In Parliament – Session 2022 - 2023

HS2

High Speed Rail (Crewe – Manchester)

Background information and data accompanying SES2 and AP2 ES

Ecology and biodiversity

BID EC-007-00000 SES2 and AP2 ES

Ecological baseline data – amphibians

MA01: Hough to Walley's Green

MA02: Wimboldsley to Lostock Gralam

MA03: Pickmere to Agden and Hulseheath

MA06: Hulseheath to Manchester Airport

MA07: Davenport Green to Ardwick

MA08: Manchester Piccadilly Station

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Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

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Contents

Tables

1 Introduction

1.1.1 This document sets out Background Information and Data (BID) that accompanies the High Speed Two (HS2) High Speed Rail (Crewe – Manchester) Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 Environmental Statement (AP2 ES)[1].

1.1.2 This document sets out baseline data for amphibians not reported in the Background Information and Data report [2] (the main BID report) that accompanied the HS2 High Speed Rail (Crewe – Manchester) Environmental Statement published in 2022[3] (the main ES). It also reports baseline data for amphibians not reported in the BID report[4] (MA01 – MA03 Ecological baseline data – amphibians) that accompanied the HS2 High Speed Rail (Crewe – Manchester) Supplementary Environmental Statement 1 (SES1) and Additional Provision 1 Environmental Statement (AP1 ES)[5]. It should be read in conjunction with the main BID report, Ecological baseline data – amphibians (see main BID report BID EC-007-00001) and BID report, Ecological baseline data – amphibians (see BID EC-007-00000 SES1 and AP1 ES), which accompanied SES1 and AP1 ES.

1.1.3 Baseline data covering other habitats and species are contained in the following BID reports that accompany SES2 and AP2 ES ecological baseline data reports:

- Ecological baseline data – bats (BID EC-011-00000 SES2 and AP2 ES); and
- Ecological baseline data – other (BID EC-017-00000 SES2 and AP2 ES) containing data relating to habitats, hedgerows, birds, ponds and canals, river habitat, otter and invertebrates.

1.1.4 Baseline badger data are provided in BID EC-014-00000 SES2 and AP2 ES and corresponding SES2 and AP2 ES Background Information and Data, Ecology and biodiversity Map Book, Map

[1] High Speed Two Ltd (2023), High Speed Rail (Crewe – Manchester), *Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement.* Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-2-and-additional-provision-2-environmental-statement.

[2] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data.* Available online at: https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement.

[3] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement*. Available online at: https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement.

[4] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data accompanying Supplementary Environmental Statement 1 and Additional Provision 1 Environmental Statement.* Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-1-and-additional-provision-1-environmental-statement.

[5] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Supplementary Environmental Statement 1 and Additional Provision 1 Environmental Statement*. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-supplementary-environmental-statement-1-and-additional-provision-1-environmental-statement.

Series EC-12C that accompanies the SES2 and AP2 ES. Note that baseline data for badger are not made publicly available due to the historic persecution of this species.

1.1.5 This report covers the following community areas (CA):

- Hough to Walley's Green (MA01);
- Wimboldsley to Lostock Gralam (MA02);
- Pickmere to Agden and Hulseheath (MA03);
- Hulseheath to Manchester Airport (MA06);
- Davenport Green to Ardwick (MA07); and
- Manchester Piccadilly Station (MA08).

1.1.6 Maps relevant to this report are contained in the SES2 and AP2 ES Background Information and Data, Ecology and biodiversity Map Book, Map Series EC-04 that accompanies the SES2 and AP2 ES.

1.1.7 In order to differentiate between the original scheme and the subsequent changes, the following terms are used:

- 'the original scheme' – the Bill scheme submitted to Parliament in 2022, which was assessed in the main ES;
- 'the SES1 scheme' – the original scheme with any changes described in SES1 that are within the existing powers of the Bill;
- 'the AP1 revised scheme' – the original scheme as amended by SES1 changes and AP1 amendments;
- 'the SES2 scheme' – the original scheme with any changes described in SES1 (submitted in July 2022) and the SES2; and
- 'the AP2 revised scheme' – the original scheme as amended by SES1 and SES2 changes (as relevant) and AP2 amendments.

2 Amphibians

2.1 Methodology

2.1.1 The assessment scope, key assumptions and limitations are as set out in the main ES Environmental Impact Assessment Scope and Methodology Report (SMR) (see Volume 5, Appendix: CT-001-00001 in the main ES)[6].

2.1.2 Details of the standard methodology utilised for amphibian (great crested newt) surveys are provided in the Technical note – Ecology and biodiversity – Ecological field survey methods and standards (FSMS), which is included in the SMR in the main ES.

2.1.3 The scoping, desk study exercises and surveys reported in the main ES can be found in BID EC-007-00001[7]. This section contains the outcomes of surveys undertaken that were not reported in the BID document that accompanied the main ES or the BID document that accompanied the SES1 and AP1 ES. This is either because the survey reporting process had not been completed to inform the assessment within the main ES or SES1 and AP1 ES, or because the surveys have been undertaken since their production, including on additional land required for the construction of the AP2 revised scheme.

2.1.4 The scope of additional amphibian surveys undertaken in 2022 was informed by the water body scoping exercise for the original scheme, as reported in the main BID report, BID EC-007-00001.

2.1.5 Since completion of additional amphibian surveys in 2021, a subsequent water body scoping exercise was undertaken in February 2022 based on the results of the additional surveys. The intention of this scoping exercise was to identify any additional unsurveyed water bodies that are considered relevant to the assessment of the AP2 revised scheme. These water bodies are included within Background Information and Data, Ecology and biodiversity Map Book, maps EC-04-503 to EC-04-512 which accompanies the SES2 and AP2 ES. The methodology for the updated scoping exercise followed that described within the main BID report, BID EC-007-00001.

[6] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Environmental Impact Assessment Scope and Methodology Report,* Volume 5, Appendix: CT-001-00001. Available online at: https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement.

[7] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Background Information and Data, Ecology and biodiversity, Ecological baseline data – amphibian and pond and canal surveys,* BID EC-007-00001. Available online at: https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement.

2.2 Deviations, constraints and limitations

2.2.1 In addition to the deviations and limitations reported in the main BID report, BID EC-007-00001, deviations from the methodology stated in the SMR in the main ES for great crested newt surveys were applied as follows:

- in a deviation from the Field Survey Method and Standards (FSMS) agreed with Natural England, water bodies greater than 250m from the land required for the AP2 revised scheme were surveyed using Habitat Suitability Index (HSI) and environmental DNA (eDNA) methods only. These water bodies were not subject to traditional presence/absence (P/A) surveys;
- as a result of the changes to the area of the land required for the AP2 revised scheme in August 2022, some additional areas are now present within this assessment where water bodies have not been previously considered. As such, these water bodies were not included in the February 2022 scoping exercise and have not yet been surveyed but have been given a provisional scoping requirement to allow their inclusion in this assessment;
- changes to metapopulations reported in this assessment are where marked changes have occurred to the geometry and area of an assumed metapopulation due to the addition or removal of water bodies, where new assumed populations are now included or where previous metapopulations are no longer included; and
- 'relevance to AP2' was determined by identifying the water bodies which are included in areas previously outside of the assessment and cross-referencing these with the presence of any 2022 survey data.

2.2.2 The deviations above have been undertaken using professional judgement and a risk based approach to give sufficient confidence in the survey results.

2.3 Survey constraints and limitations

2.3.1 Where issues related to specific surveys were encountered, these are noted here as follows:

- access to some water bodies was refused from the start or part way through the relevant survey type;
- a number of water bodies could not be surveyed for health and safety reasons (e.g. steep bank at water body edge);
- some HSI surveys were conducted outside the optimal May to September period, which may have affected the results for affected water bodies; and
- where a previous HSI survey identified a water body as suitable for great crested newts, this water body may have subsequently dried and was not suitable for survey in the 2022 survey season.

2.4 Baseline

Hough to Walley's Green (MA01)

Survey extent

2.4.1 The BID report that accompanied the main ES, BID EC-007-00001 reported a total of 208 water bodies within MA01 that required survey. The BID report for the SES1 and AP1 ES, BID EC-007-00001 reported a total of 209 water bodies within MA01 that required survey. The AP2 revised scheme would require a total of 276 water bodies to be surveyed, comprising:

- thirty-nine water bodies which have had all survey requirements completed prior to the 2022 survey season;
- twenty-two water bodies which have had all survey requirements completed in the 2022 survey season;
- forty-four water bodies which have received a partial suite of survey types and/or incomplete survey visits (and require completion); and
- one hundred and seventy-one water bodies which have not been surveyed (and require completion).

2.4.2 In the 2022 survey season, 47 water bodies were subject to one or more survey types.

2.4.3 Following the 2022 survey season, a total of 215 water bodies remain that require either full or partial survey.

Field survey

Habitat Suitability Index/walkover

2.4.4 Habitat Suitability Index (HSI) surveys were conducted at 18 water bodies in 2022. These water bodies were not previously subject to HSI. HSI results are reported from multiple years in Table 1. This is to capture HSI survey results not previously reported that have become relevant due to changes for the AP2 revised scheme.

2.4.5 Nine water bodies were scoped out of requiring further survey due to updates for the AP2 revised scheme and are identified in Table 1.

Table 1: Summary of locations where requirement for further survey was scoped out following HSI/walkover survey within MA01

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond4011	West of Marshfield Bank	SJ6742155502	Slurry pit, not a pond. HSI – 0.00 (Poor)	MA01	105m west	Y	N
AH1_Pond4101	West of Woolstan wood	SJ6706955651	A slurry lagoon, dry at time of survey. HSI – 0.00 (Poor)	MA01	461m west	Y	N
AH1_Pond3758	East of Crewe	SJ7144057123	Very small garden water body. No aquatic plants. HSI – 0.41 (Poor)	MA01	24m north	Y	N
AH1_Pond3759	East of Crewe	SJ7137557150	Amenity water body in a residential area. HSI – 0.35 (Poor)	MA01	1m east	Y	N
AH1_Pond4510	North of Crewe	SJ7031157970	Shallow depression in the corner of a field, dry at time of survey HSI – 0.48 (Poor)	MA01	13m east	Y	N
AH1_Pond1545	South of Minshull Hall Court	SJ6863859659	Shallow water body in corner of field. HSI – 0.37 (Poor)	MA01	1m north-west	Y	N
AH1_Pond3992	East of Larch Wood	SJ6965059916	Area of mud in a field of intensive managed pasture. HSI – 0.29 (Poor)	MA01	17m south-east	Y	N

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond4124	South of Willaston	SJ6968259940	An area of mud. HSI – 0.29 (Poor)	MA01	35m south-east	Y	N
AH1_Pond1547	Within Minshull Hall	SJ6850060031	Medium sized pond, with very turbid water, with many ducks present. HSI – 0.43 (Poor)	MA01	177m north-east	Y	N

2.4.6 HSI surveys in 2022 identified great crested newt suitability for nine water bodies surveyed in MA01, these water bodies were recommended for eDNA and/or presence/absence (P/A) surveys.

eDNA surveys

2.4.7 Four water bodies in MA01 were subject to eDNA survey in the 2022 survey season. The eDNA analysis confirmed absence of great crested newt in all four of the water bodies.

Presence/absence and population size class estimate surveys

2.4.8 Thirty-three P/A or population size class assessment (PSC) surveys have been conducted in MA01 in the 2022 survey season. The summary of results of the P/A and PSC surveys are detailed in Table 2. This table includes those water bodies supporting great crested newt (any life stage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

2.4.9 Great crested newt was confirmed present in nine of the 33 water bodies subject to P/A or PSC survey. These additional water bodies comprised three medium, two assumed medium, and four small population size classes.

2.4.10 Twenty-four water bodies (18 with an incomplete set of visits) from the 2022 survey season were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 2.

2.4.11 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any water body in Table 2 with fewer than six visits completed.

Table 2: Summary of results from surveys for amphibian presence/absence and population size class assessment with associated amphibian populations within MA01

Ecology survey code	Location	OS centroid grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad			
AA1_Pond902	South-west of Coppenhall Moss	SJ7013158157	PSC (partial)	4	11/04/2022	15/06/2022	2 (S)	5 (L)	-	-	-	Within	Y	N
AA1_Pond32	South-east of Spring Farm	SJ6933559006	PSC (partial)	5	23/03/2022	23/06/2022	57 (M)	20 (G)	1 (L)	4 (L)	-	24m north	Y	N
AA1_Pond38	North-east of Spring Farm	SJ6940459251	PSC (partial)	5	22/03/2022	22/06/2022	9 (S)	5 (L)	-	4 (L)	1 (L)	1m north	Y	N
AA1_Pond919	North-east of Moat House Farm	SJ6850760861	PSC	6	24/03/2022	22/06/2022	9 (S)	8 (L)	-	-	1 (L)	77m north-east	Y	N
AA1_Pond57	South of Park House Farm	SJ6937861118	PSC (partial)	4	05/04/2022	17/05/2022	12 (M)	3 (L)	-	-	2 (L)	192m north-east	Y	N

Ecology survey code	Location	OS centroid grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad			
AA1_Pond60	West of Park House Farm	SJ690866 1263	PSC (partial)	5	05/04/2022	08/06/2022	23 (M)	2 (L)	-		4 (L)	<1m east	Y	N
AA1_Pond61	North of Park House Farm	SJ692706 1433	PSC (partial)	5	05/04/2022	08/06/2022	3 (S)	8 (L)	-	-	11 (L)	149m east	Y	N
AA1_Pond63	East of Walley's Green	SJ688856 1520	PSC (partial)	3	05/04/2022	05/05/2022	9 (M)	2 (L)	-	1 (L)	Tadpoles only	Within	Y	N
AA1_Pond1002	North-east of Park Hall Farm	SJ693506 2026	P/A	3	06/04/2022	18/05/2022	1 (M)	-	-	-	1 (L)	392m east	Y	N

Key:

**Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:*

- Great crested newt = peak count 1-10 individuals = Small (S); 11-100 individuals = Medium (M); greater than 100 individuals = Large (L);

- Smooth and palmate newt = peak count less than 10 = Low (L); 10-100 = Good (G); greater than 100 = Exceptional (E);

- Common frog = spawn clumps less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E); and

- Common toad = peak count of less than 100 = Low (L); 100-1000 = Good (G); greater than 1000 = Exceptional (E).

Discussion of combined results

2.4.12 Forty-seven water bodies were subject to survey in 2022. Of these 47, nine water bodies were identified that support populations of great crested newt. All nine of the water bodies were identified through P/A survey and/or PSC surveys.

2.4.13 Of the nine water bodies identified as supporting great crested newt through P/A and/or PSC survey in 2022, three had medium, two had assumed medium, and four had assumed small population size classes.

2.4.14 Over the 2021 and previous survey seasons, a total of 114 water bodies were found to support populations of great crested newts. These comprise six water bodies identified through eDNA survey alone, 30 identified through P/A and/or PSC survey and the remaining 78 identified through desk study records or nearby previous planning applications. Of the 30 water bodies identified through P/A survey and/or PSC survey, there were five medium and 25 small population size classes.

2.4.15 Of the 47 water bodies surveyed in 2022, nine are within the land required for the AP2 revised scheme. Of these nine water bodies, two were found to support populations of great crested newts and five had records of great crested newt presence prior to 2022.

2.4.16 Of the 101 water bodies surveyed in 2021 and previous survey seasons, 20 are within the land required for the AP2 revised scheme. Of the 20 water bodies, 12 were found to support populations of great crested newts and two were confirmed as not supporting great crested newts. The potential for great crested newt presence at the remaining six water bodies is undetermined.

2.4.17 Eight of the nine water bodies found to support populations of great crested newts through P/A and/or PSC surveys in 2022 also support low populations of other amphibian species (smooth newt, palmate newt, common frog and/or common toad).

Metapopulations

2.4.18 Following a review of the 2022 survey results and the update to the AP2 revised scheme, 11 new great crested newt metapopulations have been identified, and no previously identified metapopulations removed. New metapopulations/populations have arisen either as a result of changes to the extent and location of land required for the AP2 revised scheme, as a result of updated survey results for water bodies, or as a result of new water bodies being identified which were not previously known to exist. Combined with survey data from previous years there are a total of 33 great crested newt metapopulations identified in MA01.

2.4.19 Four of the metapopulations identified in the main BID and the BID report that accompanied the SES1 and AP1 ES have changed following the 2022 surveys and the updates to the AP2 revised scheme. The number of water bodies in these metapopulations have changed due to new water bodies being included or water bodies being removed. The estimated population size class of these metapopulations has not changed.

2.4.20 The new metapopulations are described below. The new metapopulations and the existing metapopulations which have changed following the 2022 surveys and the updates to the AP2 revised scheme are also summarised in Table 3.

2.4.21 GCNMP1.1.23 is situated south of Basford and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of four water bodies, all situated within 500m of the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. The surrounding area comprises predominantly farmland with residential areas to the south and west.

2.4.22 GCNMP1.1.24 is situated north-east of Sandbach and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of nine water bodies, two situated within 500m, and seven situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. The surrounding area is predominantly farmland with a network of hedgerows and small patches of woodland with a residential area to the south.

2.4.23 GCNMP1.1.25 is situated east of Sandbach within Sandbach Heath and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of four water bodies, two situated within 500m, and two situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. The water bodies in this area lie within a woodland corridor with a small area of farmland and are surrounded by residential and industrial areas. The A534 borders the assumed metapopulation area to the west with the M6 to the east.

2.4.24 GCNMP1.1.26 is situated south of Worleston and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 22 water bodies, five situated within 500m, and 17 situated more than 500m from the land required for the construction of the AP2 revised scheme. Desk study records from Pond4179 suggest that great crested newts were likely to be present. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. South of Worleston the surrounding landscape is farmland connected to smaller field systems and hedgerows with pockets of scrub and woodland with the River Weaver bordering the assumed metapopulation area to the north and west.

2.4.25 GCNMP1.1.27 is situated west of Crewe and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 12 water bodies, two situated within 500m, and 10 situated more than 500m from the land required for the construction of the AP2 revised scheme. Desk study records from Pond4069, Pond4202 and Pond4203 suggest that great crested newts were likely to be present. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. West of Crewe the surrounding landscape is

farmland connected to smaller field systems and hedgerows with pockets of semi-natural grassland, scrub and residential buildings.

2.4.26 GCNP1.1.28 is situated east of Nantwich and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of one pond, situated within 500m of the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. East of Nantwich the surrounding landscape is farmland and hedgerows with pockets of semi-natural grassland, scrub and residential buildings with Cheer Brook running through the assumed population area from north-west to south-east.

2.4.27 GCNMP1.1.29 is situated north-east of Nantwich and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of eight water bodies, five situated within 500m, and three situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. North-east of Nantwich the surrounding landscape is farmland connected to smaller field systems and hedgerows with pockets of scrub, woodland and amenity grassland. Cheney Brook also runs through the metapopulation from north to south.

2.4.28 GCNMP1.1.30 is situated north-west of Shavington and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 15 water bodies, four situated within 500m, and 11 situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. The metapopulation is bordered to the north by the A500 and to the south and east by residential buildings and associated gardens. North-east of Shavington the habitat comprises predominantly farmland with a woodland corridor to the north connecting to the wider landscape via a series of hedgerows.

2.4.29 GCNP1.1.31 is situated within the northern edge of Crewe and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of two water bodies, both situated within 500m of the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. Both of the water bodies are situated at the end of an unnamed watercourse extending to the east, and are surrounded by a woodland corridor. Beyond this woodland the area is surrounded by industrial buildings with the West Coast Main Line running north to south to the west of the assumed population area.

2.4.30 GCNMP1.1.32 is situated east of Barrows Green to the north-west of Crewe and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of four water bodies, two situated within 500m, and two situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-

surveyed water bodies. East of Barrows Green the area is predominantly farmland with areas of semi-improved grassland to the south and Leighton Brook running east to west.

2.4.31 GCNMP1.1.33 is situated north of Crewe and lies partially within the land required for the construction of the AP2 revised scheme. It consists of four water bodies, all situated directly within the land required for the construction of the AP2 revised scheme. Presence/absence surveys to AA1_Pond28, AA1_Pond902, and AA1_Pond905 revealed small populations of great crested newts. eDNA surveys to AA1_Pond28, AA1_Pond903, and AA1_Pond905 returned positive results for great crested newt DNA. These survey results include data from 2022 surveys, but also from surveys in earlier years. Desk study records from AA1_Pond903 also suggest that great crested newts were likely to be present. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. North of Crewe the area within the assumed GCNMP comprises principally farmland and rough semi-improved grassland with hedgerows and scattered trees. The West Coast Main Line running north from Crewe borders the assumed metapopulation area to the west.

2.4.32 Table 3 provides details of the revised list of Ecology Survey Codes for the four revised metapopulations and the 11 new metapopulations.

Table 3: Summary of assumed great crested newt metapopulations within MA01

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNMP1.1.12	Pond4045, Pond4117; and four additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	229m south	Y	N
GCNMP1.1.15	AH1_Pond4889, Pond3847, Pond4699, Pond3846, Pond4700, Pond3818, Pond3768, Pond3817, Pond3763, AA3_Pond3772, Pond3819, Pond3615, Pond3771, Pond3770,	Assumed medium	98m south-east	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	Pond3774, Pond3773; and 15 additional ponds more than 500m from the AP2 revised scheme.				
GCNMP1.1.19	Pond1054, AA1_Pond916, AA1_Pond917, AA3_Pond1753, AA1_Pond1752, Pond3821, AA1_Pond908, AA3_Pond907, AA3_Pond3717, AH1_Pond3720, AA1_Pond906, Pond1111, Pond3721, AA1_Pond40, Pond3719, AA1_Pond42, Pond3725, Pond1105, Pond4110, AA1_Pond47, AA1_Pond49, Pond3812, AA1_Pond50, Pond995, Pond996, Pond998, Pond3732, Pond999, Pond1005, AA1_Pond51, Pond1522, Pond3914, Pond3901, Pond4015, Pond4014, Pond4000, AA1_Pond54,	Assumed large	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AA1_Pond55, AA3_Pond1001, AA1_Pond57, AA1_Pond60, AA3_Pond1000, AA1_Pond61, Pond3286, AA1_Pond63, Pond3300, AA1_Pond1002, AA1_Pond1003, AA1_Pond66, AH1_Pond904, AA1_Pond68, AA3_Pond1051, AA1_Pond74, AH1_Pond1794, Pond1035, AA3_Pond923, AA1_Pond82, AA1_Pond1038, Pond1633, AA3_Pond920, AA3_Pond1640, AA1_Pond88, AA3_Pond1791, AA1_Pond854, AA1_Pond856, AA1_Pond97, Pond1042; and 46 additional water bodies more than 500m from the AP2 revised scheme.				
GCNMP1.1.20	Pond4122, EES_AA3_Pond29, AA1_Pond1524, Pond1520, AA1_Pond30, AA1_Pond909, AA1_Pond1521, AA3_Pond31, AA1_Pond32,	Medium	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AA1_Pond33, Pond3878, AH1_Pond1526, Pond3875, AA1_Pond35, Pond3924, Pond994, AA3_Pond37, Pond3923, Pond3874, Pond1523, AA1_Pond38, Pond3877, AA1_Pond1525, Pond3881, Pond3925, Pond1117, Pond3882, Pond1116, AH1_Pond4891, AA1_Pond1546, AA1_Pond39, AA1_Pond41, AA1_Pond43, AH1_Pond1548, AA1_Pond44, AA1_Pond45, AA3_Pond1512, AA1_Pond1509, AA1_Pond46, AA3_Pond1510, AA3_Pond1508, AA1_Pond1511, AA1_Pond919, AA1_Pond52, AA1_Pond53, AA1_Pond918, Pond59, Pond64, Pond65; and 6 additional water bodies more than 500m from the AP2 revised scheme.				

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNMP1.1.23	Pond3836, Pond3740, Pond3837 and, Pond3838.	Assumed medium	360m east	Y	N
GCNMP1.1.24	Pond4703, Pond4702; and 7 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	388m north-east	Y	Y
GCNMP1.1.25	Pond4705, Pond4704; and 2 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	333m south-west	Y	Y
GCNMP1.1.26	Pond4072, Pond4089, Pond4050, Pond4007, Pond4052; and 17 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	280m north-west	Y	N
GCNMP1.1.27	Pond4069, Pond4090; and 10 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	485m east	Y	N
GCNP1.1.28	Pond4004.	Assumed medium	283m south-west	Y	N
GCNMP1.1.29	Pond4100, Pond3988, Pond3999, Pond4080, Pond4027; and 3 additional water	Assumed medium	362m south-west	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	bodies more than 500m from the AP2 revised scheme.				
GCNMP1.1.30	Pond3829, Pond3827, Pond3686, Pond3687; and 11 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	281m north-west	Y	N
GCNP1.1.31	Pond3995 and Pond4104.	Assumed medium	258m south	Y	N
GCNMP1.1.32	Pond3919, Pond3870; and 2 additional water bodies more than 500m from theAP2 revised scheme.	Assumed medium	307m north-west	Y	N
GCNMP1.1.33	AA1_Pond902, AA1_Pond903, AA1_Pond905 and AA1_Pond28.	Assumed medium	Within	Y	N

Wimboldsley to Lostock Gralam (MA02)

Survey extent

2.4.33 The BID report for the main ES, BID EC-007-00001 reported a total of 336 water bodies within MA02 that required survey. The BID report that accompanied the SES1 and AP1 ES reported a total of 318 water bodies within MA02 that required survey. The AP2 revised scheme would require a total of 373 water bodies to be surveyed, comprising:

- one hundred and eighteen water bodies which have had all survey requirements completed prior to the 2022 survey season;
- nineteen water bodies which have had all survey requirements completed in the 2022 survey season;

- seventy-seven water bodies which have received a partial suite of survey types and/or incomplete survey visits (and require completion); and
- one hundred and fifty-nine water bodies which have not been surveyed (and require completion).

2.4.34 In the 2022 survey season, 36 water bodies were subject to one or more survey types.

2.4.35 Following the 2022 survey season, a total of 236 water bodies remain that require either full or partial survey.

Field survey

Habitat Suitability Index/walkover

2.4.36 HSI surveys were conducted at 19 water bodies in 2022. 18 of these water bodies were not previously subject to HSI. HSI results are reported from multiple years in Table 4. This is to capture HSI survey results not previously reported have become relevant due to changes for the AP2 revised scheme.

2.4.37 Nine water bodies were scoped out of requiring further survey due to updates for the AP2 revised scheme and are identified in Table 4.

Table 4: Summary of locations where requirement for further survey was scoped out following HSI/walkover survey within MA02

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond 69	South of Wimboldsley	SJ6892262300	Flooded area within field. HSI – 0.38 (Poor)	MA02	33m south-east	Y	N
AH1_Pond 4113	South-east of Clive Green	SJ6863664982	No water body present during survey visit. HSI – 0.00 (Poor)	MA02	Within	Y	N
AA1_Pond 830	East of Clive Green	SJ6843965084	No water body present during survey visit. HSI – 0.00 (Poor)	MA02	Within	Y	N
AA1_Pond 832	North of Clive Green	SJ6807065416	Water body is actually a slurry	MA02	16m south	Y	N

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
			pit – unsuitable for survey. HSI – 0.00 (Poor)				
AA1_Pond 105	North of Clive Green	SJ6813165481	Water body does not exist. HSI – 0.00 (Poor)	MA02	Within	Y	N
AA1_Pond 2991	North of Clive Green	SJ6764865545	Water body does not exist. HSI – 0.00 (Poor)	MA02	144m north-west	Y	N
AA1_Pond 2984	South of Clive	SJ6764365546	Water body does not exist. HSI – 0.00 (Poor)	MA02	148m north-west	Y	N
AH1_Pond 146	South-east of Northwich	SJ6863670655	The water body has a muddy substrate and heavily shaded by scrub and woodland. HSI – 0.31 (Poor)	MA02	Within	Y	N
AH1_Pond 3150	South of Lostock Green	SJ6997672947	Water body surrounded by willow scrub. HSI – 0.48 (Poor)	MA02	147m south	Y	N

2.4.38 HSI surveys in 2022 identified great crested newt suitability for nine of the water bodies surveyed in MA02, and these water bodies were recommended for eDNA and/or presence/absence (P/A) surveys.

eDNA surveys

2.4.39 Three water bodies in MA02 had eDNA survey in the 2022 survey season. The eDNA analysis confirmed absence of great crested newts in all three of the water bodies.

Presence/absence and population size class estimate surveys

2.4.40 Twenty-three P/A or population size class assessment (PSC) surveys have been conducted in MA02 in the 2022 survey season. The summary of results of the P/A and PSC surveys are detailed in Table 5. This table includes those water bodies supporting great crested newt (any life stage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

2.4.41 Great crested newt was confirmed present in one of the 23 water bodies subject to P/A or PSC survey, with a small population found. This water body only supported lower life stages of great crested newt (no adults recorded present).

2.4.42 Twenty-two water bodies (11 with an incomplete set of visits) from the 2022 survey season were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 5.

2.4.43 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any water body in Table 5 with fewer than six visits completed.

Table 5: Summary of results from surveys for amphibian presence/absence and population size class assessment with associated amphibian populations within MA02

Ecology survey code	Location	OS centroid grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad			
AA1_Pond82	East of Yewtree Farm	SJ6912363302	PSC (partial)	5	23/03/2022	22/06/2022	Eggs only (S)	1 (L)	-	-	1 (L)	121m east	Y	N

Key:

**Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:*

- Great crested newt = peak count 1-10 individuals = Small (S); 11-100 individuals = Medium (M); greater than 100 individuals = Large (L);

- Smooth and palmate newt = peak count less than 10 = Low (L); 10-100 = Good (G); greater than 100 = Exceptional (E);

- Common frog = spawn clumps less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E); and

- Common toad = peak count of less than 100 = Low (L); 100-1000 = Good (G); greater than 1000 = Exceptional (E).

Discussion of combined results

2.4.44 Thirty-six water bodies were subject to survey in 2022. Of these 36, one water body was identified that supports a population of great crested newt. This water body was identified through PSC survey.

2.4.45 The one water body identified as supporting great crested newt through P/A and/or PSC survey in 2022, had an assumed small population size class. This water body only supported lower life stages of great crested newt (i.e. no adults were recorded).

2.4.46 Over the 2022 and previous survey seasons, a total of 64 water bodies were found to support populations of great crested newts. These comprise 17 water bodies identified through eDNA survey alone, 28 identified through P/A and/or PSC survey and the remaining 19 identified through desk study records or nearby previous planning applications. Of the 28 water bodies identified through P/A survey and/or PSC survey, there were six medium and 22 small population size classes.

2.4.47 Of the 36 water bodies surveyed in 2022, eight are within the land required for the AP2 revised scheme. Of the eight water bodies, none were found to support populations of great crested newts in 2022. Two of these water bodies had records of great crested newt presence prior to 2022, four did not support populations of great crested newts and the potential for great crested newt presence at the remaining two water bodies remains undetermined.

2.4.48 Of the 264 water bodies surveyed in 2022 and previous survey seasons, 57 are within the land required for the AP2 revised scheme. Of the 57 water bodies, 16 were found to support populations of great crested newts and 29 were confirmed as not supporting great crested newts. The potential for great crested newt presence at the remaining 12 water bodies are undetermined.

2.4.49 The one water body found to support populations of great crested newts through P/A and/or PSC surveys in 2022 also supports low populations of other amphibian species (smooth newt, palmate newt, common frog and/or common toad).

Metapopulations

2.4.50 Following a review of the 2022 survey results and the update to the AP2 revised scheme, five new great crested newt metapopulations have been identified, and three previously identified populations removed (GCNP1.2.6, GCNP1.2.7 and GCNP1.2.10). New metapopulations/populations have arisen, or existing ones removed as a result of changes to the extent and location of land required for the AP2 revised scheme, as a result of updated survey results for water bodies, or as a result of new water bodies being identified which were not previously known to exist. Combined with survey data from previous years there are a total of 38 great crested newt metapopulations identified in MA02.

2.4.51 Seven of the metapopulations identified in the main BID and the BID report that accompanied the SES1 and AP1 ES have changed following the 2022 surveys and the

updates to the AP2 revised scheme. The number of water bodies in these metapopulations has changed due to new water bodies being included or water bodies being removed. The estimated population size class of these metapopulations has not changed.

2.4.52 The new metapopulations are described below. The new metapopulations and the existing metapopulations which have changed following the 2022 surveys and the updates to the AP2 revised scheme are also summarised in Table 6.

2.4.53 GCNMP1.2.40 is situated west of Middlewich and lies partially within and extends up to 250m from the land required for the construction of the AP2 revised scheme. It consists of five water bodies, three situated directly within and two situated within 250m from the land required for the construction of the AP2 revised scheme. eDNA surveys to AA1_Pond99 (prior to 2022) returned positive results for great crested newt DNA. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. West of Middlewich the surrounding landscape consists of farmland with hedgerows and woodland.

2.4.54 GCNMP1.2.41 is situated south-east of Rudheath and lies within 250m of the land required for the construction of the AP2 revised scheme. It consists of six water bodies situated within 250m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. South-east of Rudheath the surrounding landscape consists of farmland with hedgerows and woodland, and a marina. There is some potential for this metapopulation to be connected to GCNMP1.2.23 across the Sandbach to Northwich railway line corridor.

2.4.55 GCNP1.2.42 is situated north of Middlewich and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of one water body situated within 500m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of an un-surveyed water body. North of Middlewich the surrounding landscape consists of farmland with hedgerows and woodland. There is some potential for this population to be connected to GCNMP1.2.16 across the B5309 (King Street).

2.4.56 GCNP1.2.43 is situated east of Middlewich and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of three water bodies, two situated within 500m, and one situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. East of Middlewich the surrounding landscape consists of farmland with hedgerows and woodland.

2.4.57 GCNMP1.2.44 is situated south-east of Middlewich and lies within 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 16 water bodies, one situated within 500m, and 15 situated more than 500m from the

land required for the construction of the AP2 revised scheme. Desk study records from Pond4288, Pond4289, and Pond4290 suggest that great crested newts were likely to be present. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. South-east of Middlewich the surrounding landscape is farmland connected to smaller field systems with hedgerows and pockets of woodland.

2.4.58 Table 6 provides details of the revised list of Ecology Survey Codes for the seven revised metapopulations and the five new metapopulations.

Table 6: Summary of assumed great crested newt metapopulations within MA02

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNP1.2.9	AA1_Pond910.	Assumed medium	Within	Y	N
GCNMP1.2.12	Pond110, Pond111, Pond112, Pond113, AA1_Pond1050, Pond1019, Pond1014, Pond1009, Pond1016, AA1_Pond1015, Pond4690, AA1_Pond1018, Pond1011; and nine additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	1m south-west	Y	N
GCNMP1.2.18	Pond4691, AA1_Pond1044, AA3_Pond1045, Pond3007, Pond3002, Pond3003, Pond3005, AA1_Pond122, Pond3011, AA1_Pond123, AA3_Pond1023,	Medium	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AA1_Pond124, AA1_Pond125, Pond1031, Pond1047, AA1_Pond129, AA3_Pond1028, AA3_Pond1034, AA3_Pond1030, EES_AA3_Pond130, AA1_Pond133, AA1_Pond132, AA1_Pond138; and three additional water bodies more than 500m from the AP2 revised scheme.				
GCNMP1.2.19	Pond3013, Pond3028, Pond3016, Pond3984, AA3_Pond1543, AA1_Pond144, Pond4114, AA1_Pond147, EES_AA3_Pond148, AA1_Pond151, AA1_Pond152, AA1_Pond153, Pond4695; and 13 additional water bodies more than 500m from the AP2 revised scheme.	Medium	Within	Y	N
GCNP1.2.29	Pond181 and Pond4693	Assumed medium	Within	Y	N
GCNMP1.2.36	AA1_Pond206, AA1_Pond207, AH1_Pond929, AA1_Pond208, AA1_Pond209,	Assumed large	Within	Y	Y

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AH1_Pond934, AH1_Pond933, AA1_Pond210, AH1_Pond932, AA1_Pond211, AA1_Pond213, AA1_Pond216, AA1_Pond217, AA1_Pond218, AA1_Pond220, AA1_Pond222, AA1_Pond224, AA1_Pond1495, AA1_Pond225, AA1_Pond226, AA1_Pond231, AA1_Pond232, AA1_Pond233, AA1_Pond234, AA1_Pond236, AA3_Pond1553, AH1_Pond237, AA1_Pond238, AA3_Pond1327, AA1_Pond239, AA1_Pond242, AA1_Pond241, AA1_Pond243, AA1_Pond244, Pond3566, AA1_Pond247, AA1_Pond248, AA1_Pond249, Pond250, Pond1493, Pond1328, Pond3567, AA1_Pond252, Pond1497, Pond3564, Pond1498, Pond3570, Pond3573,				

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	Pond3575, Pond1336, Pond1338, Pond1499, Pond1500, Pond1331, AA3_Pond1335, AH1_Pond1333, Pond3571, Pond3589, Pond3593, Pond3594, Pond3588, Pond2786, Pond3985, Pond2614, Pond2712, Pond1193, Pond2702; and 36 additional water bodies more than 500m from the AP2 revised scheme.				
GCNP1.2.38	Pond4697 and Pond4512.	Assumed medium	20m north-west	Y	N
GCNMP1.2.40	Pond1787, AH1_Pond4888, AA1_Pond95, AH1_Pond4890 and AA1_Pond99.	Assumed medium	Within	Y	N
GCNMP1.2.41	Pond156, AH1_Pond158, AA1_Pond161, Pond1063, Pond1062 and AA1_Pond945.	Assumed medium	73m south	Y	N
GCNP1.2.42	Pond1637.	Assumed medium	408m east	Y	Y
GCNP1.2.43	Pond4040, Pond4071; and 1 additional water	Assumed medium	290m east	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	body more than 500m from the AP2 revised scheme.				
GCNMP1.2.44	Pond4041; and 15 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	391m south-east	Y	N

Pickmere to Agden and Hulseheath (MA03)

Survey extent

2.4.59 The BID report for the main ES, BID EC-007-00001 reported a total of 485 water bodies within MA03 that required survey. The BID report that accompanied the SES1 and AP1 ES reported a total of 451 water bodies within MA03 that required survey. The AP2 revised scheme would require a total of 553 water bodies to be surveyed, comprising:

- one hundred and eighty-five water bodies which have had all survey requirements completed prior to the 2022 survey season;
- forty-five water bodies which have had all survey requirements completed in the 2022 survey season;
- one hundred and one water bodies which have received a partial suite of survey types and/or incomplete survey visits (and require completion); and
- two hundred and twenty-two water bodies which have not been surveyed (and require completion).

2.4.60 In the 2022 survey season, 74 water bodies were subject to one or more survey types.

2.4.61 Following the 2022 survey season, a total of 323 water bodies remain that require either full or partial survey.

Field survey

Habitat Suitability Index/walkover

2.4.62 HSI surveys were conducted at 44 water bodies in 2022. Thirty-six of these water bodies were not previously subject to HSI. HSI results are reported from multiple years in Table 7. This is to capture HSI survey results not previously reported that have become relevant due to changes for the AP2 revised scheme.

2.4.63 Fifteen water bodies were scoped out of requiring further survey due to updates for the AP2 revised scheme and are identified in Table 7.

Table 7: Summary of locations where requirement for further survey was scoped out following HSI/walkover survey within MA03

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond 265	North-east of Pickmeremoss Wood	SJ7031878284	A temporary pond created by run-off from fields. Large amount of leaf litter in pond making water very brown and turbid. HSI – 0.42 (Poor)	MA03	25m south-west	Y	N
AA1_Pond 267	North-east of Pickmeremoss Wood	SJ7035478326	Water body was dry, and unlikely to hold water except after periods of sustained heavy rainfall. HSI – 0.00 (Poor)	MA03	Within	Y	N
AA1_Pond 1555	West of Over Tabley	SJ7032980080	No water body present, just a depression in the middle of a sheep grazed field. HSI – 0.00 (Poor)	MA03	97m west	Y	N

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond 2622	North-west of Winterbottom	SJ7064081771	Dug out water body on field boundary, lacking aquatic vegetation. HSI – 0.40 (Poor)	MA03	442m north-west	Y	N
AH1_Pond 1165	North-east of Mere Heyes Cottages	SJ7065681815	Dug out water body on field boundary lacking aquatic vegetation. HSI – 0.24 (Poor)	MA03	443m north-west	Y	N
AH1_Pond 1166	North-east of Mere Heyes Cottages	SJ7065681815	Dug out water body on field boundary lacking aquatic vegetation. HSI – 0.49 (Poor)	MA03	273m north-west	Y	N
AH1_Pond 1475	North of Winterbottom	SJ7072382204	Oval pond within improved grassland which may dry out by spring. HSI – 0.49 (Poor)	MA03	435m west	Y	N
AH1_Pond 1477	North of Winterbottom	SJ7079182285	Water body is within improved grassland. It is likely to dry out by spring. HSI – 0.49 (Poor)	MA03	376m west	Y	N
AH1_Pond 1476	North of Winterbottom	SJ7082282308	Dry, no water present, very shaded. HSI – 0.00 (Poor)	MA03	355m west	Y	N
AA1_Pond 377	South of Yew Tree Farm	SJ7140582644	No water body. Just a dry depression within pasture	MA03	Within	Y	N

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
			field. HSI – 0.00 (Poor)				
AA1_Pond 381	South of Hoo Green	SJ7139582735	No water body. Just a dry depression within pasture field. HSI – 0.00 (Poor)	MA03	9m west	Y	N
AH1_Pond 396	West of Bucklow Hill	SJ7190483401	Small depression in trees and scrub. HSI – 0.31 (Poor)	MA03	Within	Y	N
AA1_Pond 411	North-west of Bucklow Hill	SJ7174483566	No water body present. HSI – 0.00 (Poor)	MA03	Within	Y	N
AH1_Pond 1767	High Legh Park (north)	SJ7043984433	Polluted water and choked with leaf litter. HSI – 0.42 (Poor)	MA03	283m south-west	Y	N
AA1_Pond 489	North-east of High Legh	SJ7147984780	Water body was dry and unlikely to hold sufficient water to support amphibians at any time of year. HSI – 0.00 (Poor)	MA03	77m south-east	Y	N

2.4.64 HSI surveys in 2022 identified great crested newt suitability for 30 of the water bodies surveyed in MA03, these water bodies were recommended for eDNA and/or presence/absence (P/A) surveys.

eDNA surveys

2.4.65 Twenty-eight water bodies in MA03 were subject to eDNA survey in the 2022 survey season. The summary of results of the eDNA surveys from 2022 are detailed in Table 8.

2.4.66 The eDNA analysis confirmed presence of great crested newt in four of the water bodies. One of the ponds, AA1_Pond322 recorded presence of great crested newts using traditional presence/absence surveys, even though the eDNA was negative and is included in Table 8.

Table 8: Summary of relevant results from eDNA presence/absence surveys for MA03

Ecology survey code	Location	OS centroid grid reference	Date water sample taken	Approximate % water body margin accessible[8]	Presence of inflows	GCN eDNA test result	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AA3_Pond322	Within Neild's Rough	SJ7113480179	26/04/2022	80	No inflows present	Negative (with positive results from subsequent P/A survey)	MA03	8m east	Y	N
AA3_Pond508	West of Booth Bank	SJ7215285031	22/06/2022	50	No inflows present	Positive	MA03	Within CCB	Y	N
AA3_Pond1798	West of Bucklow Hill	SJ7257683049	17/05/2022	90	No inflows present	Positive	MA03	22m east	Y	N
AA3_Pond956	North of Bongs Wood	SJ7019480165	25/05/2022	90	No inflows present	Positive	MA03	260m north-west	Y	N
AA3_Pond955	West of Hollowood Farm	SJ7020580176	25/05/2022	90	No inflows present	Positive	MA03	252m north-west	Y	N

[8] At least 80% access to the pond perimeter is deemed necessary to detect a valid positive eDNA result (Biggs et al., 2014) Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R. A., Foster, J., Wilkinson, J., Arnett, A., Williams, P. and Dunn, F. (2014), *Analytical and methodological development for improved surveillance of the Great Crested Newt*. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

Presence/absence and population size class estimate surveys

2.4.67 Forty-five P/A or population size class assessment (PSC) surveys have been conducted in MA03. The summary of results of the P/A and PSC surveys are detailed in Table 9. This table includes those water bodies supporting great crested newt (any life stage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

2.4.68 Great crested newt was confirmed present in eight of the 45 water bodies subject to P/A or PSC survey in 2021 and 2022. These additional water bodies comprised one medium, two assumed medium and five small population size classes.

2.4.69 Forty water bodies (26 with an incomplete set of visits) from the 2022 survey season were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 9.

2.4.70 An additional four water bodies with presence of great crested newts or good populations of other common amphibian species are included in Table 9 as a result of the updates to the AP2 revised scheme.

2.4.71 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any water body in Table 9 with fewer than six visits completed.

Table 9: Summary of results from surveys for amphibian presence/absence and population size class assessment with associated amphibian populations within MA03

Ecology survey code	Location	OS centroid grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad			
AA1_Pond 319	South-west of Hollowood Farm	SJ7063980 124	PSC (partial)	4	29/03/ 2022	15/06/ 2022	1 (S)	1 (L)	-	-	-	16m north-east	Y	N
AA1_Pond 332	North of Hollowood Farm	SJ7092480 704	PSC (partial)	3	27/04/ 2021	25/05/ 2021	0	12 (G)	-	2 (L)	-	Within	Y	N
AA1_Pond 1798	East of Bucklow Hill	SJ7257683 049	PSC (partial)	4	06/04/ 2022	08/06/ 2022	1 (S)	-	-	2 (L)	-	22m east	Y	N
AA1_Pond 414	South-west of Altrincham	SJ7232883 595	PSC	6	05/04/ 2022	08/06/ 2022	1 (S)	2 (L)	-	-	-	10m west	Y	N
AA1_Pond 1758	Within Peter's Covert	SJ7036984 552	PSC	6	22/04/ 2021	01/06/ 2021	10 (S)	6 (L)	-	-	-	238m south-west	Y	N
AA1_Pond 1760	North-west of	SJ7033484 583	PSC	6	22/04/ 2021	01/06/ 2021	12 (M)	4 (L)	-	1 (L)	-	243m south-west	Y	N

Ecology survey code	Location	OS centroid grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad			
	Peter's Covert													
AA1_Pond 1178	North of High Legh	SJ7022184 711	PSC	6	12/04/ 2021	25/05/ 2021	1 (S)	-	-	1 (L)	-	210m south	Y	N
AA1_Pond 510	West of Booth Bank	SJ7159685 090	PSC (partial)	3	13/04/ 2022	07/06/ 2022	3 (M)	8 (L)	-	-	1 (L)	24m north-west	Y	N
AA1_Pond 322	Within Neild's Rough	SJ7113480 179	PSC (partial)	2	26/04/ 2022	04/05/ 2022	Larvae only (M)	-	-	-	-	8m east	Y	N

Key:

**Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:*

- Great crested newt = peak count 1-10 individuals = Small (S); 11-100 individuals = Medium (M); greater than 100 individuals = Large (L);

- Smooth and palmate newt = peak count less than 10 = Low (L); 10-100 = Good (G); greater than 100 = Exceptional (E);

- Common frog = spawn clumps less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E); and

- Common toad = peak count of less than 100 = Low (L); 100-1000 = Good (G); greater than 1000 = Exceptional (E).

Discussion of combined results

2.4.72 Seventy-four water bodies were subject to survey in 2022. Of these 74, eight water bodies were identified that support populations of great crested newt. These comprise three water bodies identified through eDNA survey alone and five through P/A survey and/or PSC surveys.

2.4.73 Of the five water bodies identified as supporting great crested newt through P/A and/or PSC survey in 2022, two had assumed medium and three had assumed small population size classes.

2.4.74 Over the 2022 and previous survey seasons, a total of 86 water bodies were found to support populations of great crested newts. These comprise 14 water bodies identified through eDNA survey alone, 59 identified through P/A and/or PSC survey and the remaining 13 identified through desk study records or nearby previous planning applications. Of the 59 water bodies identified through P/A survey and/or PSC survey, there were 10 medium and 49 small population size classes.

2.4.75 Of the 74 water bodies surveyed in 2022, 15 are within the land required for the AP2 revised scheme. Of the 15 water bodies, one was found to support a population of great crested newts and one had records of great crested newt presence prior to 2022.

2.4.76 Of the 340 water bodies surveyed in 2022 and previous survey seasons, 82 are within the land required for the AP2 revised scheme. Of the 82 water bodies, 26 were found to support populations of great crested newts and 37 were confirmed as not supporting great crested newts. The potential for great crested newt presence at the remaining 19 water bodies is undetermined.

2.4.77 Three of the five water bodies found to support populations of great crested newts through P/A and/or PSC surveys in 2022 also support low populations of other amphibian species (smooth newt, palmate newt, common frog and/or common toad).

Metapopulations

2.4.78 Following a review of the 2022 survey results and the update to the AP2 revised scheme, 13 new great crested newt metapopulations have been identified, and no previously identified metapopulations removed. New metapopulations have arisen either as a result of changes to the extent and location of land required for the AP2 revised scheme, as a result of updated survey results for water bodies, or as a result of new water bodies being identified which were not previously known to exist. Combined with survey data from previous years there are a total of 23 great crested newt metapopulations identified in MA03.

2.4.79 Seven of the metapopulations identified in the main BID and the BID report that accompanied the SES1 and AP1ES have changed following the 2022 surveys and the updates to the AP2 revised scheme. The number of water bodies in these metapopulations has

changed due to new water bodies being included or water bodies being removed. The estimated population size class of these metapopulations has not changed.

2.4.80 The new metapopulations are described below. The new metapopulations and the existing metapopulations which have changed following the 2022 surveys and the updates to the AP2 revised scheme are also summarised in Table 3.

2.4.81 GCNMP1.3.14 is situated west of Knutsford and lies between 250m and 500m from the land required for the construction of the AP2 revised scheme. It consists of six water bodies, three situated within 250m and three situated within 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. The assumed metapopulation area encompasses a portion of the grounds of The Tabley House stately home, and comprises woodland and semi-improved grassland.

2.4.82 GCNP1.3.15 is situated south of Bucklow Hill and lies within 250m of the land required for the construction of the AP2 revised scheme. It consists of two water bodies, both situated within 250m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. The surrounding landscape is farmland with hedgerows, scattered trees and pockets of semi-improved grassland and woodland with a row of residential buildings and a golf course to the east, the A556 to the west and the A50 to the south.

2.4.83 GCNMP1.3.16 is situated north-east of Appleton Thorn and lies between 250m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 11 water bodies, two situated within 250m, four situated within 500m, and five situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. North-east of Appleton Thorn, the assumed metapopulation area comprises farmland with hedgerow networks and an area of woodland (Bradley Copse) to the south-east, Bradley Brook bordering the assumed metapopulation area to the south and an industrial area situated to the west.

2.4.84 GCNP1.3.17 is situated south-west of Lymm and lies within 250m of the land required for the construction of the AP2 revised scheme. It consists of one water body, situated within 250m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of an un-surveyed water body. The surrounding area comprises farmland with a woodland corridor bordering Massey Brook which runs from north to south. The assumed population area is bordered to the south by Cliff Lane leading to junction 20 of the M6 which runs north to south and borders the assumed population area to the east.

2.4.85 GCNP1.3.18 is situated south-west of Lymm and lies within 250m of the land required for the construction of the AP2 revised scheme. It consists of one water body, situated within 250m from the land required for the construction of the AP2 revised scheme. The population size

class of this population is assumed medium, due to the presence of an un-surveyed water body. The surrounding area comprises farmland with a woodland corridor bordering Massey Brook which runs from north to south and borders the assumed population area to the west with the M6 bordering the area to the east.

2.4.86 GCNMP1.3.19 is situated west of Bowdon and lies between 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 21 water bodies, eight situated within 500m, and 13 situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. The assumed metapopulation area encompasses the majority of the Dunham Massey National Trust property and estate which comprises woodland, semi-improved grassland and farmland and is bordered by the River Bollin to the south.

2.4.87 GCNP1.3.20 is situated east of Bowdon and lies within 250m of the land required for the construction of the AP2 revised scheme. It consists of two water bodies, both situated within 250m, from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. The surrounding area is farmland with hedgerows and scattered trees.

2.4.88 GCNP1.3.21 is situated east of Bowdon and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of one water body, situated within 500m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of an un-surveyed water body. The assumed population area principally surrounds Ash Farm Country House with semi-improved grassland fields, scattered trees, hedgerows and woodland. The assumed population area is bordered by the Bridgwater Canal to the west and the River Bollin to the east.

2.4.89 GCNP1.3.22 is situated east of Bowdon and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of one pond, situated within 500m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of an un-surveyed water body. The surrounding area comprises farmland and semi-improved grassland with scattered trees with the River Bollin running along the north of the assumed population area.

2.4.90 GCNP1.3.23 is situated south of Dunham Woodhouses and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of three water bodies, all situated within 500m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. South of Dunham Woodhouses the surrounding area comprises predominantly farmland with areas of woodland along Agden Brook which runs through the assumed population area from north to south.

2.4.91 GCNMP1.3.24 is situated east of Over Tabley and lies between 250m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 24 water bodies, three situated within 250m, six situated within 500m, and 15 situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. East of Over Tabley, the area is predominantly farmland with a large area of woodland in the centre of the assumed metapopulation area connecting to smaller woodland parcels via hedgerows and areas of semi-improved grassland and scrub.

2.4.92 GCNP1.3.25 is situated south-east of Dunham Woodhouses and lies within 500m of the land required for the construction of the AP2 revised scheme. It consists of one pond, situated within 500m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of an un-surveyed water body. The water body sits within a parcel of woodland, which borders a sewage treatment plant that makes up the majority of the rest of the population area.

2.4.93 GCNP1.3.26 is situated south-west of Hoo Green and lies partially within the land required for the construction of the AP2 revised scheme. It consists of one pond, situated directly within the land required for the construction of the AP2 revised scheme. eDNA surveys to AA1_Pond382 returned positive results for great crested newt DNA. The population size class of this population is medium. South-west of Hoo Green the area is predominantly farmland with hedgerows, scattered trees and residential buildings.

2.4.94 Table 10 provides details of the revised list of Ecology Survey Codes for the seven revised metapopulations and the 13 new metapopulations.

Table 10: Summary of assumed great crested newt metapopulations within MA03

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNMP1.3.1	Pond1341, Pond1342, Pond1317, Pond1318, Pond3539, AA3_Pond1151, Pond967, AA3_Pond1150, AA1_Pond263, AA1_Pond264, AA3_Pond1154, AH1_Pond1147, AH1_Pond273, AA1_Pond975,	Medium	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AA1_Pond277, AA1_Pond285; and 24 additional water bodies more than 500m from the AP2 revised scheme.				
GCNMP1.3.3	AA1_Pond287, Pond1319, AA1_Pond289, AA1_Pond291, Pond1321, Pond1155, Pond2698, Pond2658, Pond2666, AH1_Pond293, EES_AA3_Pond294, Pond295, AH1_Pond296, Pond2663, AH1_Pond963, Pond1478, Pond297, Pond2681, AA1_Pond298, Pond2683, Pond2657, Pond299, Pond300, AH1_Pond965, Pond4025, AH1_Pond966, Pond301, AA1_Pond302, Pond303, AA1_Pond306, Pond2676, AA1_Pond304, Pond305, Pond2613, Pond2696, AA1_Pond307, Pond308, Pond1191, Pond1192, AH1_Pond309, Pond1320, AA1_Pond2783, AA1_Pond310, Pond2798,	Medium	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AA1_Pond312, Pond313, Pond314, AA3_Pond315, Pond2781, Pond316, AH1_Pond317, AA1_Pond318, Pond2777, AA1_Pond319, AA1_Pond954, AA3_Pond956, AA3_Pond955, AA1_Pond322, Pond4035, AH1_Pond1163, Pond1162, Pond1160, Pond1164, Pond1118; and 25 additional water bodies more than 500m from the AP2 revised scheme.				
GCNMP1.3.4	Pond1126, Pond1305, Pond1266, Pond1395, Pond1299, Pond1273, Pond1397, Pond1195, Pond326, AA3_Pond1307, AA3_Pond1194, Pond1350, AA1_Pond328, AA1_Pond332, AA1_Pond864, AA1_Pond335, AA1_Pond336, AH1_Pond1783, AH1_Pond1784, AA1_Pond337, AH1_Pond1161, AH1_Pond1782, AA1_Pond338, AA1_Pond339, Pond1201, AA1_Pond340, AA1_Pond341,	Assumed large	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AA1_Pond1197, AA1_Pond343, Pond4009, AA1_Pond1781, AA1_Pond344, AH1_Pond1556, Pond1564, Pond1588, Pond4037, AA1_Pond345, AH1_Pond1167, Pond1501, Pond4629, AA1_Pond347, AA1_Pond346, Pond1138, Pond1128, AA1_Pond875, AA1_Pond350, AA1_Pond879, AA1_Pond352, AH1_Pond1199, AA1_Pond356, AA1_Pond357, AA1_Pond361, AA1_Pond359, Pond1217, AA1_Pond362, AA1_Pond363, AA1_Pond364, AH1_Pond365, AA3_Pond366, Pond2708, AA3_Pond1202, Pond1168, Pond1396, Pond1371, Pond1301, Pond1169, Pond379, Pond1170, AA3_Pond383, AA1_Pond385, AA3_Pond1172; and 78 additional water bodies more than 500m from the AP2 revised scheme.				

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNMP1.3.7	Pond2723, AA1_Pond1798, AA3_Pond974, Pond1799, Pond1222, AA3_Pond1374, AA3_Pond1298, Pond2729, Pond2728, AA3_Pond1223, Pond2812; and 0 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	1m south-west	Y	N
GCNP1.3.8	Pond2788 and AA1_Pond2649.	Assumed medium	211m east	Y	N
GCNMP1.3.9	Pond1274, Pond1272, Pond1136, AA1_Pond388, Pond1127, Pond1302, Pond1226, AA1_Pond389, Pond1399, Pond1119, Pond1297, Pond1221, AA1_Pond394, AA1_Pond395, AA1_Pond399, AA3_Pond409, AA1_Pond1340, AA1_Pond410, Pond1224, AA1_Pond414, AA3_Pond1204, AA1_Pond1203, Pond1205, Pond415, AH1_Pond2260, AA3_Pond1559, Pond861, AA3_Pond1558, Pond419, Pond1562, AA1_Pond952, Pond428, Pond1219, Pond1557, AA1_Pond432,	Assumed large	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AH1_Pond1561, EES_AA3_Pond439, AA1_Pond438, AA1_Pond436, AA1_Pond440, Pond1218, Pond1765, Pond1755, AA3_Pond1207, Pond4534, AH1_Pond2225, Pond4533, AA3_Pond1398, Pond4532, AH1_Pond1761, AH1_Pond1766, AH1_Pond1776, AA1_Pond458, AA3_Pond1757, AA1_Pond1601, AA1_Pond1182, AA1_Pond1602, Pond465, Pond466, AH1_Pond980, AA1_Pond1229, AA1_Pond1184, Pond1764, Pond470, AA1_Pond959, AA1_Pond1179, AA1_Pond1768, AH1_Pond1759, AA1_Pond1758, AA3_Pond477, AA1_Pond1760, Pond4499, AA1_Pond1181, Pond1208, AA1_Pond1178, Pond1175, Pond1183, AA3_Pond491, Pond494, AA3_Pond1174, Pond1176, Pond1177, Pond1348, Pond4535, EES_AA3_Pond504,				

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	AA3_Pond508, EES_AA3_Pond506, AA1_Pond977, AH1_Pond961, AA3_Pond1210, AA1_Pond510, Pond1406, AA1_Pond511, EES_AA3_Pond512, AA1_Pond1225; and 5 additional water bodies more than 500m from the AP2 revised scheme.				
GCNP1.3.13	Pond4527, Pond2701, and Pond1190.	Assumed medium	229m south	Y	N
GCNMP1.3.14	Pond3579, Pond3583, Pond3595, Pond3591, Pond3590, and Pond3592.	Assumed medium	5m south	Y	Y
GCNP1.3.15	Pond2724.	Assumed medium	196m south-west	Y	N
GCNMP1.3.16	Pond4728, Pond4732, Pond4733, Pond4725, Pond4731, Pond4730; and 5 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	142m north-west	Y	Y
GCNP1.3.17	Pond4721	Assumed medium	128m north	Y	Y
GCNP1.3.18	Pond4722	Assumed medium	19m north-east	Y	Y
GCNMP1.3.19	Pond2297, Pond2345, Pond2292, Pond4729, Pond2281, Pond4708, Pond2204, Pond2205; and 13 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	301m south-east	Y	Y
GCNP1.3.20	Pond4550, and Pond2203.	Assumed medium	63m west	Y	Y

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNP1.3.21	Pond2186	Assumed medium	358m north-east	Y	Y
GCNP1.3.22	Pond2218	Assumed medium	357m east	Y	Y
GCNP1.3.23	Pond2206, Pond2208, and Pond2270.	Assumed medium	257m east	Y	Y
GCNMP1.3.24	Pond2633, Pond2715, AH1_Pond2713, Pond2652, Pond2730, Pond2635, Pond2639, Pond2718, Pond2648; and 15 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	40m west	Y	Y
GCNP1.3.25	Pond2209	Assumed medium	351m south-east	Y	Y
GCNP1.3.26	Pond382	Medium	Within	Y	N

Hulseheath to Manchester Airport (MA06)

Survey extent

2.4.95 The BID report for the main ES, BID EC-007-00001 reported a total of 253 water bodies within MA06 that required survey. The AP2 revised scheme would require a total of 292 water bodies to be surveyed, comprising:

- seventy-five water bodies which have had all survey requirements completed prior to the 2022 survey season;
- fourteen water bodies which have had all survey requirements completed in the 2022 survey season;
- forty water bodies which have received a partial suite of survey types and/or incomplete survey visits (and require completion); and
- one hundred and sixty-three water bodies which have not been surveyed (and require completion).

2.4.96 In the 2021 and 2022 survey season, 32 water bodies were subject to one or more survey types. Nine of these water bodies were surveyed in 2021. These 2021 survey results have not been previously reported because MA06 was not included in the BID report that accompanied the SES1 and AP1 ES.

2.4.97 Following the 2022 survey season, a total of 203 water bodies remain that require either full or partial survey.

Field survey

Habitat Suitability Index/walkover

2.4.98 HSI surveys were conducted at seven water bodies in 2021 and 12 water bodies in 2022. Seventeen of these water bodies were not previously subject to HSI. HSI results are reported from multiple years in Table 11. This is to capture HSI survey results not previously reported that have become relevant due to changes for the AP2 revised scheme.

2.4.99 Eight water bodies were scoped out of requiring further survey due to updates for the AP2 revised scheme and are identified in Table 11.

Table 11: Summary of locations where requirement for further survey was scoped out following HSI/walkover survey within MA06

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond 2885	South-east of New Mills	SJ7804381792	No water body present at time of survey. HSI – 0.00 (Poor)	MA06	141m south-west	Y	N
AH1_Pond 2451	East of New Mills	SJ7892181902	Not a pond, completely dry depression in semi-improved field. HSI – 0.00 (Poor)	MA06	265m north-east	Y	N
AH1_Pond 1807	East of Pepper Street	SJ7778082277	Shaded dry pond. Landowner informed surveyors the pond is wet during the winter and the pond has been dry for at least one month at the time of survey. HSI – 0.33 (Poor)	MA06	Within	Y	N

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond 427	South-west of Thorns Green	SJ7769083797	No water body present at time of survey. HSI – 0.00 (Poor)	MA06	Within	Y	N
AH1_Pond 1600	South of Warburton Green	SJ8003284400	No water body present at time of survey. HSI – 0.00 (Poor)	MA06	64m south	Y	N
AH1_Pond 992	North of Sunbank Wood	SJ7980084413	Water body dry at time of survey. HSI – 0.00 (Poor)	MA06	Within	Y	N
AH1_Pond 541	East of Davenport Green	SJ8034986498	No water body present at time of survey. HSI – 0.00 (Poor)	MA06	7m north	Y	N
AH1_Pond 989	South of Hale Barns	SJ7950983499	Heavily shaded and surrounded by arable farmland. HSI – 0.46 (Poor)	MA06	115m south	Y	N

2.4.100 HSI surveys in 2021 identified great crested newt suitability for five water bodies surveyed in MA06. HSI surveys in 2022 identified great crested newt suitability for nine water bodies surveyed in MA06. These 14 water bodies were recommended for eDNA and/or presence/absence (P/A) surveys.

eDNA surveys

2.4.101 Three water bodies in MA06 were subject to eDNA survey in the 2021 survey season. Eight water bodies in MA06 were subject to eDNA survey in the 2022 survey season. The summary of results of the eDNA surveys from both seasons are detailed in Table 12.

2.4.102 The eDNA analysis reported absence of great crested newt in all eleven of the water bodies. Two of the ponds, AA3_Pond2906 and AA3_Pond4571 recorded presence of great crested newts using traditional presence/absence surveys, even though the eDNA was negative and are included in Table 12.

Table 12: Summary of relevant results from eDNA presence/absence surveys for MA06

Ecology survey code	Location	OS centroid grid reference	Date water sample taken	Approximate % water body margin accessible[9]	Presence of inflows	GCN eDNA test result	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AA3_Pond2906	South-west of Manchester Airport	SJ7860181589	20/04/2022	70	No inflows present	Negative (with positive results from subsequent P/A survey)	MA06	34m south-west	Y	N
AA3_Pond4571	South of Davenport Green	SJ8005486100	20/04/2022	65	No inflows present	Negative (with positive results from subsequent P/A survey)	MA06	Within	Y	N

[9] At least 80% access to the pond perimeter is deemed necessary to detect a valid positive eDNA result (Biggs et al., 2014) Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R. A., Foster, J., Wilkinson, J., Arnett, A., Williams, P. and Dunn, F. (2014), *Analytical and methodological development for improved surveillance of the Great Crested Newt*. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

Presence/absence and population size class estimate surveys

2.4.103 Seven P/A or population size class assessment (PSC) surveys have been conducted in MA06 in the 2021 survey season. Nineteen P/A or PSC surveys have been conducted in MA06 in the 2022 survey season. The summary of results of the P/A and PSC surveys are detailed in Table 13. This table includes those water bodies supporting great crested newt (any life stage) and/or those with good populations of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad).

2.4.104 Great crested newt was confirmed present in nine of the 26 water bodies subject to P/A or PSC survey. These additional water bodies comprised one medium, one assumed medium, and seven small population size classes.

2.4.105 Sixteen water bodies from the 2021 and 2022 survey seasons were identified as not supporting great crested newt, or only supported low numbers of the other common amphibian species (smooth newt, palmate newt, common frog and/or common toad) and are not shown in Table 13.

2.4.106 A full six visits are required in order to obtain a robust PSC assessment. An indication of the corresponding minimum PSC, based on the known peak count, is provided for any water body in Table 13 with fewer than six visits completed.

Table 13: Summary of results from surveys for amphibian presence/absence and population size class assessment with associated amphibian populations within MA06

Ecology survey code	Location	OS centroid grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad			
AA1_Pond 2906	South-west of Manchester Airport	SJ786018158 9	PSC	6	29/03/2022	14/06/2022	7 (S)	18 (G)	1 (L)	2 (L)	3 (L)	34m south-west	Y	N
AA1_Pond 4679	North-east of Knutsford	SJ784808164 3	PSC (partial)	4	29/03/2022	06/06/2022	2 (S)	-	-	-	-	75m west	Y	N
AA1_Pond 2574	West of Manchester airport	SJ786558193 5	PSC	6	28/03/2022	06/06/2022	8 (S)	3 (L)	-	1 (L)	-	124m north	Y	N
AA1_Pond 952	South of Hulseheath	SJ724628378 7	PSC	6	15/04/2021	21/06/2021	19 (M)	26 (G)	-	-	1 (L)	47m north-west	Y	N
AA1_Pond 446	South of Hale Bank Farm	SJ799778402 3	PSC	6	14/04/2021	14/06/2021	1 (S)	3 (L)	-	1 (L)	Spawn only	71m north-east	Y	N
AA1_Pond 451	South of Hale Bank Farm	SJ799008411 7	PSC	6	14/04/2021	14/06/2021	2 (S)	7 (L)	-	3 (L)	Spawn and Tadpoles	85m north-east	Y	N
AA1_Pond 473	South-west of	SJ789348442 8	PSC	6	14/04/2021	14/06/2021	6 (S)	5 (L)	-	1 (L)	1 (L)	<1m east	Y	N

Ecology survey code	Location	OS centroid grid reference	Survey type	Number of visits completed	First survey visit	Last survey visit	Peak count during single visit with single method					Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
							Great crested newt	Smooth newt	Palmate newt	Common frog	Common toad			
	Warburton Green													
AA1_Pond 1786	South of Warburton Green	SJ7982184553	PSC	6	14/04/2021	14/06/2021	2 (S)	8 (L)	-	3 (L)	-	Within	Y	N
AA1_Pond 530	North-east of Hale Barns	SJ8016585885	PSC (partial)	1	14/04/2021	14/04/2021	0	12 (G)	-	Spawn only	-	Within	Y	N
AA1_Pond 4571	South of Davenport Green	SJ8005486100	PSC (partial)	2	19/04/2022	04/05/2022	3 (M)	-	-	-	-	Within	Y	N

Key:

**Bracketed text within species column indicates the relevant population size class for the peak count obtained as follows:*

- Great crested newt = peak count 1-10 individuals = Small (S); 11-100 individuals = Medium (M); greater than 100 individuals = Large (L);

- Smooth and palmate newt = peak count less than 10 = Low (L); 10-100 = Good (G); greater than 100 = Exceptional (E);

- Common frog = spawn clumps less than 50 = Low (L); 50-500 = Good (G); greater than 500 = Exceptional (E); and

- Common toad = peak count of less than 100 = Low (L); 100-1000 = Good (G); greater than 1000 = Exceptional (E).

Discussion of combined results

2.4.107 Thirty-two water bodies were subject to survey in 2021 and 2022. Of these 32, nine water bodies were identified that support populations of great crested newt. These were all water bodies where the presence of great crested newt was confirmed through P/A survey and/or PSC surveys.

2.4.108 Of the nine water bodies identified as supporting great crested newt through P/A and/or PSC survey in 2021 and 2022, one had medium, one had assumed medium, and seven had small population size classes.

2.4.109 Over the 2020 and previous survey seasons, a total of 13 water bodies were found to support populations of great crested newts. These comprise 11 water bodies identified through eDNA survey alone and two identified through P/A and/or PSC survey. Both of the water bodies identified through P/A survey and/or PSC survey were small population size classes.

2.4.110 Of the 32 water bodies surveyed in 2021 and 2022, eight are within the land required for the AP2 revised scheme. Of the eight water bodies, two were found to support populations of great crested newts.

2.4.111 Of the 119 water bodies surveyed in 2020 and previous survey seasons, 38 are within the land required for the AP2 revised scheme. Of the 38 water bodies, seven were found to support populations of great crested newts and 23 were confirmed as not supporting great crested newts. The potential for great crested newt presence at the remaining eight water bodies is undetermined.

2.4.112 Seven of the nine water bodies found to support populations of great crested newts through P/A and/or PSC surveys in 2021 and 2022 also support populations of other amphibian species (smooth newt, palmate newt, common frog and/or common toad).

Metapopulations

2.4.113 Following a review of the 2021 and 2022 survey results and the update to the AP2 revised scheme, six new great crested newt metapopulations have been identified, and three previously identified populations removed (GCNP1.6.2, GCNP1.6.9 and GCNP1.6.16). New metapopulations/populations have arisen, or existing ones removed, as a result of changes to the extent and location of land required for the AP2 revised scheme, as a result of updated survey results for water bodies, or as a result of new water bodies being identified which were not previously known to exist. Combined with survey data from previous years there are a total of 30 great crested newt metapopulations identified in MA06.

2.4.114 Six of the metapopulations identified in the main BID have changed following the 2021 and 2022 surveys and the updates to the AP2 revised scheme. The number of water bodies in these metapopulations has changed due to new water bodies being included or water

bodies being removed. The estimated population size class of these metapopulations has not changed.

2.4.115 The new metapopulations are described below. The new metapopulations and the existing metapopulations which have changed following the 2022 surveys and the updates to the AP2 revised scheme are also summarised in Table 14.

2.4.116 GCNP1.6.28 is situated north of Manchester Airport and lies within 250m of the land required for the construction of the AP2 revised scheme. It consists of one water body situated within 250m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. North of Manchester airport, the area comprises principally hardstanding in the form of a car park with associated planting and small areas of scattered trees.

2.4.117 GCNMP1.6.29 is situated south-west of Bowdon and lies within 250m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 13 water bodies, two situated within 250m, six situated within 500m, and five situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. South-west of Bowden, the surrounding landscape consists of farmland with hedgerows and woodland.

2.4.118 GCNP1.6.30 is situated south-west of Bowdon and lies within 250m of the land required for the construction of the AP2 revised scheme. It consists of one water body situated within 250m from the land required for the construction of the AP2 revised scheme. The population size class of this population is assumed medium, due to the presence of un-surveyed water bodies. South-west of Bowden the surrounding landscape consists of farmland with hedgerows and woodland.

2.4.119 GCNMP1.6.31 is situated south of Hale Barns and lies between 250m and 500m from the land required for the construction of the AP2 revised scheme. It consists of seven water bodies, three situated within 250m, and four situated within 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. South of Hale Barns the landscape is dominated by a golf course with the residential area of Hale Barns to the north and east.

2.4.120 GCNMP1.6.32 is situated west of New Mills and lies between 500m and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 51 water bodies, two situated within 500m, and 49 situated more than 500m from the land required for the construction of the AP2 revised scheme. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. West of New Mills the surrounding landscape consists of farmland with hedgerows and woodland.

2.4.121 GCNMP1.6.33 is situated west of Manchester Airport and lies partially within and extends more than 500m from the land required for the construction of the AP2 revised scheme. It consists of 39 water bodies, eight situated directly within, 11 situated within 250m, 16 situated within 500m, and four situated more than 500m from the land required for the construction of the AP2 revised scheme. Presence/absence surveys to AA1_Pond1786, AA1_Pond446, and AA1_Pond451 revealed small populations of great crested newts. eDNA surveys to AA3_Pond1599, AA1_Pond1786, AA1_Pond446, AA1_Pond451, and AA3_Pond454 returned positive results for great crested newt DNA. Desk study records from Pond1450 and Pond2547 suggest that great crested newts were likely to be present. These survey results include data from 2022 surveys, but also from surveys in earlier years. Data from planning applications identified the presence of great crested newts in Pond1450, AA3_Pond1599, Pond2529, Pond2530, Pond2534, Pond2547, AA1_Pond446, AA1_Pond451, and AA1_Pond493. The population size class of this metapopulation is assumed medium, due to the presence of un-surveyed water bodies. West of Manchester Airport the surrounding landscape consists of pasture grassland with hedgerows, scrub and woodland.

2.4.122 Table 14 provides details of the revised list of Ecology Survey Codes for the six revised metapopulations and six new metapopulations.

Table 14: Summary of assumed great crested newt metapopulations within MA06

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNMP1.6.1	Pond4023, Pond4051, Pond4063, Pond4031, Pond4046, Pond4084, Pond2888, Pond2893, Pond2883, AA1_Pond4680, Pond2889, Pond2887, AA1_Pond2890, AA1_Pond2879, Pond2882, AA1_Pond2894, AA1_Pond2906, AA1_Pond4679, Pond2450, Pond2884, Pond2886, Pond2454, Pond2465, AA1_Pond2574, Pond1806, Pond4554, Pond4039, Pond4059,	Assumed large	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	Pond2562, Pond4095, Pond4098, Pond4097, Pond1433, Pond1438, Pond1435, Pond3981, Pond4083, Pond1437, Pond1429, Pond1427, Pond1428, Pond1430, Pond1426, Pond1425, Pond1439, Pond1432, Pond1445, Pond2502, Pond397, Pond398, Pond1441, AA1_Pond408, Pond4565, Pond413, AA3_Pond416, Pond420, Pond421, AA3_Pond422, AH1_Pond430, Pond435, AA3_Pond442, AA3_Pond455; and 112 additional water bodies more than 500m from the AP2 revised scheme.				
GCNMP1.6.4	Pond2844, AA3_Pond1419, Pond1408, Pond1464, Pond1407, Pond1507, Pond1405, AA3_Pond464, Pond469, Pond472; and six additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	Within	Y	N
GCNMP1.6.5	AA3_Pond4628, AH1_Pond400, AA3_Pond402 and AH1_Pond404.	Assumed medium	Within	Y	N
GCNMP1.6.17	AA3_Pond503, Pond2369, Pond2312,	Assumed medium	Within	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
	Pond2367 and Pond4557.				
GCNMP1.6.20	Pond2370, Pond2347, Pond2346, Pond2310, Pond2311, Pond2374 and Pond2372.	Assumed medium	233m south-east	Y	N
GCNMP1.6.27	AA1_Pond4571, AA1_Pond538, AA1_Pond540, Pond1449, Pond1448, Pond2331, Pond873, Pond4572, Pond2328, Pond542, Pond543, Pond2329, Pond1456, Pond2330, Pond1459, Pond1460, Pond544, Pond1457, Pond1458, Pond1455, Pond1454, Pond1462, Pond1463, Pond2336, Pond2340, Pond1461, Pond2339; and 19 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	Within	Y	N
GCNP1.6.28	Pond536.	Assumed medium	64m south	Y	N
GCNMP1.6.29	Pond1411, Pond1404, Pond1409, Pond1416, Pond1506, Pond2350, Pond2276, Pond2278; and five additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	90m north-east	Y	Y
GCNP1.6.30	Pond4556.	Assumed medium	165m west	Y	N
GCNMP1.6.31	Pond1401, Pond1402, Pond2321, Pond2322, Pond2324, Pond2323 and Pond2325.	Assumed medium	111m north	Y	N

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNMP1.6.32	Pond2878, Pond2852; and 49 additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	347m west	Y	N
GCNMP1.6.33	Pond2533, Pond4507, Pond4506, Pond4505, Pond4504, AH1_Pond2532, Pond2534, AA3_Pond1599, Pond4564, AA1_Pond446, Pond4503, Pond4567, Pond2537, Pond4566, Pond4502, Pond4501, AA1_Pond451, Pond4500, Pond4562, Pond4561, AA3_Pond454, AA1_Pond2538, Pond2542, Pond1451, AA1_Pond459, Pond1453, Pond1452, AA1_Pond993, Pond1450, Pond4563, AA1_Pond1786, Pond4573, AA1_Pond493, Pond4706, Pond502; and four additional water bodies more than 500m from the AP2 revised scheme.	Assumed medium	Within	Y	N

Davenport Green to Ardwick (MA07)

Survey extent

2.4.123 The BID report for the main ES BID EC-007-00001 reported a total of 19 water bodies within MA07 that required survey. The AP2 revised scheme would require a total of 18 water bodies to be surveyed, comprising:

- three water bodies which have had all survey requirements completed prior to the 2022 survey season;
- three water bodies which have received a partial suite of survey types and/or incomplete survey visits (and require completion); and
- twelve water bodies which have not been surveyed (and require completion).

2.4.124 In the 2021 and 2022 survey seasons, one water body was subject to one or more survey types.

2.4.125 Following the 2022 survey season, a total of 15 water bodies remain that require either full or partial survey.

Field survey

Habitat Suitability Index/walkover

2.4.126 HSI surveys were conducted at one water body in 2021 and no water bodies in 2022.

2.4.127 The one water body surveyed was scoped out of requiring further survey due to updates for the AP2 revised scheme and is identified in Table 15.

Table 15: Summary of locations where requirement for further survey was scoped out following HSI/walkover survey within MA07

Ecology survey code	Location	Ordnance Survey (OS) centroid grid reference	Brief rationale for scoping out (with HSI score)	CA	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
AH1_Pond2551	West of Painswick Park	SJ8141586259	Heavily shaded water body inside woodland at Painswick Park. HSI – 0.38 (Poor)	MA07	241m north	Y	N

eDNA surveys

2.4.128 No water bodies in MA07 were subject to eDNA survey in the 2021 and 2022 survey seasons.

Presence/absence and population size class estimate surveys

2.4.129 No P/A or population size class assessment (PSC) surveys have been conducted in MA07 in 2021 and 2022.

Discussion of combined results

2.4.130 There are no survey results from the 2021 and 2022 survey season to report for MA07.

2.4.131 Over the 2022 and previous survey seasons, a total of one water body was found to support a population of great crested newts. This one water body was identified through eDNA survey alone.

2.4.132 Of the eight water bodies surveyed in 2022 and previous survey seasons, one is within the land required for the AP2 revised scheme. This was confirmed as not supporting great crested newts.

Metapopulations

2.4.133 Following the update to the AP2 revised scheme, no new great crested newt metapopulations have been identified, and one previously identified population removed (GCNP1.7.3). Changes to metapopulations/populations have arisen either as a result of changes to the extent and location of land required for the AP2 revised scheme, as a result of updated survey results for water bodies, or as a result of new water bodies being identified which were not previously known to exist. Combined with survey data from previous years there are a total of five great crested newt metapopulations identified in MA07.

2.4.134 One of the metapopulations identified in the main BID has changed following the updates to the AP2 revised scheme. The number of water bodies in this metapopulation has changed due to new water bodies being included. The estimated population size class of these metapopulations has not changed.

2.4.135 Table 16 provides details of the revised metapopulation.

Table 16: Summary of assumed great crested newt metapopulations within MA07

Assumed metapopulation reference (GCNMP/GCNP)	Ecology survey code of water bodies within assumed metapopulation	Estimated population size class of metapopulation (peak counts from all known great crested newt populations from a single nights' survey visit within the assumed metapopulation)	Approximate distance from land required for the construction of the AP2 revised scheme (m) and orientation	Relevant to SES2 (Y/N)	Relevant to AP2 (Y/N)
GCNMP1.7.5	Pond4741, Pond4576, AA3_Pond602 and AH1_Pond607.	Assumed medium	2m south	N	N

Manchester Piccadilly Station (MA08)

Survey extent

2.4.136 No water bodies requiring assessment for great crested newts or other amphibians were identified in MA08. As such, there is nothing to report for MA08 and Map Series EC-04 does not include any maps for MA08.

3 References

Biggs et al. (2015), Using eDNA to develop a national citizen science-based monitoring programme for the great crested newt (*Triturus cristatus*) in Biological Conservation, Volume 183, 2015.

Cameron, R; Burgess, K; and Payne, B. (2019), *The Rationale for Great Crested Newt District Level Licensing in* In Practice, Issue 103, March 2019.

High Speed Two Ltd (2012) and Arup/URS*, London to West Midlands EIA Scope and Methodology Report*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/372981/HS2_London_to_West_Midlands_EIA_Scope_and_Methodology_Report_FINAL.pdf.

High Speed Two Ltd (2022), *High Speed Rail (Crewe – Manchester) Environmental Statement*. Available online at: https://www.gov.uk/government/collections/hs2-phase2b-crewe-manchester-environmental-statement.

Natural England website (2016), *Method statement template for great crested newt licence*. Available online at: https://www.gov.uk/government/publications/great-crested-newts-apply-for-a-mitigation-licence.

Natural Environment and Rural Communities Act 2006. Available online at: http://www.legislation.gov.uk/ukpga/2006/16/section/41.

Wildlife and Countryside Act (1981 as amended). Available online at: http://www.legislation.gov.uk/ukpga/1981/69/contents.

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