



# Hollow Way Lane - Baseline report

## Part A – Modular River Survey

Smarter Water Catchment Programme

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Working in partnership



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## Contents

1	Introduction .....	4
2	What did we learn from the baseline MoRPh surveys? .....	5
2.1	Site overview .....	5
2.2	Extent of bed siltation .....	11
2.3	Riparian vegetation structural complexity .....	11
3	Conclusions .....	1

## List of figures

<b>Figure 1.1:</b> General view of the Little Chess at the Holloway Lane site taken during the baseline (pre-restoration) MoRPh surveys (subreach 2) .....	5
<b>Figure 2.1</b> Map of the Little Chess at the Holloway Lane site, showing the locations of the MoRPh subreaches (red circles). .....	6
<b>Figure 2.2:</b> Evidence of the lack of flow diversity taken at Subreach 2 (left) and Subreach 3 (right). .....	6
<b>Figure 2.3:</b> Photos of the variation in bed siltation which is higher upstream in the site shown by the left photo (taken at Subreach 1) and the right photo (taken at Subreach 5). .....	7
<b>Figure 2.4:</b> Photos of the average riparian physical habitat and vegetation complexity and the restriction on complexity due to the proximity of Holloway Lane road (right). Taken at Subreach 1 (left) and Subreach 5 (right). .....	8
<b>Figure 2.5</b> Summary of the pre-restoration (baseline) averages of the MoRPh indexes per subreach from the Hollow Way Lane site. Also shown are index value comparisons for all MoRPh surveys on the Little Chess (light green), UK average chalk stream values (brown), and average values for all rivers within the Citizen Science MoRPH database (red). .....	9
<b>Figure 2.6</b> Frequency distributions of MoRPH Index values 1-14 for the pre-restoration (baseline) data. ....	10
<b>Figure 2.7:</b> Index 7 at each subreach. ....	11
<b>Figure 2.8:</b> Index 11 at each subreach. ....	11

# 1 Introduction

This report contains a description of the baseline Modular River Survey (MoRPh) data captured by citizen scientists engaged on the Little Chess at the Holloway Lane site located approximately 2.5km south east of the town centre of Chesham. This report will focus on the Little Chess at the Holloway Lane site (Figure 1.1). The channel flows alongside Holloway Lane road, and the downstream end is located where Holloway Lane meets Latimer Road (Figure 2.1).

MoRPh is a bankside surveying technique developed by Queen Mary University of London that enables non-specialists to gather scientific data on the physical, ecological and hydrological condition of water bodies and adjacent land. Short lengths or 'subreaches' of the river are surveyed and the results are used to calculate 14 indices that represent physical habitat mosaics and human pressures. The surveys allow independent monitoring and evaluation of our river restoration projects. We can therefore be held to account if project goals are no longer being met, and can investigate and intervene, if necessary, to ensure the long term-success of restoration work.

A programme of recruitment and training was started in early 2022, kindly funded by a grant from the Chess Smarter Water Catchments Programme. As of January 2024, our volunteers have undertaken 158 MoRPh surveys throughout the Chess catchment. This demonstrates a huge commitment from volunteers who have not only provided their time but have also co-ordinated to ensure surveys are completed, and demonstrated a great level of rigour to ensure the data gathered and uploaded is of the best quality possible.

In this report, we summarise the findings of the pre-restoration (baseline) MoRPh surveys at Holloway Lane. We make comparisons with the online MoRPh database<sup>1</sup> which contains all the data collected by citizen scientists since the Modular River Survey began in 2016, and have filtered the surveys undertaken on chalk streams<sup>2</sup>. This is used to help us measure the current condition of the river in comparison to the wider Chess catchment and other chalk streams across the UK. We have summarised the baseline conditions of the Holloway Lane site because future river restoration works are planned for the Chess catchment. To set river restoration objectives, it is necessary to understand the site as the baseline conditions will help us decide which restoration activities are most suitable.

It is worth noting that the analysis within this report is based on the average values from the baseline citizen science MoRPh surveys. Therefore, we have not discussed the possible differences in the results due to surveys undertaken in multiple seasons.

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<sup>1</sup> MoRPh Citizen Science Map, <https://modularriversurvey.org/map/>, accessed 12/02/24

<sup>2</sup>Sites from the MoRPH database were filtered based on whether they were undertaken within 50m of a chalk stream (utilising: DEFRA Priority Habitat Chalk rivers and Streams, <https://naturalengland-defra.opendata.arcgis.com/datasets/1bb8e710c8254e8fa33e95c7bc13229e>, accessed 12/02/24)



**Figure 1.1:** General view of the Little Chess at the Holloway Lane site taken during the baseline (pre-restoration) MoRPh surveys (subreach 2)

## 2 What did we learn from the baseline MoRPh surveys?

### 2.1 Site overview

Baseline surveys were undertaken on six subreaches<sup>3</sup> of the Little Chess (Figure 2.1) at the Holloway Lane site in April 2023. The river has been affected by centuries of historical modification, including canalisation and drainage for flood defence, farming and fishing pursuits, urban development and for industries such as milling. At the Holloway Lane site, it is likely that the channel was artificially created, as shown by the overwide and straight nature of the channel. Historically, the channel flowed alongside the Chesham Sewage Treatment works but in the late 19<sup>th</sup> century, the sewage treatment works moved further downstream. In 2024 the Sewage Treatment works are located south of Latimer Rd. The site is constrained by land use as the channel flows parallel to Holloway Lane Rd and is culverted under Latimer Rd at the downstream end (Figure 2.1). The proximity to the road has limited the riparian cover on the right bank (Figure 2.4).

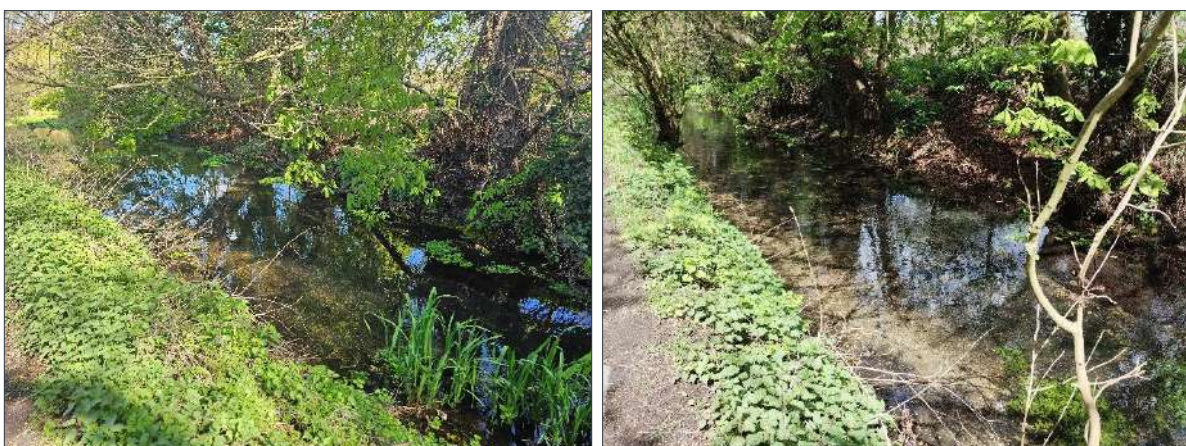
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<sup>3</sup> Subreaches are sections or 'reaches' of the river that have been divided up to undertake the survey following the standard MoRPh methodology



**Figure 2.1** Map of the Little Chess at the Holloway Lane site, showing the locations of the MoRPH subreaches (red circles).

The Pre-Project MoRPH data (Figure 2.5 and 2.6) shows the number of flow types (Index 1) were on average relatively low (1-3) (Figure 2.2), similar to the UK chalk stream average, but well below the number of flow types that the river should naturally contain (pre-modification). Index 2 illustrates that the highest energy flow types were unbroken standing wave, rippled and smooth.



**Figure 2.2:** Evidence of the lack of flow diversity taken at Subreach 2 (left) and Subreach 3 (right).

The coarsest bed material size (Index 4) on average covering the river bed was gravel, and the most common bed material (Index 6) on average was sand, then gravel. The extent of bed siltation (Index 7) was very variable, ranging from 0 to 10. Therefore, the average was much higher than the UK chalk

stream average. The extent of bed siltation is highest at the upstream end of the site and reduces towards the downstream end of the site (Figure 2.3). This is likely reflecting the overwide and over-deep nature of the channel at the upstream end of the site (subreach 1 recorded a width of 8.5m and subreach 6 had a width of 2.5m).



**Figure 2.3:** Photos of the variation in bed siltation which is higher upstream in the site shown by the left photo (taken at Subreach 1) and the right photo (taken at Subreach 5).

Channel physical habitat complexity (Index 8) and riparian physical habitat complexity (Index 10) were both close to the average for UK chalk streams and the Chess catchment (Figure 2.4). The frequency distributions for both illustrate the low physical habitat complexity of the site due to the low amount of channel physical habitat (Index 8) and riparian physical habitat (Index 10). The riparian vegetation structural complexity (Index 11) was also about average compared to other UK chalk streams. This is likely reflecting the lack of riparian diversity on the right bank due to the proximity of Holloway Lane Rd (Figure 2.4).

The number of aquatic vegetation morphotypes<sup>4</sup> (Index 9) was relatively good and slightly above the UK chalk stream average.

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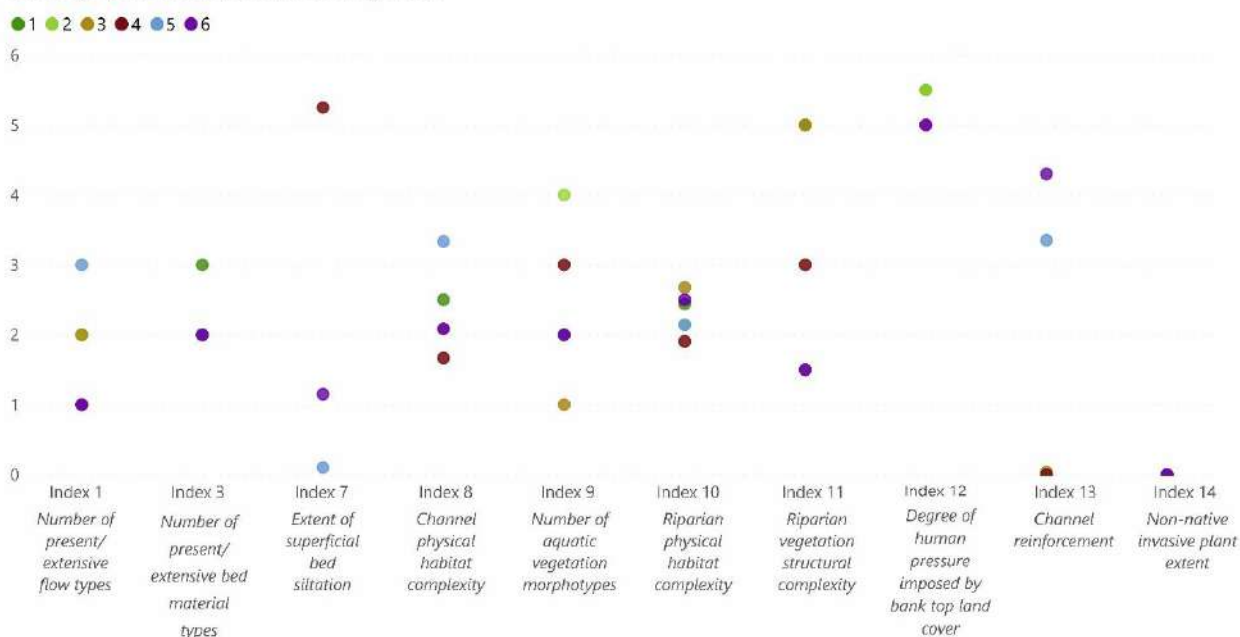
<sup>4</sup> Organisms that share particular physical characteristics (size, height etc.)



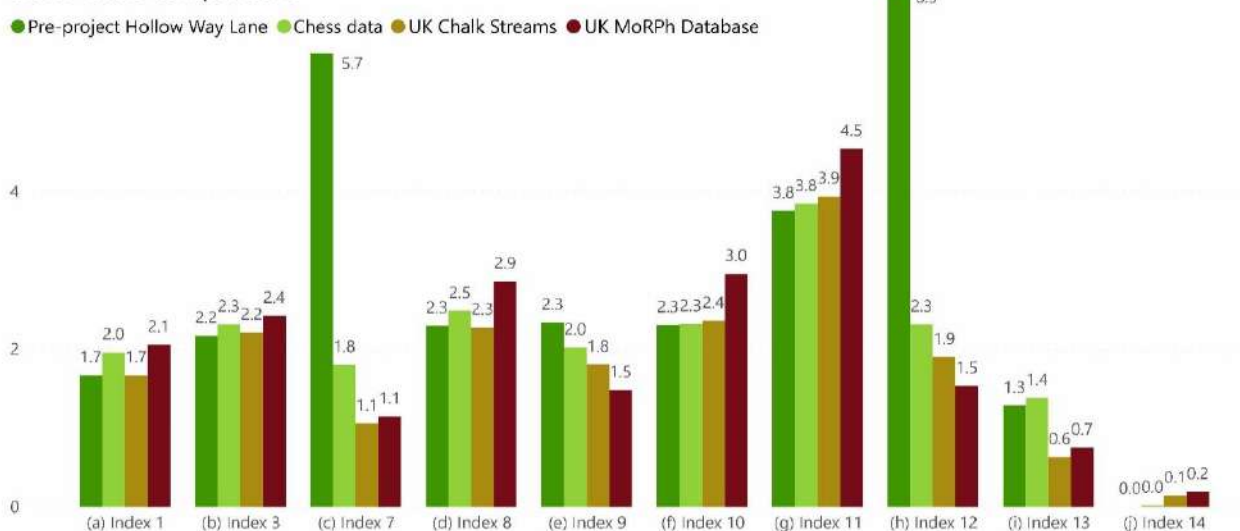
**Figure 2.4:** Photos of the average riparian physical habitat and vegetation complexity and the restriction on complexity due to the proximity of Holloway Lane road (right). Taken at Subreach 1 (left) and Subreach 5 (right).

At all subreaches, medium to high amounts of human pressures on the bank top (Index 12) were recorded, reflecting the proximity of the channel to Holloway Lane Rd. However, channel reinforcement was only identified at a few subreaches (Index 13). Channel reinforcement was recorded at the downstream end of the site at subreaches five and six. No non-native species (Index 14) were recorded at any of the subreaches.

### Average Index value at Holloway Lane



### Index value comparisons



Dataset	Index 1	Index 3	Index 7	Index 8	Index 9	Index 10	Index 11	Index 12	Index 13	Index 14
Chess data	1.96	2.31	1.80	2.48	2.02	2.32	3.84	2.31	1.38	0.00
Pre-project Holloway Lane	1.67	2.17	5.71	2.29	2.33	2.30	3.75	6.50	1.28	0.00
UK MoRPh Database	2.05	2.42	1.14	2.86	1.48	2.95	4.54	1.53	0.75	0.19
UK Chalk Streams	1.67	2.21	1.05	2.27	1.80	2.35	3.93	1.90	0.63	0.14
<b>Total</b>	<b>1.84</b>	<b>2.28</b>	<b>2.43</b>	<b>2.48</b>	<b>1.91</b>	<b>2.48</b>	<b>4.02</b>	<b>3.06</b>	<b>1.01</b>	<b>0.08</b>

Contains MoRPh Rivers Citizen Science data, licensed for access under the Creative Commons Attribution Non-Commercial 4.0 license, available at <https://modularriversurvey.org/map>, accessed 17/01/24.

**Figure 2.5** Summary of the pre-restoration (baseline) averages of the MoRPh indexes<sup>5</sup> per subreach from the Holloway Lane site. Also shown are index value comparisons for all MoRPh surveys on the Little Chess (light green), UK average chalk stream values (brown), and average values for all rivers within the Citizen Science MoRPh database (red).

<sup>5</sup> Indexes 2,4,5,6, are excluded from these plots as they are not numbers between 0 and 10.



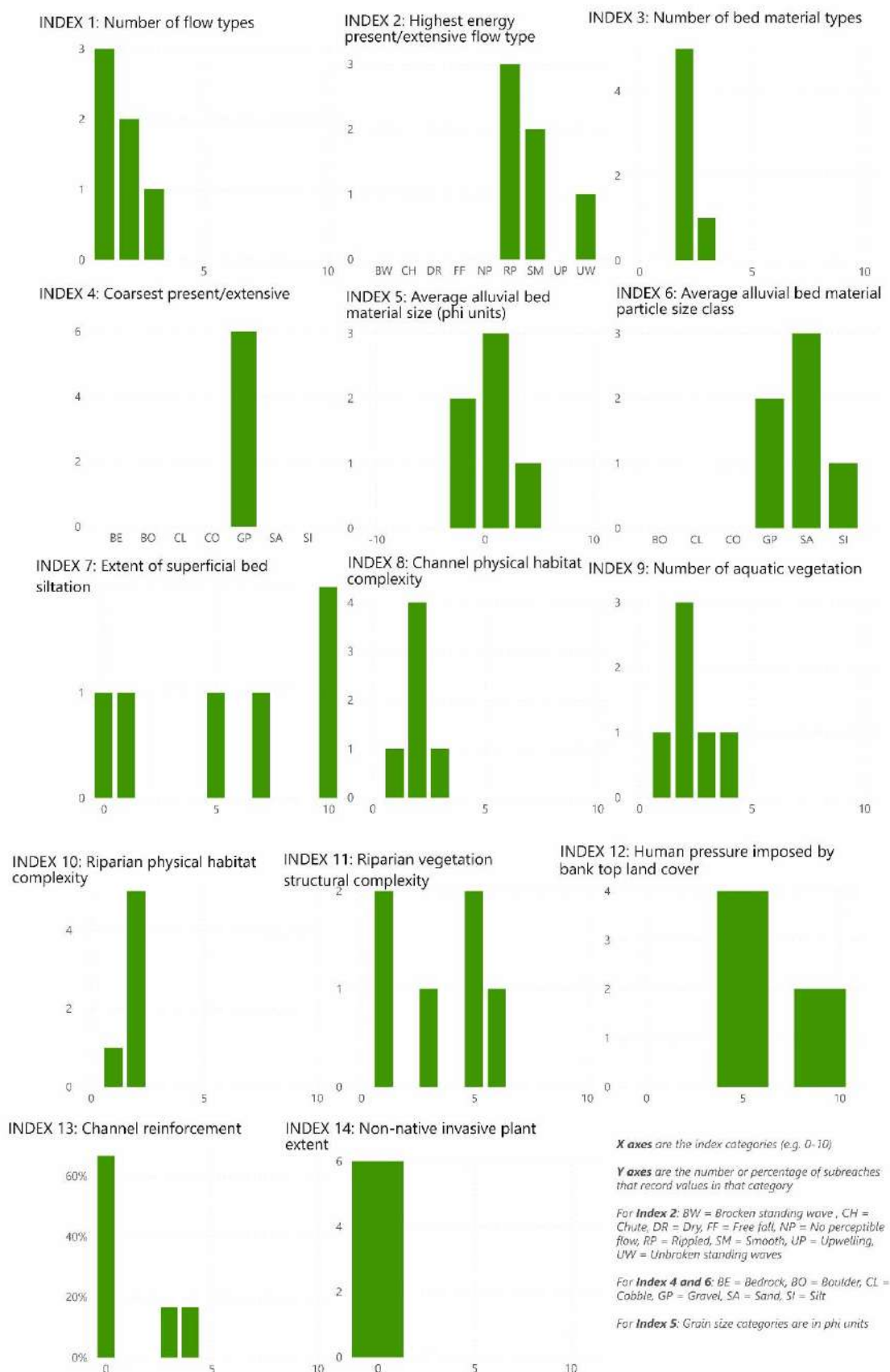


Figure 2.6 Frequency distributions of MoRPH Index values 1-14 for the pre-restoration (baseline) data.

## 2.2 Extent of bed siltation

A detailed breakdown of bed siltation along the channel within the site is shown in Figure 2.7. Index 7 illustrates the average extent of silt of the channel bed recorded by the trained citizen science surveyors. UK chalk streams are expected to have relatively low levels of silt across the channel bed as a high proportion of the flow is groundwater fed. Within the site, the extent of bed siltation recorded varied extensively and there was a higher extent of bed siltation at the upstream end of the site. This is likely related to the overall channel conditions at the upstream end of the site (Figure 2.3).

**INDEX 7: Extent of superficial bed siltation**



**Figure 2.7:** Index 7 at each subreach.

## 2.3 Riparian vegetation structural complexity

A detailed breakdown of riparian vegetation complexity within the site is shown in Figure 2.8. Index 11 illustrates the complexity of the riparian vegetation and a higher number represents greater diversity in the vegetation. At the downstream end of the site, the riparian vegetation complexity is lower which is likely related to the increased proximity of Holloway Lane road and the culverted section under Latimer Road (Figure 2.4).

**INDEX 11: Riparian physical habitat complexity**



**Figure 2.8:** Index 11 at each subreach.

### 3 Conclusions

MoRPh surveys of the Little Chess at the Holloway Lane site have enabled us to understand the pre-restoration (baseline) conditions of the channel. From this, we can make the following conclusions:

- The channel currently has on average little flow diversity or energy, and on average higher amounts of bed siltation than expected for UK chalk streams. Siltation scores reduce from the most upstream to downstream sites.
- Despite the artificial nature of the channel, the average riparian physical habitat and structural complexity at the site were average compared to UK chalk streams, and the average numbers of aquatic vegetation morphotypes<sup>4</sup> was good. The riparian vegetation on the left bank was relatively diverse. However, the MoRPh data was collected within spring which may not directly compare to wider catchment and UK average data.
- The moderate condition of the site can be attributed to the artificially straight, overwide and over deep nature of the watercourse due to Holloway Lane Rd and commercial property. This has artificially modified the banks and restricted the growth of riparian vegetation.

MoRPh citizen science surveys are a great technique for non-specialists to gather scientific evidence on the conditions of waterbodies. They are also a valuable way for the community to feel more engaged with their local river. We hope that these surveys have enabled volunteers to explore unfamiliar parts of the Chess catchment and appreciate it in a new way and are excited to see the results of future surveys.

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*MANY THANKS FOR ALL THE EFFORT WITH SURVEYING AND WE HOPE YOU'VE ENJOYED OUR REPORT. WE WOULD LOVE TO HEAR ANY FEEDBACK AT [CHESSCS@CHILTERN.S.ORG.UK](mailto:CHESSCS@CHILTERN.S.ORG.UK)*

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