075 m^3/s
5	0.087	0.009	0.206 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 decrease of 0.47°C as the day progressed. Temperature of the water in the channel ranged from between 9.41°C (Site 2) and 8.94 °C (Site 5).

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

- 4.3 The dissolved oxygen concentrations ranged between 3.585 ppm (Site 5) and 6.665 ppm (Site 2) and 25.85% (Site 5) and 58.2% (Site 4), with the highest concentrations at Site 2 and the lowest at Site 5.

Conductivity

- 4.4 Specific conductivity was recorded between 441.5 µS/cm (Site 5) and 666 µS/cm (Site 2). The lowest and highest consistent readings were at Site 5 and 2 respectively. The decrease in conductivity from site 2 to site 5 may be a direct correlation with the decrease in temperature and salinity from site 2 to 5.

pH

- 4.5 The pH had a noticeably small range from 7.43 to 7.76. The lower range was recorded at site 5 and the higher at site 2. 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 very consistent along the river, as expected. Measurements ranged from 0.21 (site 5) to 0.33 (site 2) 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 were 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	12:26:22	9.41	7.755	59.65	666	0.33	58.2	6.665
3	13:17:33	9.08	7.815	52.6	408.5	0.2	52.45	6.065
4	14:01:51	8.925	7.585	59.35	558	0.27	44.8	5.19
5	15:24:19	8.94	7.43	95.65	441.5	0.21	25.85	3.585

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

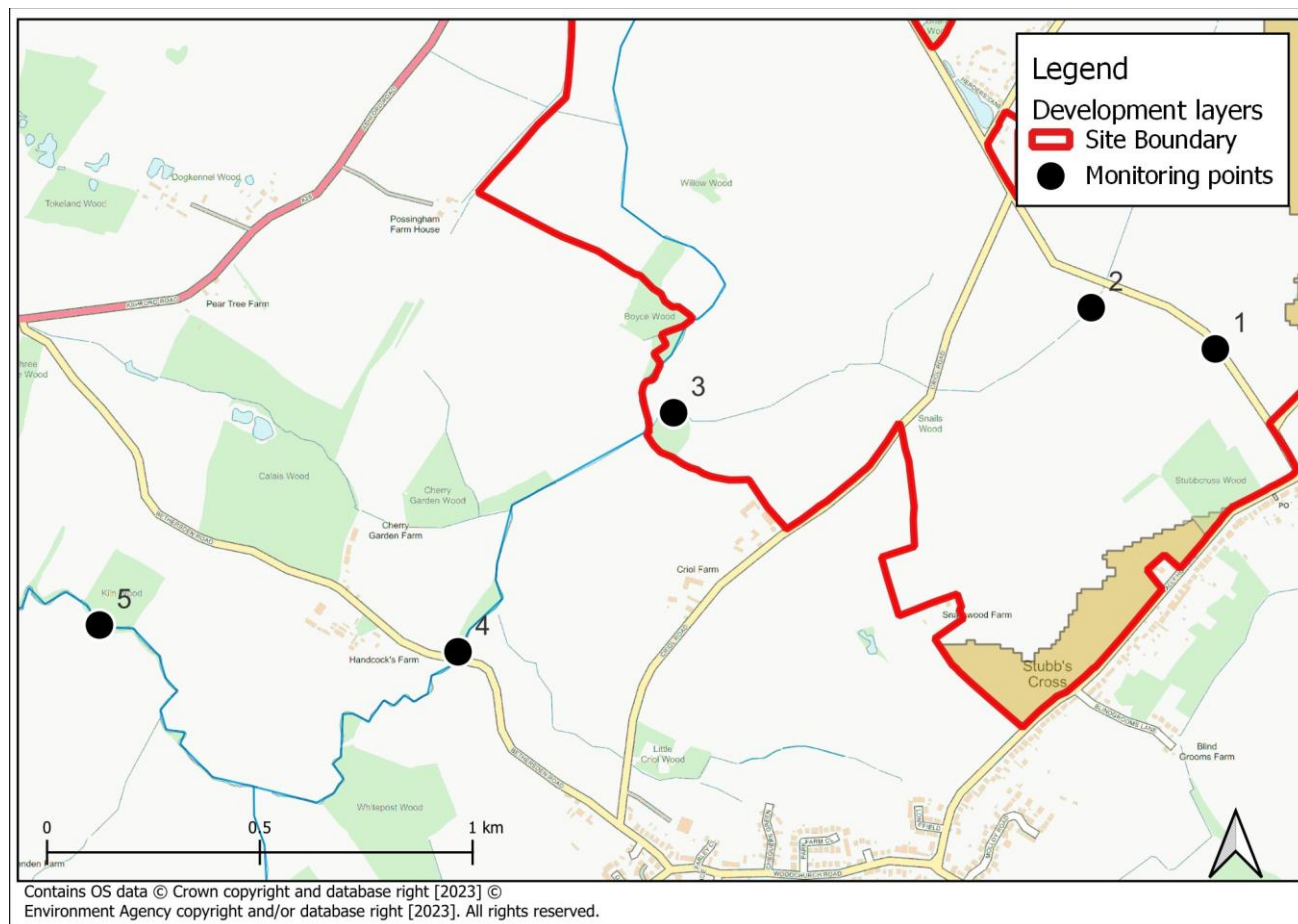
Parameter	Site 1	Site 2	Site 3	Site 4	Site 5
Biological Oxygen Demand BOD (mg/l)	NA	<1	<1	3	<1
Alkalinity as CaCO₃ (mg/l)	NA	205	216	127	104
Total Suspended Solids (mg/l)	NA	<10	<10	15	14
Ammoniacal Nitrogen as N (mg/l)	NA	0.06	<0.05	<0.05	0.06
Nitrite (mg/l)	NA	0.1	<0.1	<0.1	0.1
Nitrite as N (mg/l)	NA	0.03	<0.03	<0.03	0.03
Nitrate (mg/l)	NA	48	39.7	20.5	11.1
Nitrate as N (mg/l)	NA	10.8	8.963	4.632	2.516
Nitrogen, Oxidised Nitrogen (mg/l)	NA	10.9	9	4.7	2.5
Total Nitrogen (mg/l)	NA	15	9.6	5.5	3.5
Orthophosphate PO₄ (mg/l)	NA	0.29	0.18	0.14	0.26
Total Phosphorus (µg/l)	NA	115	74	82	114

- 5.2 Total Nitrogen decreased considerably from site 2 (15 mg/l) to site 5 (3.5 mg/l). The results for Total Phosphorus showed no notable pattern between sites, the values ranged at each site, with the two highest values found at site 2 and 5, and the two lowest values found at site 3 and 4.
- 5.3 A comparison of the results for Total Nitrogen between the data for October and November, shows a considerable increase in Total Nitrogen from October to November. For example, the highest and lowest values from October were 1.7 mg/l and 0.7 mg/l compared to the highest and lowest values from November of 15 mg/l and 3.5 mg/l. Both sets of results show a decrease in Total Nitrogen from site 2 to site 5.
- 5.4 For Total Phosphorus, there was no notable pattern. The values for site 3 and 4 remained consistent for October and November, with a range between 74 µg/l and 82 µg/l. The highest values were found at site 2 for both October and November of 532 µg/l and 115 µg/l.

6 Summary of Monitoring

- 6.1 This was the second 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.
- 6.2 A comparison of the results for Total Nitrogen between the data for October and November, shows a considerable increase in Total Nitrogen from October to November. For example, the highest and lowest values from October were 1.7 mg/l and 0.7 mg/l compared to the highest and lowest values from November of 15 mg/l and 3.5 mg/l. Both sets of results show a decrease in Total Nitrogen from site 2 to site 5.
- 6.3 For Total Phosphorus, there was no notable pattern. The values for site 3 and 4 remained consistent for October and November, with a range between 74 µg/l and 82 µg/l. The highest values were found at site 2 for both October and November of 532 µg/l and 115 µg/l.

Appendix A: Figures



Appendix B: Photographs



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

