



High Speed Two Phase 2a (West Midlands - Crewe)

Background Information and Data

Ecology and biodiversity

Ecological baseline data - fish (BID-EC-014-000)



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Department for Transport

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1 Introduction

- 1.1.1 This report presents a summary of the baseline data relating to fish (rivers and streams).
- 1.1.2 Ecological baseline data has been collected for the assessment of High Speed Rail (West Midlands - Crewe). The Proposed Scheme will pass through the following community areas (CA):
- CA1: Fradley to Colton;
 - CA2: Colwich to Yarlet;
 - CA3: Stone and Swynnerton;
 - CA4: Whitmore Heath to Madeley; and
 - CA5: South Cheshire.
- 1.1.3 This report should be read in conjunction with Map Series EC-02, EC-10, EC-11 and EC-12. 11 in the Background Information and Data, Ecology Map Books.
- 1.1.4 The following baseline ecology reports can also be referred to:
- Ecological baseline data - phase 1 habitat survey (Background Information and Data: BID-EC-002-000);
 - Ecological baseline data - protected and or notable flora (Background Information and Data: BID-EC-003-000);
 - Ecological baseline data - national vegetation classification and ancient woodland (Background Information and Data: BID-EC-004-000);
 - Ecological baseline data – hedgerows (Background Information and Data: BID-EC-005-000);
 - Ecological baseline data - river habitat, river corridor, and ditch surveys, (Background Information and Data: BID-EC-006-000);
 - Ecological baseline data - amphibian and pond surveys (Background Information and Data: BID-EC-007-000);
 - Ecological baseline data – reptiles (Background Information and Data: BID-EC-008-000);
 - Ecological baseline data - breeding and wintering birds (Background Information and Data: BID-EC-009-000);
 - Ecological baseline data - otter and water vole (Background Information and Data: BID-EC-010-000);
 - Ecological baseline data - hazel dormouse (Background Information and Data: BID-EC-011-000);

- Ecological baseline data – bats (Background Information and Data: BID-EC-12-000); and
- Ecological baseline data - white clawed crayfish and other invertebrate (Background Information and Data: BID-EC-013-000).

1.1.5 Note that baseline data for badger is not made publically available due to the historic persecution of this species.

1.1.6 The ecological assessment is detailed in the High Speed Rail (West Midlands to Crewe) Environmental Statement (ES)¹:

- Volume 2 , Community area reports;
- Volume 3, Route-wide effects;
- Volume 4, Off-route effects; and
- Volume 5, Appendices.

¹ HS2 Ltd (2017), *High Speed Rail (West Midlands – Crewe) Environmental Statement (ES)*, www.gov.uk/hs2

2 Fish

2.1 Methodology

- 2.1.1 Details of the standard methodology utilised for fish (rivers and streams) surveys are provided in the Technical Note HS2 Ecological Surveys: Field Survey Methods and Standards (FSMS) included in the Scope and Methodology Report (SMR) Addendum (see ES Volume 5: Appendix CT-001-002).
- 2.1.2 Following the approach outlined in the FSMS, the requirement for detailed fish surveys is identified for watercourses with moderate or good fish habitat where insufficient desk study data exists and there is a likelihood of finding fish species of conservation concern and has been based on consideration of the following:
- desk study records relating to fish obtained from the Environment Agency²;
 - Staffordshire Ecological Record³;
 - rECOrd⁴ (the local biological records centre for Cheshire, Halton, Warrington and Wirral (the Cheshire region)); and
 - initial habitat assessments performed during scoping surveys undertaken as part of Phase 1 habitat, macroinvertebrate and river corridor and Water Framework Directive(WFD) walkover surveys.
- 2.1.3 No survey work for fish has been undertaken to date; however incidental records have been made at some locations during surveys for crayfish and other macroinvertebrates.

2.2 Deviations, constraints and limitations

- 2.2.1 Limited access during the required survey window means that no habitat assessments were conducted at a number of watercourses within the land required for the construction of the Proposed Scheme. In addition, some watercourses where a habitat assessment was possible were not accessible for subsequent fish survey within the required survey window. All of these sites are outlined in the sections below.

Fradley to Colton (CA1)

- 2.2.2 An unnamed tributary of Bentley Brook north of Rugeley was not visited for habitat assessment; however a scoping visit to another unnamed tributary of Bentley Brook, which appears similar in nature on examination of aerial imagery, indicated poor fish habitat. It is therefore considered unlikely that the tributary which was not accessed contains moderate or good fish habitat.
- 2.2.3 Moreton Brook was not surveyed for fish; however good fish habitat and incidental fish observations were recorded during macroinvertebrate survey of this watercourse.

² Environment Agency, <https://www.gov.uk/government/organisations/environment-agency>

³ Staffordshire Ecological Record, *The Ecological Database for Staffordshire*, http://www.staffs-ecology.org.uk/html2015/index.php?title=Main_Page

⁴ rECOrd, *Local Biological Records Centre serving Cheshire*, <http://www.record-lrc.co.uk/>

- 2.2.4 An unnamed tributary of Moreton Brook at Lea Hall Farm was not visited for habitat assessment. Scoping surveys of other unnamed tributaries of Moreton Brook, which appear similar in nature on examination of aerial imagery, indicate these are small ditches/drains with poor fish habitat. It is therefore considered unlikely that the tributary, which was not accessed, contains moderate or good fish habitat.
- 2.2.5 The River Trent and unnamed tributaries at Manor Park and Kings Bromley Lane were not visited for habitat assessment. Historic data are available for the River Trent in CA₁ and in the absence of habitat assessment information it is assumed that these species could be present in the River Trent and tributaries in the vicinity of the Proposed Scheme.

Colwich to Yarlet (CA₂)

- 2.2.6 Kingston Brook and an unnamed tributary of the River Trent at Lionlodge Covert were not accessed for habitat assessment. However, maps and aerial imagery suggest that the tributary at Lionlodge Covert is a simple woodland drain and that the section of Kingston Brook within the land to be used for the Proposed Scheme is a field drain which may be prone to drying out. It is therefore considered likely that fish habitat will be poor at these locations.
- 2.2.7 Suitable fish habitat is present in the River Trent near Hoomill Lane and in the Trent and Mersey Canal west of Great Haywood; however these were not accessed for fish survey. Historic data are available for both of these watercourses in CA₂ and it is assumed that these species are currently present there in the vicinity of the Proposed Scheme.

Stone and Swynnerton (CA₃)

- 2.2.8 An isolated drain at Lodge Covert was not visited for habitat assessment. However mapping and aerial imagery suggest this small vegetated drain is likely to be unsuitable for fish.

Whitmore Heath and Madeley (CA₄)

- 2.2.9 Meece Brook was not visited for habitat assessment, however recent desk study data are available for Meece Brook in CA₄.
- 2.2.10 A number of unnamed tributaries of the River Lea east of Manor Road and near Wrinehill Wood were not surveyed for fish. Desk study records exist for the River Lea near Madeley upstream of the Proposed Scheme in CA₄ and it is assumed that the species recorded could also be present in River Lea tributaries in this CA. In addition, incidental fish observations were made in the River Lea within and downstream of the land required for the construction of the Proposed Scheme during crayfish surveys. Moderate fish habitat was found during a scoping survey of the tributary which runs to the north and east of Wrinehill Wood.

South Cheshire (CA₅)

- 2.2.11 Mere Gutter was not visited for habitat assessment; however a section north of Waybutt Lane was visited for macroinvertebrate survey when it was found to have high sediment levels and to contain poor fish habitat. One incidental fish record was made at the time.

- 2.2.12 Basford Brook was not visited for habitat assessment and no desk study records or incidental observations exist for this watercourse. The site is part of the Basford Brook and Mere Gutter Local Wildlife Site, designated for its population of white-clawed crayfish. Suitable fish habitat is therefore assumed to be present.
- 2.2.13 Gresty Brook was not visited for habitat assessment, however recent Environment Agency survey data are available for a site approximately 700m downstream of the Proposed Scheme and the species recorded are also considered likely to be present in Gresty Brook within, and in the immediate vicinity of, the Proposed Scheme in CA5.

2.3 Baseline

Desk Study

Fradley to Colton (CA1)

- 2.2.14 Environment Agency data exists for the River Trent at High Bridge, approximately 1.25km upstream of the land required for the construction of the Proposed Scheme. The most recent survey of this site was a single run electric fishing in 2010 when three fish species were caught; pike (*Esox lucius*), perch (*Perca fluviatilis*) and three-spined stickleback (*Gasterosteus aculeatus*). Spined loach (*Cobitis taenia*), bullhead (*Cottus gobio*) and European eel (*Anguilla anguilla*) had been found at this site in previous years during single run electric fishing surveys between 2007 and 2009. In 2010 the catch at Yoxall Bridge, approximately 3km downstream of the Proposed Scheme included bullhead, European eel, roach (*Rutilus rutilus*), tiger trout (*Salmo trutta* x *Salvelinus fontinalis*; a sterile, non-native hybrid of brown and brook trout), chub (*Leuciscus cephalus*), bream (*Abramis brama*), perch and barbel (*Barbus barbus*). Given that most species were found at low density, and catch at sites can vary considerably from year to year, in the absence of recent survey data it is supposed that all of these species currently have the potential to be present in the Trent at CA1 in the vicinity of the Proposed Scheme.
- 2.2.15 Bullhead and spined loach are listed in Annex IIa of the EU Habitats and Species Directive⁵. Spined loach is also listed on Appendix III of the Bern Convention⁶ and is included in Section 41 (S41) of the Natural Environment and Rural Communities Act 2006 (NERC Act 2006)⁷. In the UK, spined loach is naturally restricted to five east-flowing river systems, the Trent, Welland, Witham, Nene and Great Ouse. European eel is listed as Critically Endangered by the IUCN⁸, and is also a S41 species.
- 2.2.16 Environment Agency data from 2002 indicate the presence of bullhead within Bourne Brook approximately 2km downstream of the Proposed Scheme.

Colwich to Yarlet (CA2)

⁵ Joint Nature Conservation Committee (1994-1999), *A framework for the conservation of amphibians and reptiles in the UK*, http://jncc.defra.gov.uk/pdf/pubs99_Frameworkforamphibiansconservation.pdf

⁶ Council of Europe (1979), Appendix III, <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680304356>

⁷ Natural Environment and Rural Communities Act (2006), <http://www.legislation.gov.uk/ukpga/2006/16/section/41>

⁸ International Union for Conservation of Nature (2016), <http://www.iucnredlist.org/details/60344/0>

- 2.2.17 Environment Agency data exists for the River Trent at CA2 within and in the immediate vicinity of the land required for construction of the Proposed Scheme. The most recent of these is immediately downstream of the Proposed Scheme at Great Haywood. Ten species of fish were found during a 2014 single pass electric fishing survey of this site; chub, dace (*Leuciscus leuciscus*), gudgeon (*Gobio gobio*), roach, perch, bullhead, spined loach, stone loach (*Barbatula barbatula*), minnow (*Phoxinus phoxinus*) and a roach-bream hybrid (*Rutilus rutilus* x *Abramis brama*). Other species previously recorded in the Trent in the area are pike, bream and common carp (*Cyprinus carpio*), which were recorded approximately 2km downstream of the land required for construction of the Proposed Scheme at Shugborough in 2010. European eel and three-spined stickleback were recorded immediately upstream of the land required for construction of the Proposed Scheme in 1999.
- 2.2.18 Fish density at all sites was relatively low for most species across all sites on the River Trent in the vicinity of the Proposed Scheme, though single run electric fishing is likely to under represent fish populations, particularly for species such as bullhead. The behaviour of bullhead means it is often immobilised underneath stones by the electric current and difficult for surveyors to detect.
- 2.2.19 Environment Agency data from 2008 indicate the presence of bullhead within the Trent and Mersey Canal at Weston approximately 4km to the north of the Proposed Scheme.

Stone and Swynnerton (CA3)

- 2.2.20 The closest Environment Agency survey site with connectivity to watercourses in CA3 is on the River Trent at Aston-by-Stone, where brown trout (*Salmo trutta*), gudgeon, bullhead and stone loach were recorded in a single pass electric fishing survey in 2014. However, this site is situated approximately 4km downstream of the land required for construction of the Proposed Scheme in habitat which is not represented in the vicinity of the Proposed Scheme itself. River Trent tributary habitat in CA3 was noted to be poor during habitat assessments.

Whitmore Heath and Madeley (CA4)

- 2.2.21 Environment Agency data exists for Meece Brook at a number of locations immediately adjacent to and downstream of the land required for construction of the Proposed Scheme. The closest and most recent of these is for Meece Brook at Whitmore Cricket Club, immediately adjacent to and upstream of the proposed scheme. Four species of fish were found during a 2015 single pass electric fishing survey of this site; roach, perch, three-spined stickleback and stone loach. Fish density was relatively low. Approximately 4km further downstream on Meece Brook at Standon Mill, bullhead was recorded during single pass electric fishing in 2013 and 2015, and in the absence of obvious barriers to movement have the potential to occur in the vicinity of the Proposed Scheme in CA3 and CA4. Bullhead minimum density at this site in 2015 was 260/100m². There are also historic records of European eel on Meece Brook, approximately 12km downstream of the Proposed Scheme, at Shallow Ford and Izaak Walton's Cottage; the most recent of these being two individuals in 300m² in 2006.

2.2.22 Environment Agency electric fishing survey data exist for bullhead and brown trout on the River Lea near Madeley in 2005, approximately 1.25km upstream of the Proposed Scheme. Brown trout is listed as a S41 species.

South Cheshire (CA5)

2.2.23 The closest Environment Agency fish sampling point on Checkley Brook is approximately 5km downstream of the land required for construction of the Proposed Scheme; however in the absence of obvious barriers to movement it is assumed that the same species may be present in the stretch of Checkley Brook at CA5. Five species of fish were found during a 2015 single pass electric fishing survey of this site; chub, dace, bullhead, minnow and a species of lamprey (family Petromyzontidae). Bullhead was found at a density of approximately 6/100m² at this site. Two lamprey were caught in 320m², however standard electric fishing techniques are not effective for indicating density of lamprey species. All three species of lamprey found in UK rivers are listed in Annex IIa of the EU Habitats Directive and Appendix III of the Bern Convention. River lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*) are S41 species. River lamprey is also listed in Annex V of the EU Habitats Directive.

2.2.24 Environment Agency data exist for Gresty Brook approximately 700m downstream of the land required for construction of the Proposed Scheme. The only survey data for this site, from a single pass electric fishing in 2014, recorded only two three-spined stickleback in approximately 130m². However, in 2001 an additional three species were caught at a site approximately 2km further downstream; tench (*Tinca tinca*), perch and stone loach.

Incidental observations

2.2.25 Table 1 summarises those locations where incidental observations of fish species were made and the species recorded.

Table 1: Summary of incidental fish records made during white-clawed crayfish and macroinvertebrate field surveys

Ecology survey code	Watercourse/ waterbody	Location	OS grid reference	Species recorded	Date	CA	Approximate distance from the land required for the construction of the Proposed Scheme (m) and orientation
000-WC1-190001	Bourne Brook	Staffordshire, Rileyhill	SK113148	Bullhead	10 October 2016 and 11 October 2016	CA1	4m south-east
000-IA-190001	Bourne Brook	Staffordshire, downstream of Rileyhill	SK 127157	Bullhead	28 November 2016	CA1	224m north-west
000-IA-191001	Crawley Brook	Staffordshire, Shaw Lane	SK113157	3-spined stickleback	28 November 2016	CA1	Within
000-WC1-205001	River Trent	Staffordshire, Hoomill Lane, Great Haywood	SJ996237	Bullhead	21 October 2016	CA2	6m south-west

000-IA-201001	Moreton Brook	Staffordshire, Upper Moreton	SK034224	Bullhead	28 November 2016	CA2	Within
000-WC1-236001	River Lea	Staffordshire, East of Station Road	SJ773441	Bullhead	13 September 2016	CA4	44m north-east
000-WC1-239003	River Lea	Staffordshire, South of Checkley Lane	SJ746458	Bullhead	18 October 2016	CA5	10m south-east
000-WC1-239003	Checkley Brook	Staffordshire, South of Checkley Lane	SJ750463	Bullhead	18 October 2016	CA5	10m south-east
000-IA-243001	Mere Gutter	Staffordshire, near West Heath	SJ736496	3-spined stickleback	21 November 2016	CA5	108m north-west
000-IA-244001	Swill Brook	Staffordshire, South of Chorlton	SJ726498	3-spined stickleback	28 November 2016	CA5	Within

Fradley to Colton (CA1)

- 2.2.26 Incidental records of bullhead at two locations in Bourne Brook at Rileyhill support desk study evidence and confirm the continued presence of the species in this watercourse.
- 2.2.27 Three-spined stickleback was observed during macroinvertebrate survey of Crawley Brook, which has been scoped out of detailed fish survey for reasons of poor habitat. This species is relatively tolerant of the poor biological water quality confirmed by the invertebrate data at this site.

Colwich to Yarlet (CA2)

- 2.2.28 Incidental observations of bullhead on the Trent at Hoomill Lane confirm the presence of this species in the immediate vicinity of the Proposed Scheme which was suggested by the desk study data from nearby sites on the River Trent.
- 2.2.29 Bullhead was observed in Moreton Brook at Upper Moreton during macroinvertebrate survey, when good habitat with varied flow and a mosaic of substrate types was found.

Stone and Swynnerton (CA3)

- 2.2.30 No incidental fish observations were made in CA3.

Whitmore Heath and Madeley (CA4)

- 2.2.31 Incidental observations of bullhead were made during crayfish survey of the River Lea, east of Station Road, supporting desk study evidence and confirming the continued presence of the species in this watercourse.

South Cheshire (CA5)

- 2.2.32 Incidental observations of bullhead were made during crayfish survey of Checkley Brook, confirming the presence of this species in the immediate vicinity of the

Proposed Scheme which was suggested by the desk study data from the closest Environment Agency site some distance downstream.

- 2.2.33 Three-spined stickleback was observed during macroinvertebrate surveys of Swill Brook and Mere Gutter; demonstrating the relative tolerance of this species to the sedimentation and Fair biological water quality found in these watercourses. Detailed fish survey has been scoped out for these watercourses for reasons of poor habitat.

Watercourses scoped out of detailed fish survey

- 2.2.34 Watercourses which were not included in the scope of further survey following initial habitat assessment are listed in Table 2 with reasons for the exclusions in each case.

Table 2: Watercourses scoped out of fish survey due to poor habitat in CA1 to CA5

Watercourse	Location	OS grid reference	Rationale for scoping watercourse/water body out of requirement for further survey	CA	Approximate distance from the land required for the construction of the Proposed Scheme (m) and orientation
Pyford Brook	Staffordshire, East of Woodend Common Barn	SK130140	Poor habitat due to bad overall WFD status and ecological status	CA1	Within
Unnamed tributary of Pyford Brook	Staffordshire, East of Woodend Common Barn	SK130140	Scoping visit showed habitat at site to be poor	CA1	Within
Ashby Stitch	Staffordshire, East of Common Farm	SK124148	Scoping visit showed habitat at site to be poor	CA1	Within
Unnamed tributary of Bentley Brook	Staffordshire, North of Rugley	SK003223	Scoping visit showed habitat at site to be poor	CA1	Within
Crawley Brook	Staffordshire, Shaw Lane	SK113160	Scoping visit showed habitat at site to be poor	CA1	Within
Luth Burn	Staffordshire, Pipe Wood Lane	SK096178	Scoping visit showed habitat at site to be poor	CA1	Within
Unnamed tributary of Bentley Brook	Staffordshire, South of Blithbury	SK081195	Scoping visit showed habitat at site to be poor	CA1	Within
Unnamed tributary of Moreton Brook	Staffordshire, Stockwell Heath	SK056214	Scoping visit showed habitat at site to be poor	CA1	Within
Unnamed tributary of Moreton Brook	Staffordshire, Lea Hall Farm	SK044220	Scoping visit showed habitat at site to be poor	CA1	Within
Unnamed tributary of Moreton Brook	Staffordshire, Moreton Grange	SK027227	Scoping visit showed habitat at site to be poor	CA2	Within

Watercourse	Location	OS grid reference	Rationale for scoping watercourse/water body out of requirement for further survey	CA	Approximate distance from the land required for the construction of the Proposed Scheme (m) and orientation
Unnamed tributary of Moreton Brook	Staffordshire, Upper Moreton	SK031225	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of River Trent	Staffordshire, Downstream Tithebarn Covert	SK009233	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of River Trent	Staffordshire, South of Toldish Lane	SK002234	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of River Trent	Staffordshire, South of Toldish Lane	SK003233	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of Kingston Brook	Staffordshire, Downstream of Weetman's Plantation	SJ959249	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of River Trent	Staffordshire, South of Hollytree Farm	SJ925275	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of River Trent	Staffordshire, Marston Lane	SJ930275	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of River Trent	Staffordshire, Yarlet Wood	SJ914287	Scoping visit showed habitat at site to be poor	CA2	Within
Unnamed tributary of River Trent	Staffordshire, East of Pirehill Lane	SJ899306	Scoping visit showed habitat at site to be poor	CA3	Within
Unnamed tributary of Meece Brook	Staffordshire, Shelton under Harley Farm	SJ815395	Scoping visit showed habitat at site to be poor	CA3	Within
Unnamed drain	Staffordshire, Walton Heath Farm	SJ888323	Scoping visit showed habitat at site to be poor	CA3	Within
Filly Brook Millstream	Staffordshire, Pool House Farm	SJ881332	Scoping visit showed habitat at site to be poor	CA3	Within
Unnamed tributary of Filly Brook	Staffordshire, Northeast of Pool House Farm	SJ883335	Scoping visit showed habitat at site to be poor	CA3	Within
Unnamed tributary of Filly Brook	Staffordshire, Upstream of Fox Covert	SJ870347	Scoping visit showed habitat at site to be poor	CA3	Within
Unnamed tributary of Filly Brook	Staffordshire, Upstream of Fox Covert	SJ870347	Scoping visit showed habitat at site to be poor	CA3	Within

Watercourse	Location	OS grid reference	Rationale for scoping watercourse/water body out of requirement for further survey	CA	Approximate distance from the land required for the construction of the Proposed Scheme (m) and orientation
Unnamed tributary of Filly Brook	Staffordshire, Upstream of Fox Covert	SJ870347	Scoping visit showed habitat at site to be poor	CA3	Within
Unnamed tributary of River Trent	Staffordshire, West of Sandyford Farm	SJ856361	Scoping visit showed habitat at site to be poor	CA3	Within
Unnamed Drain	Staffordshire, Whitmore Wood	SJ791416	Scoping visit showed habitat at site to be poor	CA4	Within
Unnamed Drain	Staffordshire, Whitmore Wood	SJ789418	Scoping visit showed habitat at site to be poor	CA4	Within
Unnamed tributary of River Lea	Staffordshire, West of Hey Sprink	SJ781425	Scoping visit showed habitat at site to be poor	CA4	Within
Unnamed tributary of River Lea	Staffordshire, Snape Hall Road	SJ794414	Scoping visit showed habitat at site to be poor	CA4	Within
Swill Brook	Staffordshire, South of Chorlton	SJ726498	Scoping visit showed habitat at site to be poor	CA5	Within
Mere Gutter	Staffordshire, nr West Heath	SJ736496	Scoping visit showed habitat at site to be poor	CA5	Within

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