



The Sizewell C Project

6.6 Volume 5 Two Village Bypass Chapter 12 Groundwater and Surface Water Appendix 12A Two Village Bypass River Corridor Survey

Revision: 1.0
Applicable Regulation: Regulation 5(2)(a)
PINS Reference Number: EN010012

May 2020

Planning Act 2008
Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009



Contents

1.	Two Village Bypass River Corridor Survey	1
1.1	Introduction	1
1.2	Background	1
1.3	Methodology	1
1.4	River corridor survey results	2

Tables

Table 1.1:	Plants and trees and associated abbreviations identified within the River Alde reach 1 of 3.....	3
Table 1.2:	Plants and trees and associated abbreviations identified within the River Alde reach 2 of 3.....	6
Table 1.3:	Plants and trees and associated abbreviations identified within the River Alde reach 3 of 3.....	9
Table 1.4:	Plants and trees and associated abbreviations identified within the Parkgate Farm reach	12
Table 1.5:	Plants and trees and associated abbreviations identified within the Whin Covert reach	15

Plates

Plate 1.1:	Descriptive photos of the River Alde reach 1 of 3.....	4
Plate 1.2:	Descriptive photos of the River Alde reach 2 of 3	7
Plate 1.3:	Descriptive photos of the River Alde reach 3 of 3	10
Plate 1.4:	Descriptive photos of the Parkgate Farm reach	13
Plate 1.5:	Descriptive photos of the Whin Covert reach.....	16

FIGURES

Figure 12A.1 River Corridor Survey Reaches

APPENDICES

Appendix 12A.1: River Corridor Survey Figures

Appendix 12A.2: Symbols used in the River Corridor Survey Figures

1. Two Village Bypass River Corridor Survey

1.1 Introduction

1.1.1 The purpose of this document is to report the findings of the River Corridor Survey (RCS) undertaken on the River Alde and two of its tributaries, near Farnham, Suffolk on the 15 May 2019. This survey was undertaken as part of the Sizewell C Project for EDF Energy and provides baseline ecological and geomorphological descriptions and information for the reaches surveyed.

1.1.2 These watercourses were identified as being potentially impacted by the proposed two village bypass scheme, that would assist in enabling the construction of the Sizewell C Power Station. This brief report details the RCSs undertaken on the River Alde, Parkgate Farm Drain and Whin Covert Drain with the aim to provide baseline information that can be used to assess the potential future impacts from the scheme.

1.2 Background

1.2.1 The survey area is located in the south of the A12 in the vicinity of Stratford St Andrew and Farnham. The River Alde flows into the survey area underneath the A12 in a southerly direction. The Parkgate Farm Drain flows in an easterly direction, adjacent to a gravel access road to its confluence with the River Alde. The Whin Covert flows in a northerly direction along the eastern edge of the River Alde floodplain to its confluence with the River Alde. All three watercourses would be crossed by proposed scheme. **Figure 12A.1** shows the location of the reaches surveyed.

1.2.2 The River Alde and its tributaries form part of the River Alde Water Framework Directive (WFD) waterbody (water body ID GB105035046060). The River Alde is not designated as an artificial or heavily modified water body. The current overall WFD status for this waterbody is Poor (Good for chemical elements, Poor for biological elements).

1.3 Methodology

1.3.1 The river corridor survey methodology is a habitat-based approach, recording details of the more dominant vegetation and physical structures identified within the reach, rather than comprehensive species accounts. A reach typically covers a length of approximately 500 metres (m). This information is gathered and recorded in the form of a map using a set of standard symbols and abbreviations. A description of each reach and information gathered from a desk study prior to undertaking the survey is provided in the

sections below. The RCS maps produced for each reach are presented in **Appendix 12A.1** with the accompanying key to identify the ecological and geomorphological features presented in **Appendix 12A.2**.

1.4 River corridor survey results

a) River Alde reach 1 of 3

i. Broad Nature

1.4.1 Meandering main river with little in the way of historical management, although one area of dredging/spoil was observed mid-500m section. The river flows through both arable field and rough pasture. The river is fenced off from cattle and no evidence of poaching was observed. A mix of tall grass/herbs, mature trees and hedgerows cover both banks, species including nettle (*Urtica dioica*), carex sp. alder (*Alnus glutinosa*), hawthorn (*Crataegus monogyna*) and horse chestnut (*Aesculus hippocastanum*). In-channel vegetation is present, although is limited in places by bankside shading.

ii. Dimensions

1.4.2 As the channel meanders, the wetted width varies between 1m and up to 3m, although the average width was approximately 1.5m. Neither bank was identified as being embanked, with heights varying between 1m and 2m, averaging 1.5m over the 240m surveyed.

iii. Substrate

1.4.3 Bed substrate, where visible, was silt/sand, indicating a slow flowing watercourse.

iv. Bank structure

1.4.4 As the channel meanders, the wetted width varies between 1m and up to 3m, although the average width was approximately 1.5m. Neither bank was identified as being embanked, with heights varying between 1m and 2m, averaging 1.5m over the 240m surveyed.

v. Side channels / structures

1.4.5 No dry side channel was observed, positioned above the main river bed height. No farm tracks or footbridges were present.

vi. Instream / marginal vegetation

1.4.6 Marginal vegetation included terrestrial species such as nettle (*Urtica dioica*), grasses (*Carex* sp.) and brambles (*Rubus fruticosus*) along with aquatic species such as water forget-me-not (*Myosotis scorpioides*) and brooklime (*Veronica beccabunga*). In-stream vegetation included areas of branched bur-reed (*Sparganium erectum*) and white water-lily (*Nymphaea alba*).

vii. Adjacent land use

1.4.7 The stream is located within a mixed-use farm, with arable fields and rough pasture.

viii. Other notes

1.4.8 No invasive species were identified during the survey.

ix. Tree and plant species list

Table 1.1: Plants and trees and associated abbreviations identified within the River Alde reach 1 of 3.

Abbreviation	Scientific Name	Common Name
Ahip	<i>Aesculus hippocastanum</i>	Horse-chestnut
Aglu	<i>Alnus glutinosa</i>	Alder
Cmon	<i>Crataegus monogyna</i>	Hawthorn
Mscs	<i>Myosotis scorpioides</i>	Water forget-me-not
Nalb	<i>Nymphaea alba</i>	White water-lily
Rfru	<i>Rubus fruticosus</i>	Bramble
Sere	<i>Sparganium erectum</i>	Branched bur-reed
Udio	<i>Urtica dioica</i>	Common nettle
Vbec	<i>Veronica beccabunga</i>	Brooklime

x. Photos

Plate 1.1: Descriptive photos of the River Alde reach 1 of 3.

<p>Photo 1 – Dredging/spoil on banks with instream vegetation present in area of open canopy.</p> 	<p>Photo 2 – Drainage ditch, positioned above bed level of main channel.</p> 
<p>Photo 3 – Most downstream section with branched bur-reed and wide channel at bend in river.</p> 	

b) River Alde reach 2 of 3

i. Broad Nature

1.4.9 Meandering main river with little in the way of historical management. River flows through both arable field and rough pasture, with a small area of mature woodland (predominantly alders (*Alnus glutinosa*). Upstream, the river is fenced off from cattle and no evidence of poaching was observed, downstream there is no fence preventing cattle poaching the river, although this was not observed. Upstream a mix of tall grass/herbs, mature trees and hedgerows cover both banks, species including nettle (*Urtica dioica*), carex sp. Alder (*Alnus glutinosa*), and hawthorn (*Crataegus monogyna*). Downstream, trees occur very occasionally with bank vegetation dominated by grasses, nettles and dock species (*rumex species*). The channel upstream has occasional in-stream vegetation, whereas downstream the channel is becoming choked with aquatic vegetation.

ii. Dimensions

1.4.10 As the channel meanders, the wetted width varies between 1m and up to 3m, although the average width was approximately 1m. Neither bank was identified as being embanked, with heights varying between 0.5m and 2m, averaging 1m over the 500m surveyed.

iii. Substrate

1.4.11 Bed substrate, was silt/sand, indicating a slow flowing watercourse.

iv. Bank structure

1.4.12 No bank protection was identified at survey. Both banks substrate consisted of earth. Bank angles were very shallow for most of the stretch (approx. 30 degrees (°), although upstream the banks were steeper (50°).

v. Side channels / structures

1.4.13 One side channel was noted (Parkgate stream), positioned above the main river bed height. One main farm track was present which limited vegetation beneath, and one small footbridge which did not limit vegetation beneath.

vi. Instream / marginal vegetation

1.4.14 Vegetation included terrestrial species such as nettle (*Urtica dioica*) and grasses (*Carex* sp.) along with aquatic species such as common reed (*Phalaris australis*), branched bur-reed (*Sparganium erectum*), reed sweet-grass (*Glyceria maxima*), bulrush (*Typha latifolia*) and white water-lily (*Nymphaea alba*) which were choking the channel in places.

vii. Adjacent land use

1.4.15 The stream is located within a mixed-use farm, with arable fields and rough pasture.

viii. Other notes

1.4.16 No invasive species were identified during the survey.

ix. Tree and plant species list

Table 1.2: Plants and trees and associated abbreviations identified within the River Alde reach 2 of 3.

Abbreviation	Scientific Name	Common Name
Apse	<i>Acer pseudoplatanus</i>	Sycamore
Aglu	<i>Alnus glutinosa</i>	Alder
Asyl	<i>Anthriscus sylvestris</i>	Cow parsley
Cmon	<i>Crataegus monogyna</i>	Hawthorn
Gmax	<i>Glyceria maxima</i>	Reed sweet-grass
Nalb	<i>Nymphaea alba</i>	White water-lily
Paus	<i>Phalaris australis</i>	Common reed
Sfra	<i>Salix fragilis</i>	Crack willow
Sere	<i>Sparganium erectum</i>	Branched bur-reed
Tlat	<i>Typha latifolia</i>	Bulrush
Udio	<i>Urtica dioica</i>	Common nettle

x. Photos

Plate 1.2: Descriptive photos of the River Alde reach 2 of 3.

<p>Photo 1 – Upstream section, meandering wide river, water-lilies in channel.</p> 	<p>Photo 3 – Wide channel, mid 500m reach. Pipe structure crossing the river. Open bank structure with occasional trees.</p> 
<p>Photo 2 – Photo looking upstream of common reed from farm track bridge.</p> 	<p>Photo 4 – Downstream end of section, looking upstream. Slump of left bank and vegetation growing in channel.</p> 

c) River Alde reach 3 of 3

i. Broad Nature

1.4.17 Meandering main river with little in the way of historical management. River flows through rough pasture that will act as a floodplain. Along the whole

NOT PROTECTIVELY MARKED

500m stretch, the banks are predominantly open with a mix of grasses and herbs such as dock (*Rumex species*), nettles (*Urtica dioica*) and cow parsley (*Anthriscus sylvestris*) with occasional trees including a number of pollarded willow (*Salix fragilis*), oak (*Quercus robur*) and alder (*Alnus glutinosa*). Marginal vegetation includes common reed (*Phalaris australis*), reed sweet-grass (*Glyceria maxima*) and greater pond sedge (*Carex riparia*). At times the channel is choked with marginal and in-channel vegetation.

ii. Dimensions

- 1.4.18 As the channel meanders, the wetted width varies between 0.5m and up to 2m, although the average width was approximately 1m. Neither bank was identified as being embanked, with heights varying between 0.5m and 1.5m, averaging 0.75m over the 500m surveyed.

iii. Substrate

- 1.4.19 Bed substrate, was silt/sand, indicating a slow flowing watercourse.

iv. Bank structure

- 1.4.20 No bank protection was identified at survey. Both banks substrate consisted of earth. Bank angles were very shallow for most of the stretch (approx. 30°), although upstream the banks were steeper (50°).

v. Side channels / structures

- 1.4.21 Two side channel were noted, positioned above the main river bed height therefore not acting as backwaters. No structures (bridges or outfalls) were recorded within the 500m stretch.

vi. Instream / marginal vegetation

- 1.4.22 Vegetation included terrestrial species such as nettle, and grasses (*Carex* sp.) along with aquatic species such as common reed, branched bur-reed (*Sparganium erectum*), reed sweet-grass, water forget-me-not (*Myosotis scorpioides*), bulrush (*Typha latifolia*) and white water-lily (*Nymphaea alba*) which were choking the channel in places.

vii. Adjacent land use

- 1.4.23 The river is bounded on both sides by rough pasture with no fences to prevent cattle entering the river, however, no serious poaching was identified during survey.

viii. Other notes

1.4.24 No invasive species were identified during the survey.




ix. Tree and plant species list

Table 1.3: Plants and trees and associated abbreviations identified within the River Alde reach 3 of 3.

Abbreviation	Scientific Name	Common Name
Aglu	<i>Alnus glutinosa</i>	Alder
Asyl	<i>Anthriscus sylvestris</i>	Cow parsley
Asyl	<i>Anthriscus sylvestris</i>	Cow parsley
Crip	<i>Carex riparia</i>	Greater pond sedge
Cmon	<i>Crataegus monogyna</i>	Hawthorn
Fexc	<i>Fraxinus excelsior</i>	Ash
Gmax	<i>Glyceria maxima</i>	Reed sweet-grass
Msc0	<i>Myosotis scorpioides</i>	Water forget-me-not
Nalb	<i>Nymphaea alba</i>	White water-lily
Paus	<i>Phalaris australis</i>	Common reed
Qrob	<i>Quercus robur</i>	Pendunculate Oak
Rcan	<i>Rosa canina</i>	Dog rose
Sfra	<i>Salix fragilis</i>	Crack willow
Sere	<i>Sparganium erectum</i>	Branched bur-reed
Tlat	<i>Typha latifolia</i>	Bulrush
Udio	<i>Urtica dioica</i>	Common nettle

x. Photos

Plate 1.3: Descriptive photos of the River Alde reach 3 of 3.

<p>Photo 1 – Looking upstream, open banks, channel choked with vegetation.</p> 	<p>Photo 2 – Looking upstream, pollarded willow trees on left bank, vegetation choking channel.</p> 
<p>Photo 3 – From downstream end, looking across turbid channel with marginal vegetation.</p> 	

d) Parkgate Farm Drain

i. Broad Nature

1.4.25 Straightened farm drainage ditch running alongside farm track. The right bank is slightly embanked adjacent to the arable field (upstream), with occasional trees and hedgerows, species included hawthorn (*Crataegus monogyna*), oak (*Quercus robur*) and alder (*Alnus glutinosa*). The channel

is choked with vegetation, mostly terrestrial species and those tolerant to damp rather than wet conditions. The upstream 250m stretch was mostly dry during survey, the downstream 250m did contain some water (approximately 5 centimetres (cm) deep), although no flow was visible. The confluence with the River Alde is at the downstream end, where the channel is positioned above the bed level of the River Alde (therefore not acting as a backwater).

ii. Dimensions

- 1.4.26 The channel width throughout the 500m was relatively uniform between 1 and 1.5m. The channel has been historically straightened and the banks profiled to create uniform, almost right-angled banks. The left-hand bank is slightly embanked (approximately 0.5m higher than the right bank) only within the upstream 250m adjacent to the arable field.

iii. Substrate

- 1.4.27 Bed substrate, where visible through vegetation, was silt/sand, indicating a slow flowing stream.

iv. Bank structure

- 1.4.28 The left and right banks were steeply angled, suggesting historical dredging. Both banks substrate consisted of earth. No bank protection was evident. Bank height was at most 1.5m on the left, and 1m on the right.

v. Side channels / structures

- 1.4.29 No side channels were observed during survey. Mapping suggests a side channel joins from the rough pasture floodplain adjacent to the downstream 250m, but this was not evident during survey.

- 1.4.30 At the upstream end, a culvert is present (no flow visible at survey). A farm track crosses the stream at approximately 250m limiting vegetation beneath, and a small footbridge crosses the stream towards the downstream end, that does not limit vegetation beneath.

vi. Instream / marginal vegetation

- 1.4.31 Marginal and bankside vegetation is beginning to choke the channel, which is dominated by greater pond sedge (*Carex riparia*) and common reed (*Phragmites australis*), along with nettle (*Urtica dioica*), bulrush (*Typha latifolia*) and water horsetail (*Equisetum fluviatile*).

vii. Adjacent land use

1.4.32 The stream is located within a mixed-use farm, with arable fields and rough pasture.

viii. Other notes

1.4.33 No invasive species were identified during the survey.

ix. Tree and plant species list

Table 1.4: Plants and trees and associated abbreviations identified within the Parkgate Farm reach.

Abbreviation	Scientific Name	Common Name
Ahip	<i>Aesculus hippocastanum</i>	Horse-chestnut
Aglu	<i>Alnus glutinosa</i>	Alder
Crip	<i>Carex riparia</i>	Greater pond sedge
Cmon	<i>Crataegus monogyna</i>	Hawthorn
Ehir	<i>Epilobium hirsutum</i>	Great willowherb
Eflu	<i>Equisetum fluviatile</i>	Water horsetail
Fexc	<i>Fraxinus excelsior</i>	Ash
Gapa	<i>Galium aparine</i>	Cleavers
Paus	<i>Phragmites australis</i>	Common reed
Qrob	<i>Quercus robur</i>	Pedunculate oak
Rfru	<i>Rubus fruticosus</i>	Bramble
Solu	<i>Smyrniolus olusatrum</i>	Alexanders
Tlat	<i>Typha latifolia</i>	Bulrush
Udio	<i>Urtica dioica</i>	Common nettle

x. Photos

Plate 1.4: Descriptive photos of the Parkgate Farm reach.

<p>Photo 1 – Upstream end, algae present in pools of water. Bankside vegetation colonising channel.</p>	<p>Photo 2 – Uniform bankside vegetation including greater pond sedge along both banks for entire 500m.</p>
	
<p>Photo 3 – Looking towards downstream end, footbridge to rough pasture fields does not inhibit in-channel plant growth.</p>	
	

e) Whin Covert Drain

i. Broad Nature

1.4.34 A small tributary to the River Alde, acting as a field drainage ditch. Upstream, mature woodland is present on the right bank and the channel contains water. Here, there is a mix of aquatic vegetation in channel. Downstream, the channel is dry/water is not visible and the channel is choked with greater pond sedge (*Carex riparia*) and a few other species. At the very downstream end, the channel and confluence with the River Alde is not visible due to dense woodland and scrub. The channel has been subjected to some straightening/management historically, although is not completely straight. Other than changes in water level along the 500m stretch, there is little variation in channel character.

ii. Dimensions

1.4.35 The channel width throughout the 500m was relatively uniform, between 1-1.5m wide (however, the most downstream 50m section was not visible).

iii. Substrate

1.4.36 Channel substrate was deep silt/sand, suggesting the regular slow flow of this watercourse.

iv. Bank structure

1.4.37 The left bank height was uniform throughout at approximately 1m. The right bank height varied between 1m and 2m in height. Bank substrate consisted of earth. The left bank was mostly clear of trees or hedgerows, while the right bank was dominated by alders (*Alnus glutinosa*), hawthorn (*Crataegus monogyna*) and hazel (*Corylus avellane*) with occasional oak (*Quercus robur*), sycamore (*Acer pseudoplatanus*) and field maple (*Acer campestre*).

v. Side channels / structures

1.4.38 No side channels were observed. Structures were limited to a farm track (with a culvert) and two small footbridges, which did not limit light/vegetation beneath.

vi. Instream / marginal vegetation

1.4.39 Water was within the upstream 250m of channel, at an average of 10cm depth. The downstream 250m did not have water at the time of survey. Most of the 500m section was heavily choked with greater pond sedge and

common reed (*Phragmites australis*), with a small part of the upstream section containing a variety of aquatic vegetation including flag iris (*Iris pseudacorus*), water mint (*Mentha aquatica*), fool’s water-cress (*Apium nodiflorum*) and ranunculus species. Marginal and bankside vegetation included greater pond sedge, common nettle (*Urtica dioica*) and bramble (*Rubus fruticosus*). Occasional patches of hop (*Humulus lupulus*) was also present along the 500m stretch.

vii. [Adjacent land use](#)

1.4.40 Adjacent land use consisted of mature woodland, arable fields and rough pasture.

viii. [Other notes](#)

1.4.41 No invasive species were identified during the survey.




ix. [Tree and plant species list](#)

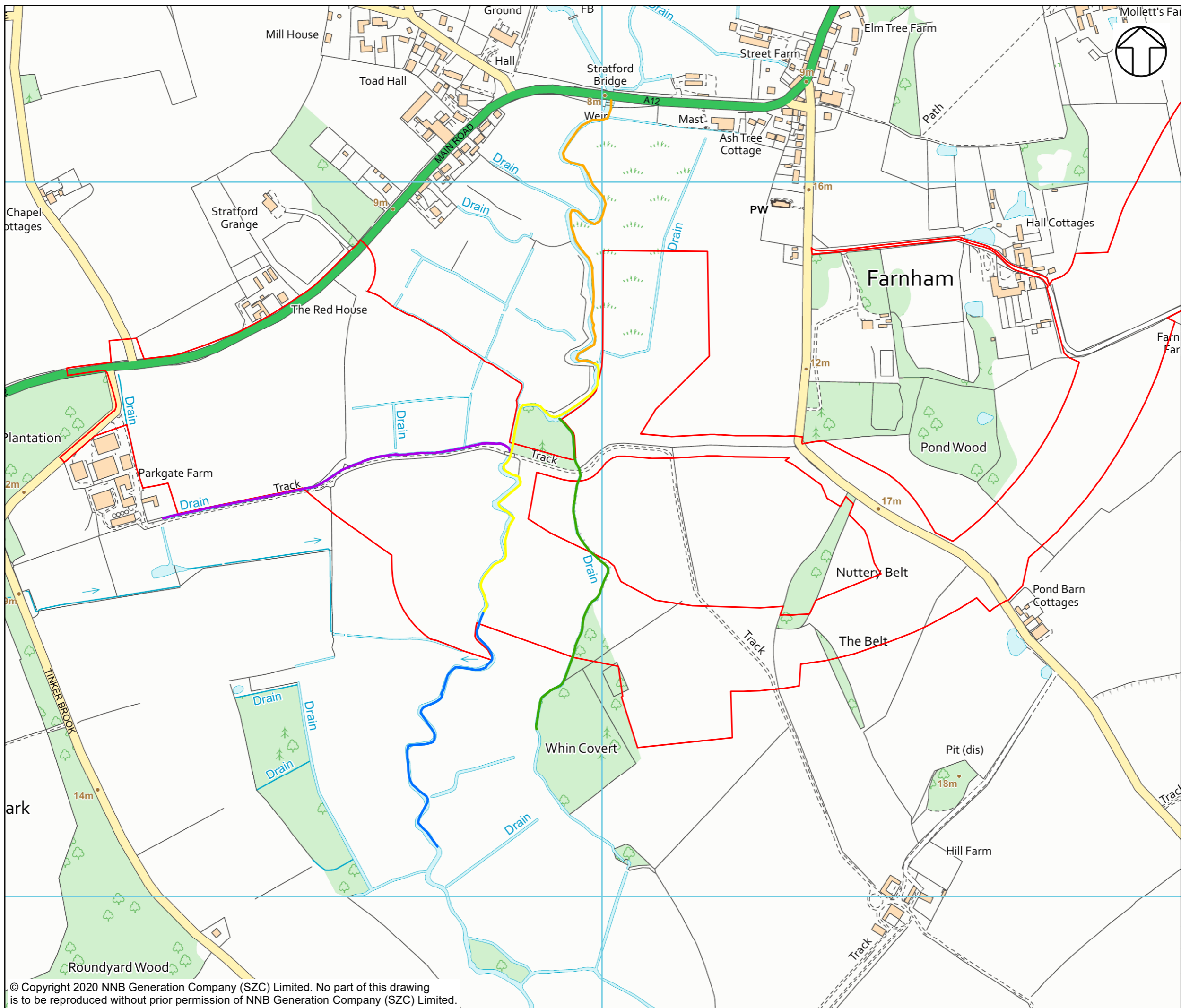
Table 1.5: Plants and trees and associated abbreviations identified within the Whin Covert reach.

Abbreviation	Scientific Name	Common Name
Acam	<i>Acer campestre</i>	Field maple
Apse	<i>Acer pseudoplatanus</i>	Sycamore
Aglu	<i>Alnus glutinosa</i>	Alder
Anod	<i>Apium nodiflorum</i>	Fool’s water-cress
Crip	<i>Carex riparia</i>	Greater pond sedge
Cave	<i>Corylus avellana</i>	Hazel
Cmon	<i>Crataegus monogyna</i>	Hawthorn
Fexc	<i>Fraxinus excelsior</i>	Ash
Gapa	<i>Galium aparine</i>	Cleavers
Hlup	<i>Humulus lupulus</i>	Common hop
Ipse	<i>Iris pseudacorus</i>	Flag iris
Maqu	<i>Mentha aquatica</i>	Water mint
Paur	<i>Phragmites australis</i>	Common reed
Qrob	<i>Quercus robur</i>	Pedunculate oak
Rfru	<i>Rubus fruticosus</i>	Bramble
Snig	<i>Sambucus nigra</i>	Elder
Udio	<i>Urtica dioica</i>	Common nettle

x. Photos

Plate 1.5: Descriptive photos of the Whin Covert reach.

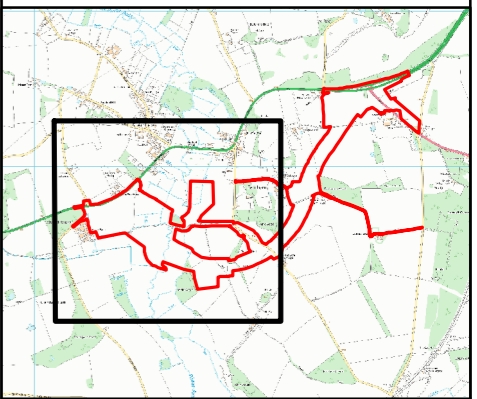
<p>Photo 1 – Taken from upstream, looking downstream, Various species of aquatic macrophytes present in wet channel.</p> 	<p>Photo 2 – Mid-channel, looking downstream. Channel dry here and choked with greater pond sedge and common reed.</p> 
<p>Photo 3 – Dense woodland/scrub at downstream end, preventing access to channel/confluence with River Alde.</p> 	



NOTES

KEY

- TWO VILLAGE BYPASS DEVELOPMENT SITE BOUNDARY
- RIVER ALDE REACH 1 OF 3
- RIVER ALDE REACH 2 OF 3
- RIVER ALDE REACH 3 OF 3
- PARKGATE FARM DRAIN
- WHIN COVERT DRAIN



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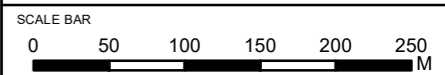


DOCUMENT:
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 ENVIRONMENTAL STATEMENT
 VOLUME 5
 APPENDIX 12A
 TWO VILLAGE BYPASS RIVER CORRIDOR SURVEY

DRAWING TITLE:
 RIVER CORRIDOR SURVEY REACHES

DRAWING NO:
 FIGURE 12A.1

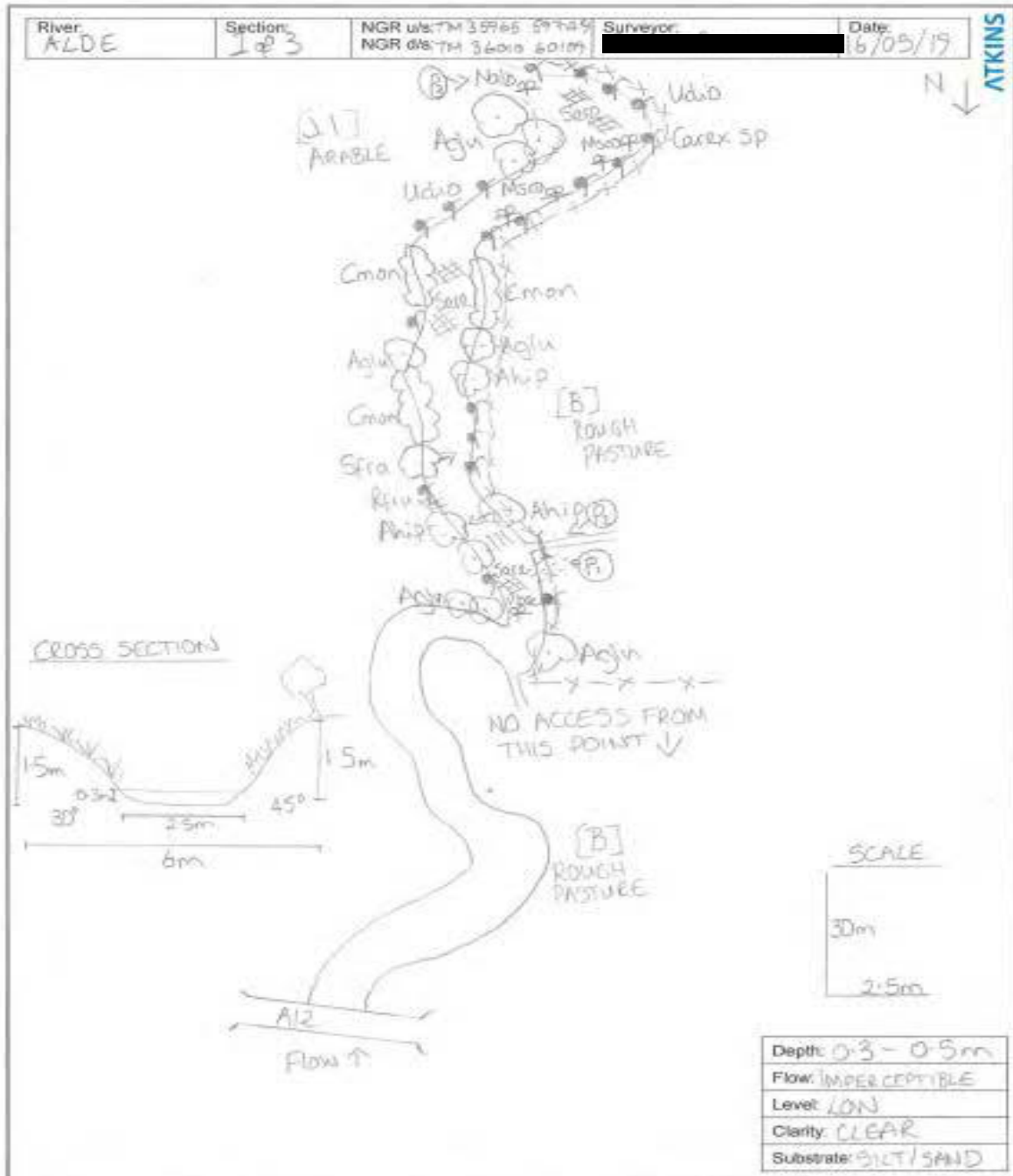
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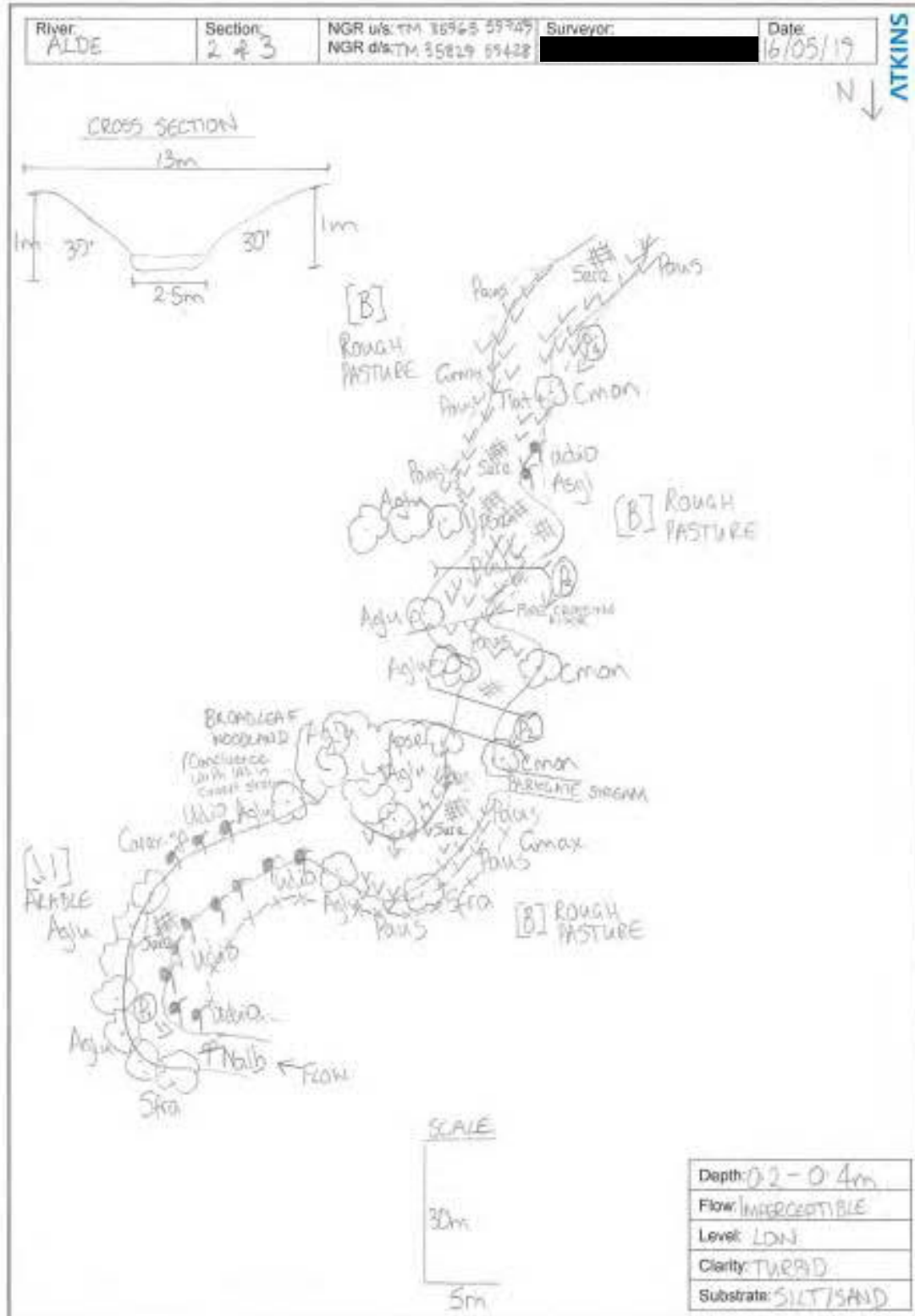
APPENDICES

Appendix 12A.1 River Corridor Survey Figures

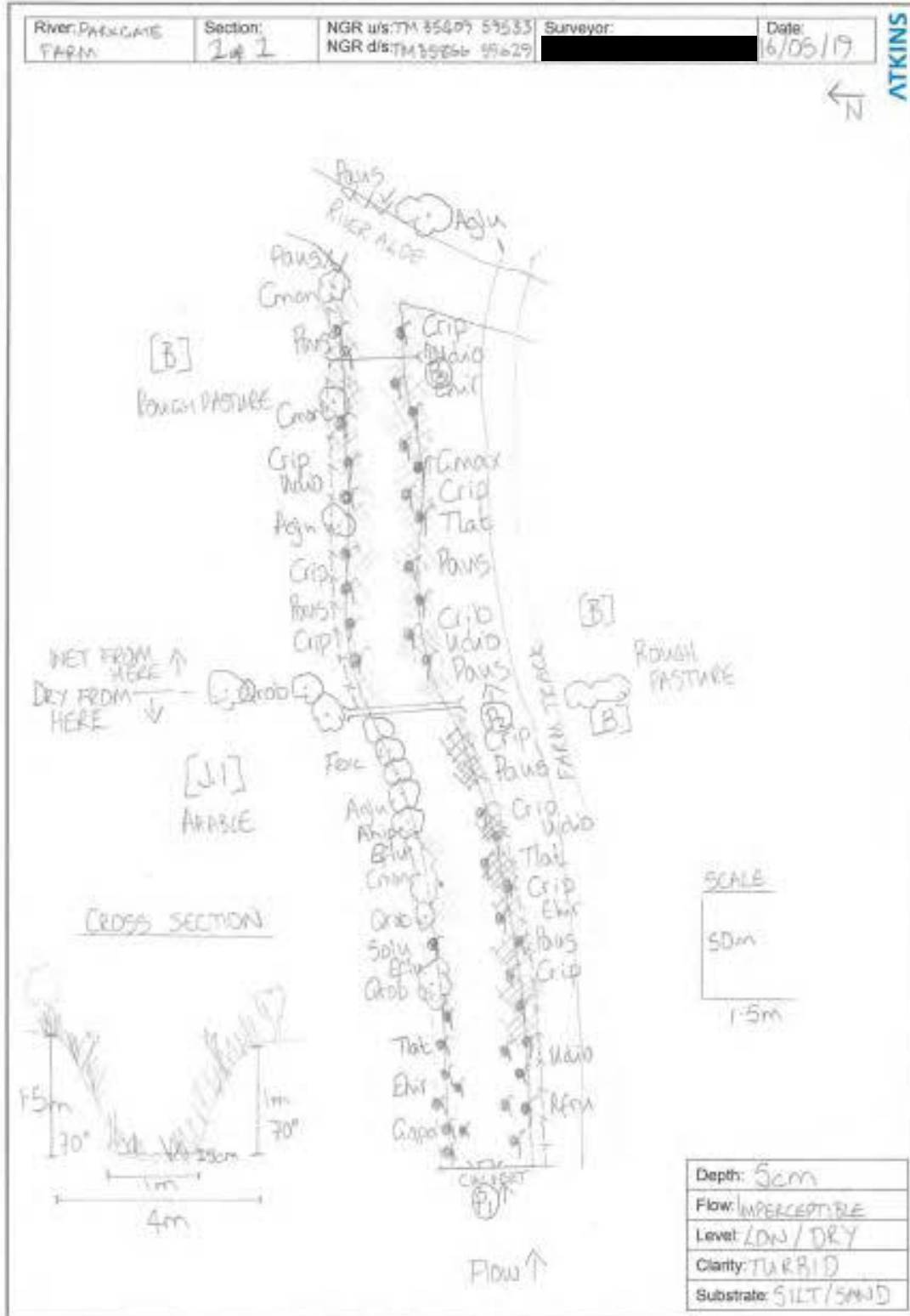
River Alde Reach 1 of 3



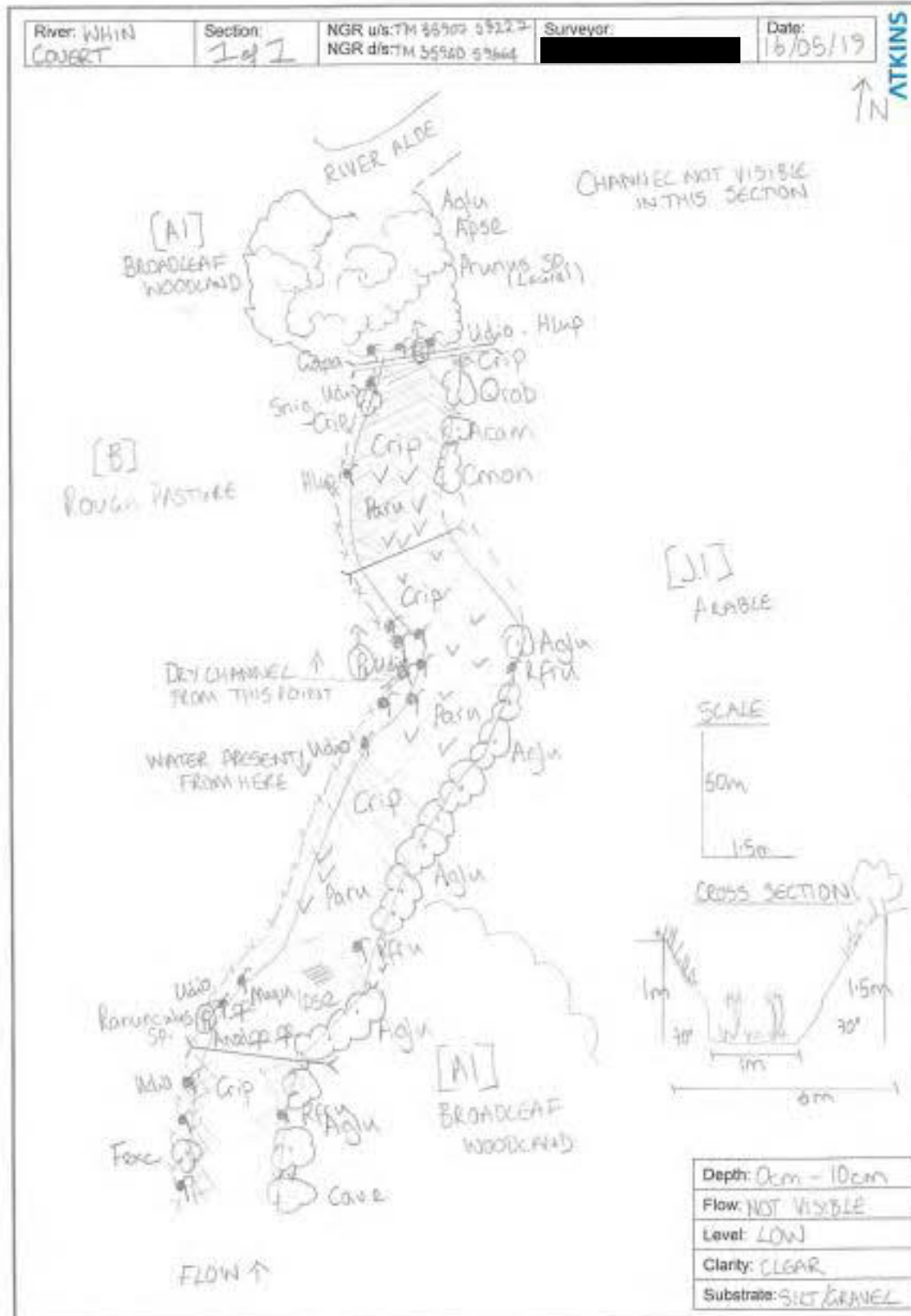
River Alde Reach 2 of 3



Parkgate Farm Drain



Whin Covert Drain

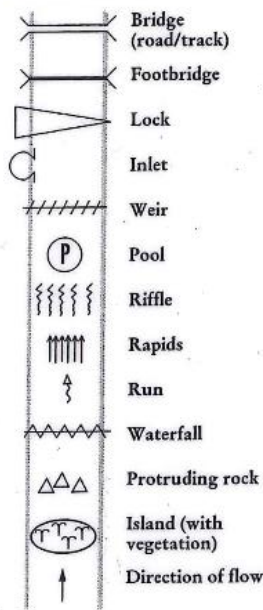


Appendix 12A.2 Symbols used in the River Corridor Survey Figures

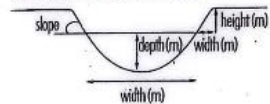
Standard Symbols for use in River Corridor Surveys

AQUATIC AND MARGINAL ZONES

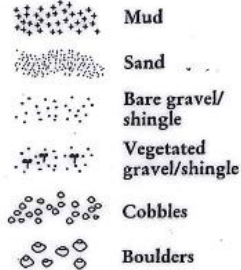
CHANNEL FEATURES



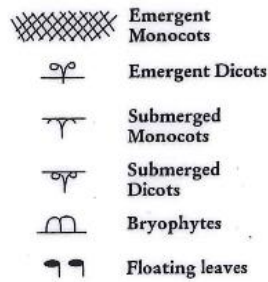
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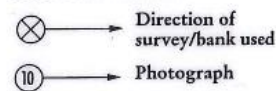
SUBSTRATE



CHANNEL VEGETATION

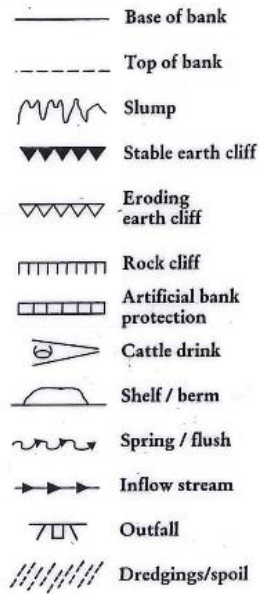


SURVEY INFORMATION

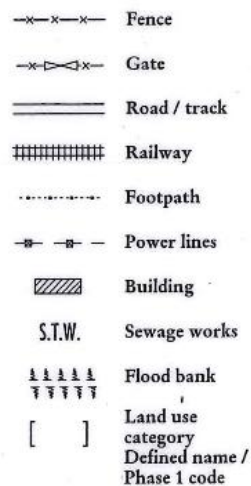


BANK AND ADJACENT LAND ZONES

BANK FEATURES



ADJACENT LAND FEATURES



VEGETATION

