

A428 Black Cat to Caxton Gibbet Improvements

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Volume 9

9.58 Aquatic Habitats Surveys 2021 Technical Note

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Rule 8(1)(k)

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November 2021

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**The Infrastructure Planning
(Examination Procedure) Rules 2010**

**A428 Black Cat to Caxton Gibbet
improvements**
Development Consent Order 2021

9.58 Aquatic Habitats Surveys 2021 Technical Note

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1 Summary

- 1.1.1 As part of the A428 Black Cat to Caxton Gibbet Improvements (the Scheme), surveys were undertaken of aquatic habitats and their condition, as well as surveys to determine the status of fish and aquatic macroinvertebrate populations. The results of these surveys were reported in Appendix 8.4, Aquatic Habitats [APP-191], Appendix 8.15, Fish [APP-202] and Appendix 8.17, Aquatic Invertebrates [APP-204] of the Environmental Statement.
- 1.1.2 These surveys were undertaken over the period 2017 to 2019, with the highest survey effort in 2018, which had a warmer and drier than average summer, leading to a number of the watercourses and ponds assessed being found to be dry. A survey was undertaken in 2021 to re-assess these watercourses and ponds to determine if they are permanently dry or, if not, to undertake the surveys as planned for 2018.
- 1.1.3 Three watercourses and six ponds were surveyed in 2018 but found to be almost permanently dry. These were re-assessed in 2021 over the period May to September to provide evidence to support this observation. The weather in 2021 was noticeably wetter, especially in January, May, June and July.
- 1.1.4 Two of the three watercourses visited during 2021, Fox Brook and Wintringham Brook, were dry on all visits, with only puddles of water present in May. One watercourse, Hen Brook, did contain water in all visits, but with little or no detectable flow in July or August. The six ponds re-assessed in 2021 were all found to be permanently dry. It was not possible to undertake the surveys as planned for 2018, i.e. aquatic habitat condition, fish or aquatic invertebrates.
- 1.1.5 The baseline for aquatic habitats in 2021 remains the same as described in the surveys undertaken in 2017 to 2019. As such, the assessment and mitigation measures outlined in Chapter 8, Biodiversity [APP-077] of the Environmental Statement remain appropriate.

2 Introduction

- 2.1.1 The purpose of the A428 Black Cat to Caxton Gibbet Improvements (the Scheme) is to address the problems of congestion, poor journey time reliability and poor resilience against incidents between the Black Cat and Caxton Gibbet roundabouts.
- 2.1.2 The Scheme seeks to address these problems through construction of a new 10 mile (16 kilometres) dual 2-lane carriageway from the Black Cat roundabout to Caxton Gibbet roundabout, to be known as the A421 and in addition approximately 1.8 miles (3 kilometres) of tie-in works.
- 2.1.3 The Scheme is shown in schematic form in **Figure 2-1**.

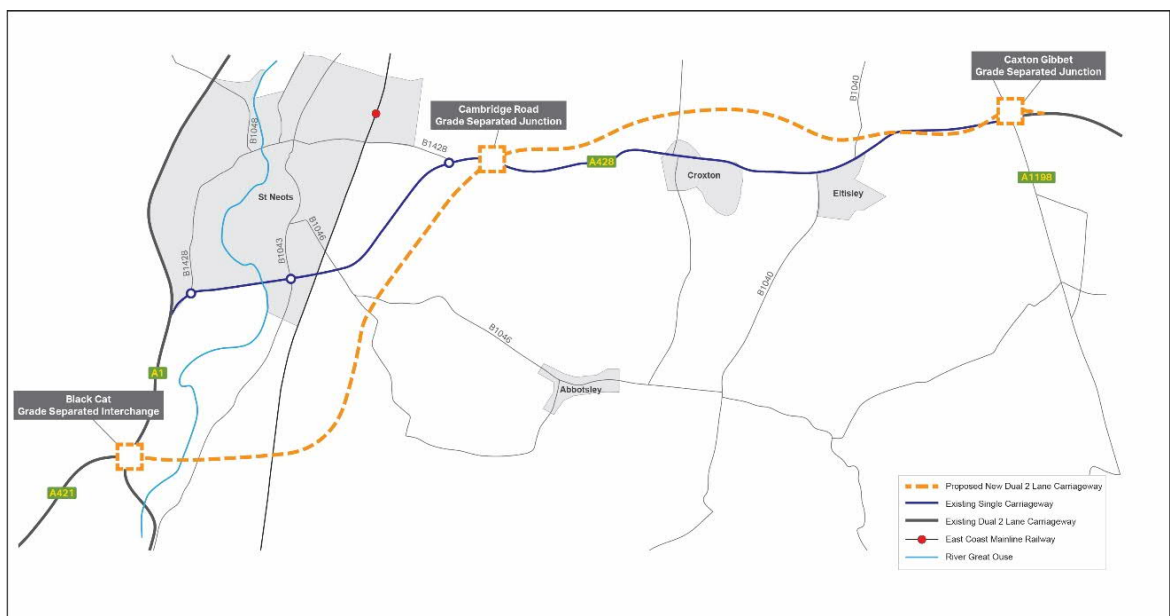


Figure 2-1: The Scheme

- 2.1.4 Surveys were undertaken of aquatic habitats and their condition, fish and aquatic macroinvertebrates as part of the assessment of impact of the Scheme on biodiversity. The results of these surveys are reported in Appendix 8.4, Aquatic Habitats [APP-191], Appendix 8.15, Fish [APP-202] and Appendix 8.17, Aquatic Invertebrates [APP-204] of the Environmental Statement. The ecological effects of the Scheme and proposed mitigation are presented in Chapter 8, Biodiversity [APP-077] of the Environmental Statement.
- 2.1.5 The objective of the surveys described in this technical note were to re-assess watercourses and ponds found to be dry in 2018 in order to determine if they are permanently dry or, if not, to undertake the surveys as planned for 2018.
- 2.1.6 This technical note should therefore be read in conjunction with the documents listed in **Table 2-1** below.

Table 2-1. Documents relating to this Technical Note

Document title	PINS Examination Library Reference
Chapter 8, Biodiversity	APP-077
Appendix 8.4 Aquatic Habitats	APP-191
Appendix 8.15 Fish	APP-202
Appendix 8.17 Aquatic Invertebrates	APP-204
Appendix 13.4 Flood Risk Assessment - Ordinary Watercourse Modelling Report	APP-222

2.1.7 Although these surveys were undertaken at appropriate times of the year over the period 2017 to 2019, the majority were undertaken in 2018, which had a warmer and drier than average summer. The dry conditions in 2018 may therefore have accounted for many of the watercourses and ponds within the Survey Area being drier than in other years. As such, a re-survey of the watercourses and ponds which were dry and could not be surveyed in 2018 was undertaken in 2021.

3 Methodology

3.1.1 Watercourses and ponds found to be dry in the surveys of 2018 were visited four times over the spring and summer of 2021.

Watercourses

3.1.2 One watercourse assessed in 2018 (Hen Brook) was re-assessed in 2021. A further two watercourses not visited in 2018 were assessed in 2021 where access allowed to reaffirm the statement made in Appendix 8.4, Aquatic Habitats [APP-191] of the Environmental Statement that all other watercourses not surveyed were deemed to be of very low ecological value as mostly dry at the time of the habitat walkover survey. The two watercourses surveyed in 2021 were Wintringham Brook and Fox Brook. The watercourses varied in size from Hen Brook as the largest to Fox Brook as the smallest. The locations of the sections visited were in the upper reaches of the watercourses (refer to **Table 3-1**). The purpose was to describe the state of the habitat in terms of key morphological channel features, riparian land uses, sources of sedimentation, bank modifications and opportunities for restoration potential in a range of river typologies. Surveys were carried out on 13 May, 7 July, 4 August and 14 September 2021.

Ponds

3.1.3 Six of the ponds assessed in 2018 were found to be dry at the time of the survey (Ponds 2, 4, 21, 45, 46 and 61). The purpose of these re-assessments was to reaffirm the statement made in Appendix 8.4, Aquatic Habitats [APP-191] of the Environmental Statement that all ponds not surveyed in 2018 were deemed to be of very low ecological value as mostly dry at the time of the habitat walkover survey.

3.1.4 The locations of these ponds were spread out along the route (refer to **Table 3-1** Error! Reference source not found.). As with the watercourses, surveys were carried out on 13 May, 7 July, 4 August and 14 September 2021.

Table 3-1: Location and description of the watercourses and ponds assessed

Habitat /Name	Location (grid reference)	Description
Watercourse		
Hen Brook	TL 208 583	Hen Brook is a tributary of the River Great Ouse. It is approximately 1.5km long and a continuation of the Abbotsley Brook. Together, these form a watercourse approximately 12.9km long with a catchment area of 58.05km ² . The bed of this brook is predominantly covered with fine sediment with some very fine gravel in patches. There are steep banks of around 2- 3m up to adjacent

Habitat /Name	Location (grid reference)	Description
		arable fields. Riparian woodland features intermittently along this watercourse.
Wintringham Brook	TL 223 592	This tributary of Fox Brook rises southeast of Croxton and flows in a generally westerly direction to join Fox Brook within St Neots. It is approximately 5.5km in length and essentially a straightened, ephemeral, agricultural drainage ditch. It has deep banks rising around 2m from the bed to adjacent arable fields.
Fox Brook	TL 228 603	Fox Brook rises as an agricultural ditch to the north of Weald and takes a westerly course towards St Neots, where it discharges into Hen Brook within St Neots shortly upstream of the River Great Ouse. Fox Brook is approximately 5.4km long and essentially a straightened, ephemeral agricultural drainage ditch. The channel is around 1m wide with a bed of fine sediment. It has deep banks rising around 2m from the bed to adjacent arable fields.
Pond		
Pond 2	TL 160 556	Pond in industrial site, in a shallow depression, completely overgrown with common macrophytes. Found to be dry at time of survey in 2018.
Pond 4	TL 173 560	Pond adjacent to broadleaf woodland and arable fields with a surface area of approximately 400m ² . Pond with silt/clay base and overgrown with Greater Pond-sedge. Found to be dry at time of survey in 2018.
Pond 21	TL 189 562	Small pond within broadleaf woodland area. Woodland surrounded by arable fields. Found to be dry at time of survey in 2018.
Pond 45	TL 228 597	Wetland area in former woodland adjacent to arable field. Overgrown with shrubs and trees. Found to be dry at time of survey in 2018.
Pond 46	TL 227 596	Wetland area in former woodland adjacent to arable field. Found to be dry at time of survey in 2018.
Pond 61	TL 245 595	Pond within small woodland area adjacent to arable fields and Abbotsley Road. Found to be dry at time of survey in 2018.

3.1.5 **Figure 3-1** in Appendix A shows a map of each habitat location visited in 2021.

- 3.1.6 Rainfall data were used to compare conditions in 2021 with those in 2018 to see whether 2021 was similarly dry or closer to average conditions. Sources used were Met Office data for East Anglia (monthly rainfall data 1862-2021) areal values from the Had UK – 1km gridded climate data [REF 1-5] and a local recording station at Turvey near Bedford (amateur recording of weekly rainfall from 1984 – 2021, combined to show monthly and year totals) [REF 1-6]. Winter rainfall (January to March) was compared and spring rainfall (April to June).

4 Limitations

- 4.1.1 The weather in 2021 was wetter than average in both May and July when the first two visits were conducted. As such, these months were considered to provide a good test of whether the watercourses and ponds chosen for assessment were permanently dry or not.

5 Results

Watercourses

- 5.1.1 Two of the three watercourses visited, Fox Brook and Wintringham Brook, were found to be mostly dry on all visits, with only puddles of water present in May (refer to **Table 5-1**). Hen Brook contained water in all visits but with little or no discernible flow in August. Water had ponded due to downstream structures (e.g. channel blockage, a weir or bed topography). The condition of both Fox Brook and Wintringham Brook indicated that neither watercourse was permanently dry as the bed of the channel in both brooks was open with exposed sediment, indicating periods of ponding or surface flow down the channel. However, a search under bricks and rubble in the channel bed failed to find any aquatic invertebrates. The riparian (terrestrial) vegetation extended down to the channel bed and was well-established and unaffected by any intermittent flow.

Ponds

- 5.1.2 The six ponds were found to be permanently dry on all visits (refer to **Table 5-1**). In addition to the absence of water on all site visits, the vegetation in some of the ponds indicated no water or that it was only rarely present historically (e.g. rank grasses and nettle (*Urtica dioica*)), whilst others were shaded by trees, the bed of the pond being an accumulation of leaf litter and little or no live vegetation.

Table 5-1: Results of survey of watercourses and ponds and dates of visits

Habitat/Name	Survey results			
	13 May 2021	7 July 2021	4 August 2021	14 September 2021
Watercourse				
Hen Brook	Channel in water, slow flow	Channel in water, slow flow	Channel in water, little or no flow	Channel in water, slow flow
Wintringham Brook	Mostly dry, puddles of water, no flow	Dry	Dry	Dry
Fox Brook	Mostly dry, puddles of water, no flow	Dry	Dry	Dry
Pond				
Pond 2	Dry	Dry	Dry	Dry
Pond 4	Dry	Dry	Dry	Dry
Pond 21	Dry	Dry	Dry	Dry

Habitat/Name	Survey results			
Pond 45	Dry	Dry	Dry	Dry
Pond 46	Dry	Dry	Dry	Dry
Pond 61	Dry	Dry	Dry	Dry

Weather

- 5.1.3 The winter months of 2018 (January, February, and March) had total rainfall slightly above the long term average (113%), whereas the spring months of 2018 (April, May and June) had lower than average rainfall overall, 91% of average, but that was due to exceptionally low rainfall in June, whereas April and May were wetter than average.
- 5.1.4 Conditions in 2019 had lower than average rainfall in both winter (82% of average) and spring (90% of average).
- 5.1.5 In 2021 the total rainfall for the winter months was 131% of the average, largely due to a wet January, February and March were closer to average. The spring months of 2021 were wetter than the average (118% of average). April 2021 was much drier than average (24% of average) but it was followed by much wetter than average conditions in May and June (May 162% and June 148% of monthly average). Met Office data for East Anglia and UK climate mapping for these seasons showed a similar pattern.

6 Discussion and Conclusion

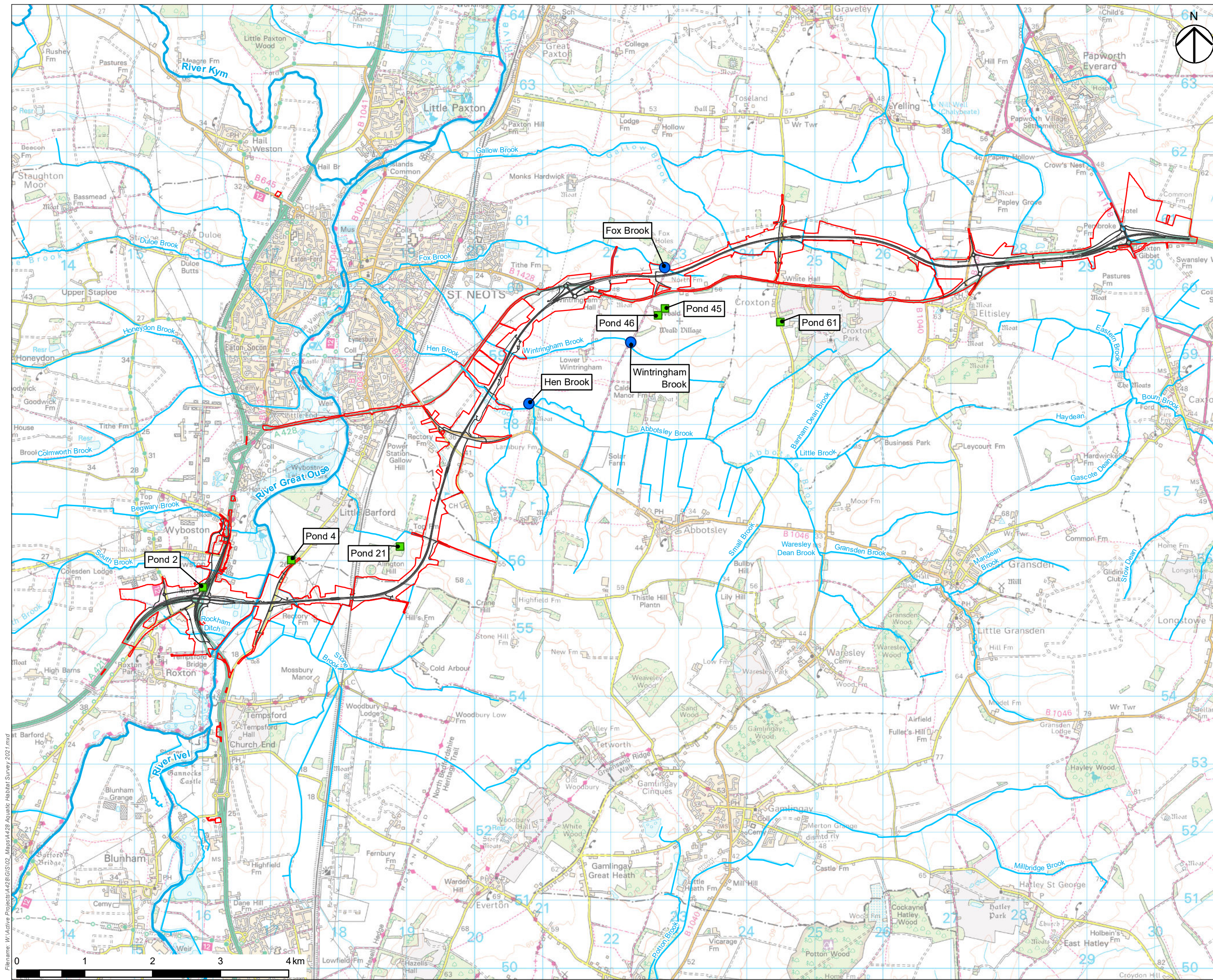
- 6.1.1 The likely cause of Fox Brook and Wintringham Brook being mostly dry, and the very low to negligible flow observed in the Hen Brook in August, is the intense level of drainage from the arable land in the catchment. Whilst the drainage of heavy clay soils (prone to prolonged surface saturation) generally results in a lowering of large and medium flow peaks in receiving watercourses and the drainage of more permeable soils usually improves the speed of subsurface discharges, both tend to lead to decreased summer flows. As indicated by the conditions in all three channels, there are periods of flow which, whilst of sufficient discharge to keep the channel bed largely clear of vegetation, are intermittent.
- 6.1.2 Although all three watercourses are termed brooks, they have lost their characteristics as streams (e.g. there are no riffle and pool sequences, and the channels are structured to function as drains within an area of intensive arable agriculture).
- 6.1.3 The ponds were dry due to gradual natural infilling (accumulation of leaf litter) over the decades with no management to keep them in water (i.e. a process of terrestrialisation), coupled with periods of low rainfall. In some cases, this was exacerbated by the presence of trees around pond margins, with associated leaf litter falling into the ponds. These processes have been recognised for a long time, Rackham (1968) [REF 1-2] and Preston *et al.* (1989) [REF 1-1] describe the disappearance of ponds in Cambridgeshire and ephemeral ponds in south Cambridgeshire respectively, due in part to intensification of agriculture. Relton (1972) [REF 1-4] provides a similar analysis quantifying the loss of ponds in an area of Huntingdonshire from 1890 to 1970 as 56%, changes in agriculture being an explanation.
- 6.1.4 The conditions in the Fox Brook and Wintringham Brook and the six ponds was such that it was not possible to sample for fish or aquatic invertebrates.
- 6.1.5 Rainfall data are available from a weather station near Bedford from a dedicated amateur meteorologist who has been recording weekly rainfall data from two sites near Bedford since 1984. Measurements collected are combined to show both monthly and yearly rainfall figures with supporting charts. Overall, these show 2018 was a warm and dry year compared to average. The total yearly rainfall for 2018 was 56.6 cm, which is less than the average yearly rainfall for this site of 66.3 cm. January 2018 had close to average rainfall, February below average rainfall, and March and April were both wetter than average months. Whilst May rainfall was close to average, the following four months were drier than average, noticeably so in June, July and September 2018.
- 6.1.6 In contrast, the data for 2021 show January and February to be wetter than average while March and April were drier than average. May, June and July were noticeably wetter than average and August and September only marginally drier than average [REF 1-3].

- 6.1.7 Despite the differences in rainfall between 2018 and 2021, the habitat re-assessments made in 2021 verify the findings of the original surveys, and as such no material changes to the assessment and outline mitigation measures prescribed in Chapter 8, Biodiversity **[APP-077]** of the Environmental Statement are deemed necessary. The findings presented in Appendix 8.4, Aquatic Habitats **[APP-191]**, Appendix 8.15, Fish **[APP-202]** and Appendix 8.17, Aquatic Invertebrates **[APP-204]** of the Environmental Statement also remain unchanged.

7 References

- REF 1-1. Preston, C.D. with the assistance of J. H. Bratton and D.E. Coombe. 1989. The ephemeral pools of south Cambridgeshire. *Nature in Cambridgeshire*, 31, 2-11.
- REF 1-2. Rackham, O. 1968. The armed ponds of Cambridgeshire. *Nature in Cambridgeshire*, 11, 25-27.
- REF 1-3. Rainfall Statistics Page. 2021. [ONLINE] Available at: <http://www.zen40267.zen.co.uk/rainfall/rainfall.html>. [Accessed 13 October 2021].
- REF 1-4. Relton, J., 1972. Disappearance of farm ponds. Monks Wood Experimental Station Report 1969-1971, pp 32-33.
- REF 1-5. Met Office UK and regional series – <https://www.metoffice.gov.uk/research/climat/maps-and-data/uk-and-regional-series>
- REF 1-6. Rainfall Statistics (Turvey, Cambridgeshire) recorder Andrew Leaper <http://www.zen40267.zen.co.uk/rainfall/rainfall.html>

Appendix A: Figures



NOTES

LEGEND

- Order Limits
- The Scheme

Aquatic habitat location

- Watercourse
- Pond

Revision Details	By	Check	Date	Suffix

Purpose of Issue

FOR INFORMATION

Client
 National Highways
 Woodlands
 Marston Lane
 Bedford Industrial Estate
 Bedford
 MK41 7LW

Development Consent Order Number

Project Title

**A428 BLACK CAT
 TO CAXTON GIBBET
 IMPROVEMENTS**

Drawing Title

**FIGURE 3-1
 AQUATIC HABITAT
 SURVEYS 2021**

Designed LS	Drawn BF	Checked LS	Approved JG	Date 15/11/2021
Internal Project No 60541541			Suitability S1	
Scale @ A3 1:50,000			Zone	

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National Highways Pin			P01
Location		Type	Role Number

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