Contents

Appendix 5.1: Air Quality Monitoring Data

Table 5.1A: Local Authority Monitoring Sites

Site ID	X	Y	Local Authority	Type	Monitored Annual Mean NO_2, 2015
37 Shelley Drive	408618	291351	Birmingham	Diffusion Tube	**40**
Copeley Hill	409493	290310	Birmingham	Diffusion Tube	34
Drake Road	408974	291056	Birmingham	Diffusion Tube	38
Willowsbrook road (363)	407126	292441	Birmingham	Diffusion Tube	34
Grindleford Road (56)	406733	293217	Birmingham	Diffusion Tube	31
Queslett (25)	405686	294338	Birmingham	Diffusion Tube	35
Tyburn Road (39)	409987	290001	Birmingham	Diffusion Tube	**43**
Chillingholme Road (114)	412733	289923	Birmingham	Diffusion Tube	31
BTL	398009	308563	Cannock Chase	Diffusion Tube	**41.1**
BTL-B	397952	308567	Cannock Chase	Diffusion Tube	36.5
67WS	398051	308512	Cannock Chase	Diffusion Tube	27.5
54WS	398250	308428	Cannock Chase	Diffusion Tube	31.2
BTMS	398009	308563	Cannock Chase	Diffusion Tube	39.0
268WS	400731	307419	Cannock Chase	Diffusion Tube	35.9
HHFW	401563	309940	Cannock Chase	Diffusion Tube	**45.9**
CNKRD	401421	309965	Cannock Chase	Diffusion Tube	**49.2**
HFRDRD	401536	310001	Cannock Chase	Diffusion Tube	29.7
32	391853	293650	Dudley	Diffusion Tube	38.5
32b	391875	293642	Dudley	Diffusion Tube	**41.9**
32e	391823	293788	Dudley	Diffusion Tube	38.1
32f	391825	293830	Dudley	Diffusion Tube	37.9
A5-2A	408893	306549	Lichfield	Diffusion Tube	33.7
A5-2B	408667	306500	Lichfield	Diffusion Tube	39.3
A5-3	412063	305379	Lichfield	Diffusion Tube	27.2
MUC-1	408164	306513	Lichfield	Diffusion Tube	**44.4**
MUC-1A/B/C	408164	306513	Lichfield	Diffusion Tube	**45.4**
MUC-2	408165	306487	Lichfield	Diffusion Tube	39.1
MUC-3	408097	306468	Lichfield	Diffusion Tube	**54.1**
MUC-4	408029	306501	Lichfield	Diffusion Tube	**43.9**

Site ID	X	Y	Local Authority	Type	Monitored Annual Mean NO_2, 2015
MUC-5	408030	306516	Lichfield	Diffusion Tube	**46.3**
MUC-6	408161	306556	Lichfield	Diffusion Tube	34.5
5	418856	290231	North Warwickshire	Diffusion Tube	28.3
Wilderness Lane (Great Barr)	403956	294855	Sandwell	Automatic Monitor	21.1
KD	403690	294703	Sandwell	Diffusion Tube	28.7
KE	403794	294693	Sandwell	Diffusion Tube	27.8
QE	403934	294934	Sandwell	Diffusion Tube	36.1
SA	403953	294855	Sandwell	Diffusion Tube	30.8
XE	404439	294846	Sandwell	Diffusion Tube	27.3
ZA	404617	294931	Sandwell	Diffusion Tube	29.7
ZC	404505	294821	Sandwell	Diffusion Tube	26.8
WA	401917	295329	Sandwell	Diffusion Tube	35.5
WB	402152	295064	Sandwell	Diffusion Tube	30.1
7	375061	308813	Shropshire	Diffusion Tube	13.6
Penkridge	393171	313859	South Staffordshire	Automatic Monitor	36.0
ES4	396957	303269	South Staffordshire	Diffusion Tube	31.5
ES5	396969	303269	South Staffordshire	Diffusion Tube	27.8
ES6	396994	303433	South Staffordshire	Diffusion Tube	30.1
HA2	394776	309756	South Staffordshire	Diffusion Tube	37.4
HA5	394828	309737	South Staffordshire	Diffusion Tube	28.6
HA6	394905	309708	South Staffordshire	Diffusion Tube	31.3
PE2	393177	313866	South Staffordshire	Diffusion Tube	26.3
PE11	393519	315327	South Staffordshire	Diffusion Tube	30.0
SA2	396716	308742	South Staffordshire	Diffusion Tube	30.9
SA5	396704	308673	South Staffordshire	Diffusion Tube	35.3

Site ID	X	Y	Local Authority	Type	Monitored Annual Mean NO_2, 2015
SA6	396701	308613	South Staffordshire	Diffusion Tube	28.3
Q2	423430	301280	Tamworth	Diffusion Tube	23.7
Q5	423840	301080	Tamworth	Diffusion Tube	26.5
Q6S	421588	301526	Tamworth	Diffusion Tube	36.3
Q6W	421555	301065	Tamworth	Diffusion Tube	33.9
Q6N	421580	301630	Tamworth	Diffusion Tube	31.3
Q6E	421600	301600	Tamworth	Diffusion Tube	**41.2**
Bloxwich Lane	399183	298809	Walsall	Automatic Monitor	**44.1**
A1	391647	298784	Wolverhampton	Automatic Monitor	34.0
A2	390374	296775	Wolverhampton	Automatic Monitor	**44.0**
A4	391261	302199	Wolverhampton	Automatic Monitor	25.0
LIC1	391698	298776	Wolverhampton	Diffusion Tube	**42**
LIC7	391663	298766	Wolverhampton	Diffusion Tube	36
LIC9	391706	298757	Wolverhampton	Diffusion Tube	**42**
PIP1	391768	298662	Wolverhampton	Diffusion Tube	**48**
PRI1	391548	298940	Wolverhampton	Diffusion Tube	35
QUE4	391707	298660	Wolverhampton	Diffusion Tube	29
STA1	391377	299818	Wolverhampton	Diffusion Tube	28
STA9	391527	303350	Wolverhampton	Diffusion Tube	28
STA9A	391536	303348	Wolverhampton	Diffusion Tube	30
BRO	391676	298865	Wolverhampton	Diffusion Tube	38
CAN	393008	300867	Wolverhampton	Diffusion Tube	25
WAT	391134	298877	Wolverhampton	Diffusion Tube	32
PEN	390379	296752	Wolverhampton	Diffusion Tube	22

Table 5.1B: Highways England commissioned diffusion tube monitoring sites

Diffusion Tube ID	X	Y	Local Authority	Dates of Data Collected	Monitored Annual Mean NO_2, Bias Adjusted and Annualised to 2015
M54M6TL_001_0813	394224	304946	South Staffordshire	14/08/2013 – 21/08/2014	34.7
M54M6TL_002_0813	394399	305464	South Staffordshire	14/08/2013 –	37.9

Diffusion Tube ID	X	Y	Local Authority	Dates of Data Collected	Monitored Annual Mean NO_2, Bias Adjusted and Annualised to 2015
				21/08/2014	
M54M6TL_003_0813	394676	305432	South Staffordshire	14/08/2013 – 21/08/2014	15.8
M54M6TL_004_0813	396138	303737	South Staffordshire	14/08/2013 – 21/08/2014	24.7
M54M6TL_005_0813	393843	303469	South Staffordshire	14/08/2013 – 21/08/2014	18.1
M54M6TL_006_0813	391680	304175	Wolverhampton	14/08/2013 – 21/08/2014	22.0
M54M6TL_007_0813	391568	304683	South Staffordshire	14/08/2013 – 21/08/2014	25.8
M54M6TL_008_0813	391448	304679	South Staffordshire	14/08/2013 – 21/08/2014	21.4
M54M6TL_009_0813	394733	306064	South Staffordshire	14/08/2013 – 21/08/2014	30.6
M54M6TL_010_0813	394715	306103	South Staffordshire	14/08/2013 – 21/08/2014	21.5
M54M6TL_011_0813	395917	306865	South Staffordshire	13/08/2013 – 21/08/2014	27.5
M54M6TL_012_0813	396533	306125	South Staffordshire	13/08/2013 – 21/08/2014	23.9
M54M6TL_013_0813	397218	306936	South Staffordshire	13/08/2013 – 21/08/2014	23.4
M54M6TL_014_0813	397314	307114	South Staffordshire	13/08/2013 – 21/08/2014	22.8
M54M6TL_015_0813	396350	307624	South Staffordshire	13/08/2013 – 21/08/2014	28.2
M54M6TL_016_0813	396638	308307	South Staffordshire	13/08/2013 – 21/08/2014	25.2
M54M6TL_017_0813	396886	309188	Cannock Chase	13/08/2013 – 21/08/2014	29.2
M54M6TL_019_0813	394133	308814	South Staffordshire	13/08/2013 – 21/08/2014	27.4
M54M6TL_020_0813	397030	304396	South Staffordshire	13/08/2013 – 21/08/2014	31.6
M54M6TL_021_0813	397196	304700	South Staffordshire	13/08/2013 – 21/08/2014	32.6
M54M6TL_022_0813	398121	301920	Walsall	13/08/2013 – 21/08/2014	33.9

Diffusion Tube ID	X	Y	Local Authority	Dates of Data Collected	Monitored Annual Mean NO_2, Bias Adjusted and Annualised to 2015
M54M6TL_023_0813	398216	301974	Walsall	13/08/2013 – 21/08/2014	**43.4**
M54M6TL_024_0813	397974	302165	South Staffordshire	13/08/2013 – 21/08/2014	26.2
M54M6TL_025_0813	398169	308455	Cannock Chase	13/08/2013 – 21/08/2014	35.6
M54M6TL_026_0813	393818	305581	South Staffordshire	14/08/2013 – 21/08/2014	16.1
M54M6TL_028_0813	401959	307241	Cannock Chase	13/08/2013 – 21/08/2014	27.7
M54M6TL_029_0813	403333	307005	Walsall	13/08/2013 – 21/08/2014	21.1
M54M6TL_030_0813	404575	307082	Walsall	13/08/2013 – 21/08/2014	21.6
M54M6TL_033_0813	398011	308563	Cannock Chase	13/08/2013 – 21/08/2014	38.7
M54M6TL_034_0813	398687	308152	South Staffordshire	13/08/2013 – 21/08/2014	28.2
M6J10AJ13_001_0710	396957	303269	South Staffordshire	01/05/2012 – 28/02/2013	23.6
M6J10AJ13_002_0710	396994	303433	South Staffordshire	01/05/2012 – 28/02/2013	23.7
M6J10AJ13_003_0710	396555	304038	South Staffordshire	01/05/2012 – 28/02/2013	22.3
M6J10AJ13_004_0710	396311	305062	South Staffordshire	01/05/2012 – 28/02/2013	**52.6**
M6J10AJ13_005_0710	396251	305055	South Staffordshire	01/05/2012 – 28/02/2013	35.4
M6J10AJ13_006_0710	394657	308500	South Staffordshire	01/05/2012 – 28/02/2013	23.8
M6J10AJ13_007_0710	394140	308783	South Staffordshire	01/05/2012 – 28/02/2013	18.2
M6J10AJ13_008_0710	393643	310049	South Staffordshire	01/05/2012 – 28/02/2013	24.6
M6J10AJ13_009_0710	392630	310258	South Staffordshire	01/05/2012 – 28/02/2013	21.3
M6J10AJ13_011_0710	393177	313866	South Staffordshire	01/05/2012 – 28/02/2013	24.2
M6J10AJ13_012_0710	393242	313962	South Staffordshire	01/05/2012 –	28.2

Diffusion Tube ID	X	Y	Local Authority	Dates of Data Collected	Monitored Annual Mean NO_2, Bias Adjusted and Annualised to 2015
				28/02/2013	
M6J10AJ13_013_0710	393213	313967	South Staffordshire	01/05/2012 – 28/02/2013	27.7
M6J10AJ13_014_0710	393179	313984	South Staffordshire	01/05/2012 – 28/02/2013	33.0
M6J10AJ13_015_0710	393152	313988	South Staffordshire	01/05/2012 – 28/02/2013	31.5
M6J10AJ13_016_0710	393326	313959	South Staffordshire	01/05/2012 – 28/02/2013	35.1
M6J10AJ13_017_0710	393347	313945	South Staffordshire	01/05/2012 – 28/02/2013	27.9
M6J10AJ13_018_0710	393371	313941	South Staffordshire	01/05/2012 – 28/02/2013	25.8
M6J10AJ13_019_0710	393420	313932	South Staffordshire	01/05/2012 – 28/02/2013	21.8
M6J10AJ13_020_0710	393524	315330	South Staffordshire	01/05/2012 – 28/02/2013	23.2
M6J10AJ13_021_0710	393019	318074	South Staffordshire	01/05/2012 – 28/02/2013	20.6
M6J10AJ13_025_0710	392748	318084	South Staffordshire	01/10/2012 – 28/02/2013	19.6
M6J10AJ13_026_0710	391243	310706	South Staffordshire	01/10/2012 – 28/02/2013	20.6
M6J10AJ13_027_0710	396348	307621	South Staffordshire	01/10/2012 – 28/02/2013	26.7
M6J10AJ13_028_0710	397610	308200	South Staffordshire	01/10/2012 – 28/02/2013	24.7
M6J10AJ13_029_0710	398503	301297	Walsall	01/10/2012 – 28/02/2013	27.0
M6J10AJ13_030_0710	399040	300126	Walsall	01/10/2012 – 28/02/2013	28.1
M6J10AJ13_031_0710	398975	300369	Walsall	01/10/2012 – 28/02/2013	31.5
M6J10AJ13_040_0710	393197	314061	South Staffordshire	01/10/2012 – 28/02/2013	18.3
M6J13J15_001_0813	392496	310309	South Staffordshire	14/08/2013 – 21/08/2014	24.5
M6J13J15_002_0813	393341	313947	South Staffordshire	14/08/2013 – 21/08/2014	39.5

Diffusion Tube ID	X	Y	Local Authority	Dates of Data Collected	Monitored Annual Mean NO_2, Bias Adjusted and Annualised to 2015
M6J13J15_003_0813	393097	313038	South Staffordshire	14/08/2013 – 21/08/2014	18.9
M6J13J15_004_0813	393181	313870	South Staffordshire	14/08/2013 – 21/08/2014	28.8
M6J13J15_005_0813	393187	313973	South Staffordshire	14/08/2013 – 21/08/2014	34.6
M6J13J15_006_0813	393198	314062	South Staffordshire	14/08/2013 – 21/08/2014	20.7
M6J13J15_007_0813	393502	315360	South Staffordshire	14/08/2013 – 21/08/2014	34.8
M6J13J15_008_0813	393420	315243	South Staffordshire	14/08/2013 – 21/08/2014	27.6
M6J13J15_009_0813	392794	318312	South Staffordshire	14/08/2013 – 21/08/2014	22.2
M6J13J15_011_0813	392777	317919	South Staffordshire	14/08/2013 – 21/08/2014	38.6
Bias adjusted and annualised concentrations are presented to 1 decimal place. Concentrations highlighted in **bold** are exceedances of the annual mean objective value of NO_2					

Appendix 6.1: Known Heritage Assets

Table 6.1A: Known Archaeology Assets

Reference	Grid Reference	Period	Description	Figure 6.1 Reference No.
01074 - MST1072	SJ 9459 0671	Medieval	Moated site in Shareshill. Rectangular moated site excavated in 1959 before being built over. The excavation revealed the moat to have originally been constructed in the 12th century and altered and strengthened in the 13th century. The site appeared to have been destroyed by a fire in the 14th century, and there was no evidence for occupation of the site after 1350.	A1
01075 - MST1073, 76955	SJ 9484 0688	Prehistoric?	The remains of a probable Bronze Age burnt mound. The mound has been eroded by the adjacent stream.	A2
01083 - MST1081, 76944, EST1814	SJ 9650 0644	Medieval	Black Lees Moated site. Site of a medieval moat which dated form at least the 14th century, based on documentary evidence. A second, possibly earlier moat may have existed to the north. Its location is marked on the OS first edition. It has been built over by a car park for a garden centre.	A3
50033 - MST11129	SJ 9442 0664	Post-Medieval	The churchyard to the Church of St Mary and St Luke, which contains a number of post-medieval grave markers, tombs and headstones. Excavations within the churchyard have also revealed evidence for tombs, vaults and grave cuts. A Second World War memorial cross stands within the churchyard.	A4
50034 – MST11130	SJ 9443 0661	Early-Medieval	The site of the Church of St Mary, Shareshill. Documentary reference to the existence of a church at Shareshill by 1213. This church is recorded to have been appropriated to Penkridge College in 1225, and raised from a chapel of ease to parochial status in 1551.	A5
01118 - MST1116	SJ 9435 0368	Medieval/Post-Medieval	The remains of a windmill at Mill Farm. A mill may have existed on this site from at least the late 17th century and was still working here in the late 19th century. During the Second World War it was used as a Home Guard observation post. It was destroyed by arson in the late 1950s.	A6

Reference	Grid Reference	Period	Description	Figure 6.1 Reference No.
MST11527 - 50418	SJ 9272 0534	Modern	Royal Ordnance Factory, Cat and Kittens Lane, Featherstone. A shell filling factory from World War II. It was built between 1940 and 1942. It included barracks, air raid shelters, pillboxes (see separate entries) workshops and a railway siding, as well as the factory buildings. It is thought that the factory was used to fill heavy bombs, along with the production of anti-tank shells and .303 cartridges for Lee Enfield rifles and Bren guns. The site was chosen as it was relatively flat and was close to a railway line. Later uses included a teacher training college and a prison. It has since been redeveloped.	A7
50419 – MST11528	SJ 9238 0459	Modern	A Second World War pillbox of red brick construction with a flat concrete roof, which is located within the disused Royal Ordnance (shell filling) Factory to the west of Featherstone.	A8
50665 - MST12236	SJ 9661 0649	Post-Medieval	Possible marl pit, north of Backlees Farm. No remains survive.	A9
01674 - MST1666	SJ 9486 0450	Post-Medieval	Possible boundary marker in the form of a low earthwork bank. A former road or trackway followed the line of the bank in the 19th century.	A10
01690 - MST1682	SJ 9518 0518	Medieval	The site of a moated site at Hilton Park. The 18th century house is now built over it. A possible deserted medieval village may have been located nearby.	A11
54186 - MST17955	SJ 9673 0681	Post-Medieval/Modern	Site of brickworks which may have been known as the Holly Bush Works. It has its origins in the 19th century and was also producing tile by *c.*1900. It was disused by 1920.	A12
55268 – MST19037	SJ 9425 0643	Medieval	The earthwork remains of medieval or later ridge and furrow, identified on aerial photography from the 1960s.	A13
55320 – MST19089	SJ 9399 0645	Medieval	Ridge and furrow identified on aerial photography from the 1960s in the area to the west of Shareshill.	A14
55321 - MST19090	SJ 9409 0596	Medieval & Later	Ridge and furrow identified on 1960s aerial photography. The earthworks appear to have been ploughed out.	A15

Reference	Grid Reference	Period	Description	Figure 6.1 Reference No.
58439 - MST22307	SJ 9340 0492	Post-Medieval	Site of Brook House Farm. It was shown on Yates' map of 1775 but was demolished in the late 20th century in advance of construction of a housing estate.	A16
58770 - MST22641	SJ 9632 0796	Modern	The remains of a Second World War anti-aircraft gun site at Middle Hill, Saredon. The remains include four octagonal gun pits with an associated oblong command post.	A17
02713 - MST2701	SJ 9471 0721	Early Medieval	Moated site at little Saredon Manor. A medieval moated site occupied by a listed timber framed building (12724) with an early 16th century core. The moat survives on three sides as a water-filled feature fed by a spring.	A18
03546 - MST3321, 76950	SJ 9467 0651	Medieval	One of four possible moated sites at Shareshill. Some remains survived as water filled features into the 1960s.	A19
03644 - MST3418	SJ 9448 0662	Early Medieval	Moated site, east of the church in Shareshill. Documentary evidence for the site of a moat with a platform measuring approximately 30 metres by 38 metres.	A20
04091 - MST3815	SJ 9505 0358	Medieval	Earthworks observed in fields under pasture, interpreted as the possible remains of former tenements or crofts which were likely to have formed part of the shrunken settlement of Essington.	A21
04534 - MST4198	SJ 9579 0704	Unknown	A number of field boundaries recorded as cropmarks.	A22
04535 - MST4199	SJ 9565 0723	Unknown	Cropmark evidence identified from an aerial photograph of a group of faint, well-defined ditched enclosure.	A23
04536 - MST4200, 1411041, EST2448	SJ 9546 0770	Medieval/Post-Medieval	Cropmarks of features related to a medieval field system and/or post-medieval trackways and field boundaries. The features were excavated in advance of the construction of the M6 Toll.	A24

Reference	Grid Reference	Period	Description	Figure 6.1 Reference No.
04537 - MST4201	SJ 9543 0780	Unknown	Cropmarks at Saredon Hall Farm identified on aerial photography and originally interpreted as a rectilinear enclosure containing a ring ditch, and another enclosure containing a ring ditch and linear features. Subsequent examination identified no trace of these features.	A25
04538 - MST4202	SJ 9514 0790	Medieval	Site of a possible church. The field name 'Church Field' given on a Tithe map of 1841. A rectangular cropmark in this area may be the remains of a former church building (see Primary Record Number 04539).	A26
04539 - MST4203	SJ 9521 0799	Unknown.	Cropmark evidence for a rectangular enclosure with a smaller enclosure on the north-west side.	A27
05416 - MST4950	SJ 9567 0805	Medieval	The earthwork remains of medieval ridge and furrow, identified from aerial photography.	A28
05417 - MST4951	SJ 9486 0724	Post-Medieval	A late 19th century pound located at Little Saredon Dairy Farm.	A29
05418 - MST4952	SJ 9486 0717	Post-Medieval	A corn mill at Little Saredon, which was extant by at least the early 19th century. Originally powered by wind, it was converted to steam power in the 1870s.	A30
05419 - MST4953	SJ 9499 0718	Post-Medieval	Smithy at Little Saredon. Documentary evidence for the site of a probable 19th century smithy. The building still appears to be extant.	A31
05420 - MST4954	SJ 9507 0764	Post-Medieval	Smithy, near Little Saredon. A smithy is marked in this location on the 1st Edition Ordnance Survey map of 1884.	A32
05422 - MST4956	SJ 9458 0770	Post-Medieval	The location of a former quarry, identified from 19th century field name evidence. There is no evidence for any quarrying in this area by the late 19th century.	A33
05423 - MST4957	SJ 9577 0741	Unknown	Cropmark complex of unknown date. Features include ditches, pits and other cut features which may represent a settlement complex.	A34

Reference	Grid Reference	Period	Description	Figure 6.1 Reference No.
05424 - MST4958	SJ 9579 0759	Unknown	A curvilinear bank and a second, straighter bank, recorded from aerial photographs.	A35
05425 - MST4959	SJ 9551 0703	Unknown	A cropmark complex containing pits and other negative features.	A36
20391 - MST5661	SJ 9446 0621	Medieval	Earthwork remains of ridge and furrow recorded from aerial photographs from the 1960s.	A37
20393 - MST5663	SJ 9486 0702	Medieval	The remains of medieval ridge and furrow earthworks, identified on aerial photography from the 1960s in the area to the south of Little Saredon.	A38
20491 - MST5761	SJ 9418 0428	Modern	Hilton Main Colliery. Established in the early 20th century.	A39
20732 - MST5981	SJ 9524 0494	Post-Medieval	A landscape park around Hilton Hall, probably established in the mid to late 18th century, with some landscaping work by Repton.	A40
20733 - MST5982	SJ 93163 04418	Modern	A formal garden (knot garden) at Moseley Old Hall, established by the National Trust in the second half of the 20th century. The gardens were designed to reflect a style of circa 1640 and is an example of a 20th century 'period' garden.	A41
52072 – MST13508	SJ 945 067	Medieval/Post-Medieval	Sherds of medieval or early post-medieval pottery recovered from unstratified contexts during an archaeological watching brief to the north of 29 School Lane.	A42
52261 - MST13695, EST1874	SJ 9474 0656	Post-Medieval to Modern	The find spot of unstratified finds of late post-medieval or modern date recovered during an archaeological watching brief. Finds included pottery and a handmade brick.	A43
52323 – MST13756	SJ 9245 0491	Modern	A brick pillbox constructed in circa 1938 within the Second World War Royal Ordnance (shell filling) Factory at Featherstone.	A44
52324 – MST13757	SJ 9243 0489	Modern	A brick and concrete cold war pill box built *circa* 1955.	A45

Reference	Grid Reference	Period	Description	Figure 6.1 Reference No.
60652 – MST15861	SJ 95 07	Roman	Findspot – A copper alloy Colchester derivative Polden brooch of 1st-2nd century AD date recovered during metal detecting.	A46
61152 – MST15941	SJ 93 04	Roman	Findspot – A silver denarius of Hadrian, minted in Rome between AD 134 and AD 138, recovered during metal detecting.	A47
60895 – MST16078	SJ 94 07	Early Medieval/Medieval	Findspot – A fragment of a probable cast copper alloy mount with enamel decoration of possible 12th-14th century date, recovered during metal detecting.	A48
01814 - MST1806	SJ 943 067	Bronze Age	A bronze, unlooped palstave reputed to have been found in the vicinity of the parish church at Shareshill. The style of the palstave suggests it is of Middle Bronze Age or later date.	A49
01915 - MST1907	SJ 9342 0492	Neolithic	Find spot of a Neolithic polished axe.	A50
56020 – MST20138	SJ 9362 0565	Modern?	A black and white painted wooden finger post, situated at the junction of New Road and Featherstone Lane. The arms of the finger post point direction to Shareshill and Saredon, Moseley, Hilton and Featherstone and Coven.	A51
56021 – MST20139	SJ 9330 0520	Modern?	A black and white painted wooden finger post situated on East Road, Featherstone. The arms point direction to Moseley, Coven, Shareshill and Featherstone. Possibly erected in the early to mid 20th century.	A52
56035 – MST20153	SJ 9502 0822	Modern?	A black and white painted wooden finger post at the junction of Saredon Road and Saredon Lane, south of the village of Great Saredon. The finger post points direction to Shareshill, Faetherstone, Calf Heath, Four Ashes (amongst other places). Of possible early to mid 20th century date.	A53
02456 - MST2446	SJ 950 036	Early Medieval	The settlement of Essington/Eseningtone recorded in the Domesday Survey. The exact location of the settlement is uncertain, though earthworks observed in the area around Essington Hall Farm and the Manor House west of the modern settlement Essington Hall Farm	A54

Reference	Grid Reference	Period	Description	Figure 6.1 Reference No.
02459 - MST2449	SJ 935 056	Early medieval/Medieval?	The settlement of Featherstone/ Ferdestan which developed after the Domesday Survey.	A55
03784 - MST2471, 76917	SJ 952 054	Early Medieval	Hilton/ Haltone deserted settlement. The site of a settlement first recorded in 994/6AD and in the Domesday Book. The date of the desertion is unknown.	A56
02560 - MST2550	SJ 948 071	Early Medieval	Little Saredon. A settlement of probable Saxon origin. Earthworks relating to the former extent of the settlement survive to the south of the existing village, within which a moated site referred to since the 13th century also still survives.	A57
02563 - MST2553	SJ 944 065	Early Medieval	Shareshill/ Servesed settlement. A settlement with two villagers and five smallholders, recorded in the Domesday survey of 1086.	A58
58520 - MST22386	SO 9300 9752	Post-Medieval	Streetway and Wordsley Green Turnpike Road. A mid-18th century turnpike road. The route had nine main gates and four side gates, and was first recorded in 1761.	A59

Table 6.1B: Listed buildings, locally listed buildings and non-designated historic buildings

Reference	Grid Reference	Period	Description	Figure 6.2 Reference No.
12718 - MST10262	SJ 93161 04315	Post-Medieval	Moseley Old Hall Cottage, Featherstone. A listed 16th century house, much rebuilt and remodelled in the 19th and late 20th centuries. The building has a timber framed core of cruck construction with the outer walls rebuilt in brick and plaster. **Grade II listed building**	B1
09119, 76936, DST3795	SJ 95202 05194	Post-Medieval	Hilton Hall. A country house built for Henry Vernon *c.*1720-30. Built of red brick and with three storeys. It is tentatively attributed to Richard Trubshaw. **Grade I listed building**.	B2
09122, DST3797	SJ 95058 05039	Post-Medieval	A pair of early 18th century gate piers at Hilton Park. **Grade II listed building**.	B3
09121, DST3798	SJ 9512 0527	Post-Medieval	An early 19th century conservatory at Hilton Park. Circular in plan and of a half cast-iron frame and half wooden frame construction, with a hemispherical dome. It was heated by a furnace in the cellar below. It is derelict and on the Heritage at Risk Register. **Grade I listed building**.	B4
09163 - MST10274	SJ 9530 0810	Post-Medieval	Saredon Hall Farmhouse and Cow House. A listed early 18th century farmhouse with an attached cow house which is of 16th century origin. The farmhouse and cowhouse are of red brick with tiled roofs. **Grade II listed building.**	B5
1039179	SJ 94951 08551	Post-Medieval	Great Saredon Farmhouse. An early to mid-18th century farmhouse, re-fenestrated and extensively repaired in the early 19th century. Red brick with a plain tile roof and raised verges. Brick integral end stacks. L-shaped plan. **Grade II listed building.**	B6
1039180	SJ 95069 08532	Post-Medieval	High View Cottage. A house, cottage and barn dating to the late 16th century with later alterations and additions. Timber framed with brick infill, partly rebuilt in brick with a plain tile roofs. **Grade II listed building.**	B7

Reference	Grid Reference	Period	Description	Figure 6.2 Reference No.
1039181	SJ 95095 08511	Post-Medieval	Hilltop Farmhouse. An early 19th century. Red brick, hipped plain tile roof with brick ridge stacks. **Grade II listed building.**	B8
1039182	SJ 95104 08441	Post-Medieval	Hilltop Cottages. Late 17th century timber framed cottage. **Grade II listed building.**	B9
617134	SJ 9480 0718	Post-Medieval	Little Saredon Manor. A 16th century house with an earlier moat. A timber framed core with brick walls and plain tile roofs in a H-plan. Built of stone, brick and timber. Two sides of a rectangular moat and part of a third are still in existence. **Grade II listed building**.	B10
12725 - MST10281	SJ 9444 0653	Post-medieval	Woodberry House, Shareshill. A listed eighteenth century house of brick construction with a slate roof, which was remodelled in circa 1840. The nineteenth century cast iron gates, railings and low brick wall enclosing the front garden are included in the listing. **Grade II listed building.**	B11
12726 - MST10282,52741 - MST14175	SJ 9427 0657	Post-Medieval	Manor Farmhouse and Malthouse at Shareshill. A listed early seventeenth century farmhouse and associated malthouse building. The house is of timber-framed construction with brick infill and a tiled roof. The cast iron railings which enclose the garden are included in the listing. **Grade II listed building.**	B12
12716	SJ 95057 03677	Post-Medieval	Pool Farmhouse. A listed late 17th century farmhouse, of red brick construction with a tile roof and brick end stacks. The interior has surviving timber framed partition walls and ceiling beams. **Grade II listed building**	B13
09126, 77058, 77081DST3803, 09126 - MST10261	SJ 93168 04414	Post-Medieval	Moseley Old Hall. A late 16th century timber framed house, later encased in brown brick with blue brick dressings in around 1870. Charles II took refuge here after the Battle of Worcester in 1651. Now owned by the National Trust **Grade II* listed building**.	B14
1187298	SJ 92993 04004	Post-Medieval	Moseley Hall Cottage. Probably early dating to the earty18th century and refurbished early 20th century. Brick with tile roofs and brick stacks. Single storey with an attic. 3-window range with 3-window range recessed to right.	B15

Reference	Grid Reference	Period	Description	Figure 6.2 Reference No.
			Grade II listed building.	
1201841	SJ 93066 03993	Post-Medieval	Coach house adjacent to Moseley Old Hall. Early 18th century. **Grade II listed building,**	B16
1201842	SJ 93010 04017	Post-Medieval	Gates, gatepiers and railings to northwest of Moseley Hall, Moseley Road. **Grade II Listed.**	B17
1298757	SJ 93051 03977	Post-Medieval	Moseley Hall. An early 18th century house with late 19th century addition. Brick with ashlar dressings and hipped tile roof. **Grade II* Listed building.**	B18
1298811	SJ 92936 04022	Post-Medieval	Gates and gatepiers to northwest of Moseley Hall Cottage, Moseley Road. **Grade II Listed.**	B19
1374099	SJ 95109 03568	Post-Medieval	Essington Hall Farmhouse. Early 19th century farmhouse incorporating the remains of a 16/17th century house to the rear. Red brick with a hipped plain tile roof and brick integral end stacks. **Grade II Listed Building.**	B20
12719 - MST10263,1374114	SJ 93505 05720	Post-Medieval	Timber-Framed Farm Building at Featherstone Farm. A listed L-plan farm building range adjacent to Featherstone Farmhouse. The range is dated to circa 1700 and has rectangular timber-framing with brick infill set on a red brick plinth. **Grade II listed building.**	B21
09120, DST3796	SJ 95260 05229	Post-Medieval	Coach house and stable block at Hilton Park. Dated to around 1830, built of red brick with a slate roof. It has four ranges surrounding a quadrangular courtyard. **Grade II listed building**.	B22
09123, DST3808	SJ 94998 04646	Post-Medieval	The Portobello Tower, Hilton Park. A tower built for Henry Vernon between 1739 and 1765 to commemorate the taking of Portobello by Admiral Edward Vernon during the 'War of Jenkin's Ear' in 1739. It may have been by Richard Trubshaw. The tower is in poor condition. **Grade II listed building**.	B23
12723 - MST10279	SJ 9481 0723	Post-Medieval	Little Saredon Dairy Farmhouse. A listed early 18th century farmhouse of red brick construction with a plain tile roof. The building is T-shaped in plan and has a main range with two parallel rear ranges containing a dairy and kitchen.	B24

Reference	Grid Reference	Period	Description	Figure 6.2 Reference No.
			Grade II listed building.	
1354557, 1443968, 1485899, 1488562, 1578726, 13796 - MST5269	SJ 9442 06258	Post-Medieval	Church of St Mary and St Luke. A parish church built *c.*1742 with a 15th to 16th century west tower. Built of red brick with ashlar tower and dressings and a plain tile roof. Archaeological investigation revealed post-medieval burial vaults, graves and a boundary wall. **Grade II* listed building**.	B25
12727 - MST10283	SJ 9424 0653	Post-Medieval	A barn at Home Farmhouse. A listed, timber-framed aisled barn of probable fifteenth century date, situated to the south-west of Home Farmhouse. The outer walls have now been almost entirely replaced in brick.	B26
56454, DST7925	SJ 9472 0611	Modern	An ex-Wolverhampton Corporation small timber bus shelter with a tiled roof on the junction of Cannock Road and Church Lane in Shareshill. It was probably built in the mid-20th century. **List of Buildings of Special Local Interest, Grade C**.	B27
58767, DST8288	SJ 9459 0631	Post-Medieval	The Elms Public House. A mid-19th century house converted for use as a public house in 1956. **List of Buildings of Special Local Interest, Grade A**.	B28
58768, DST8289	SJ 9457 0630	Post-Medieval	The Old Barn. A former barn, now a residential building, built around 1800. **List of Buildings of Special Local Interest**, **Grade A.**	B29
58769, DST8290	SJ 9654 0616	Post-Medieval	A three storey farmhouse at Blacklees Farm. **List of Buildings of Special Local Interest, Grade B**.	B30
05418 - MST4952, DST8291	SJ 9486 0717	Post-Medieval	Windmill tower incorporated into a house. Mill House has been in existence certainly by 1816 if not before. It is reputed to have had four sails and a boat cap. It is believed that it was worked by wind and sail until the 1870s when it was converted to steam working. It became derelict by 1938 after which time was converted to a residence with significant rebuilding/extension works undertaken in both 1978 and 1985. **List of Buildings of Special Local Interest, Grade A.**	B31

Reference	Grid Reference	Period	Description	Figure 6.2 Reference No.
58770, 1412701, DST8292	SJ 9632 0796	Modern	Remains of an anti-aircraft gun site. The remains include four octagonal gun pits with an associated oblong command post. **List of Buildings of Special Local Interest, Grade C**.	B32
DST8293	SJ 9435 0368	Post-medieval	Windmill Base. Brick Base and timbers from a post mill. The remains of Essington Mill on the approach road to the village. **List of Buildings of Special Local Interest, Grade B**.	B33
MST13321	SJ 9456 0670	Post-medieval	Havergal Primary School, School Lane, Shareshill. A traditional style brick-built Victorian school, with 20th century alterations and additions.	B34
MST13586	SJ 94400 06593	Post-medieval	Vicarage, Church Road, Shareshill. A vicarage built in 1845 on land given by Lord Hatherton. The vicarage has a stucco front with 'Tudor' windows and ornamental barge boards.	B35
MST13985	SJ 94246 06533	Medieval to Post-medieval	Home Farm, Shareshill. A farmstead of possible medieval origin, located within the village of Shareshill. The farmstead is laid out around a loose courtyard, with farmhouse long-side on to the yard. The farmstead is still extant and retains a 15th century aisled barn on the site.	B36
MST17115	SJ 9438 0660	Post-medieval	Outbuilding, The Old Vicarage, Shareshill. A mid to late 19th century outbuilding associated to the Old Vicarage, which was probably originally built as an outhouse or used for garden storage.	B37
MST21506	SJ 9611 0494	Post-medieval	Ride Farm, Hilton. An isolated farmstead laid out around a regular courtyard with main U-plan range, detached farmhouse and additional detached outbuildings. The farmstead may have been established by the late 18th century and was certainly extant by the 1830s.	B38
MST22077	SJ 9439 0660	Post-medieval	Garden Wall, The Old Vicarage, Shareshill. The remains of a probable mid-19th century brick-built garden wall at the Old Vicarage, Shareshill. The east-west aligned wall appears to have several phases of construction (including being heighted at some point) and also has a small, brick outbuilding	B39

Appendix 8.1: Extended Phase 1 Habitat Report

Contents

Appendices

1. INTRODUCTION

1.1. Background

1.1.1. The A460 currently provides a link between the M54 Junction 1, M6 Junction 11 and M6 Toll Junction T18 via Featherstone, Staffordshire. The A460 is a single carriageway road which experience significant congestion for vehicles travelling between the M6 north, M54 and M6 Toll. To alleviate congestion Highways England are proposing a new two lane dual carriageway link road, approximately 2.5 km (1.6 miles) in length between the M54 Junction 1 and the M6 Junction 11, herein referred to as the 'proposed Scheme'. This would provide free flow links to and from the M54 and connect into an improved M6 Junction 11.

1.1.2. A suit of ecological surveys will be undertaken to the support the Environmental Statement including an Extended Phase 1 survey within the proposed Scheme boundary.

1.2. Study Area and Location

1.2.1. The study area for the proposed Scheme is located north of Wolverhampton, within the County of Staffordshire. The study area for the Extended Phase 1 Habitat survey is defined as the draft DCO site boundary and a 250 m buffer as shown in Figures 1 and 2, Annex B.

1.2.2. The surrounding area consists predominantly of arable farmland interspersed with areas of grassland, woodland, several waterbodies and small watercourses. There are several major roadways which intersect the local landscape including the M6, M6 Toll, M54, and A460. Residential areas within the surrounding landscape include the small villages of Featherstone, Shareshill and Hilton which are directly adjacent to the A460, the civil parish of Great Saredon adjacent to the M6 Toll, as well as scattered small holdings and various farmhouses.

1.3. Survey Aims and Objectives

1.3.1. All habitats within the study area have been mapped and described to provide an overview of the proposed Scheme boundary. This included the recording of specific features indicating the presence, or likely presence, of protected species such as bats, birds, great crested newts (GCN) (*Triturus cristatus*), badger (*Meles meles*), water vole (*Arvicola amphibious*), and other species of conservation significance. This also included the mapping of any invasive flora identified.

1.3.2. This report is intended to identify the presence, or likelihood of presence from the evaluation of habitats and features, of protected species and other species of conservation significance against National and European Legislation (see Annex A), and recommend, where necessary, any further surveys or mitigation needed.

1.4. Limitations

1.4.1. This report highlights habitats and the potential for protected species evident on the day of the survey visit. It does not record any ecological features that may only appear at other times of the year and therefore were not evident at the time of the visit.

1.4.2. Access to certain land plots was not permitted and therefore they were surveyed from adjacent land where possible. It is possible that features of interest were missed; however, sufficient information could be gained to inform the requirement for further surveys so this is not considered a significant limitation.

1.4.3. One area, within a land plot, was not fully assessed due to the density of vegetation present at the time of survey. The location of this area was E 395694, N 307626. This area was assessed from adjoining land where access was granted.

1.4.4. Areas of private residential dwellings and their associated curtilages were not surveyed due to land access not being permitted.

1.4.5. There were numerous mature trees assessed within the survey area for bat potential. Many of the trees assessed showed significant ivy (*Hedera helix*) cover up the trunk and occasionally along major limbs. Whilst ivy should be considered for bat roost potential, it prevents identifying other features such as holes and cracks in the tree. This is not considered a limitation as further survey work, utilising a different methodology, is proposed where tree climbing surveys undertaken in August 2018 could not be undertaken safely.

1.4.6. Despite the limitations detailed above, it is considered that there was sufficient information gathered during the survey to inform the PCF Stage 3 (preliminary design) (development of the preferred route) surveys.

2. METHODOLOGY

2.1. Desktop Study

2.1.1. A desktop study of statutory and non-statutory designated sites and protected species was completed in 2015 along the route of the proposed Scheme. This search included the proposed Scheme and a 2 km buffer and was obtained from Natural England, the Environment Agency, Staffordshire Ecological Record Centre (SER), and the Ecological records centre for Birmingham and the Black Country (EcoRecord). The data search was repeated in 2017, for information held by SER.

2.1.2. In April 2018, a data search utilising freely available information from Magic Map and NBN Atlas was undertaken for statutory and non-statutory designated sites and protected species records. OS maps were further accessed to identify the presence of standing and running water within the study area. This search included the proposed Scheme and a 2 km buffer.

2.2. Field Survey

2.2.1. This survey included all accessible land plots within 250 m of the proposed Scheme boundary to identify evidence of protected species, suitable habitats or ecological features that could result in a constraint to the proposed works.

2.2.2. The survey was conducted by suitably qualified Ecologists; Stuart Graham MSc, CEcol, CEnv, MCIEEM and Dean Cordelle BSc (Hons), Grad CIEEM on the 18th, 23rd, 25th of April and 15th, 16th May 2018. Environmental conditions experienced during the surveys were as follows:

April

- 18th – 16°C, cloud with sunny intervals, no precipitation and a light breeze
- 23rd – 11°C, cloudy, no precipitation, light breeze
- 25th – 9°C, cloudy, no precipitation, light breeze

May

- 15th - 20°C, light cloud, no precipitation, light breeze
- 16th - 14°C, light cloud, no precipitation, light breeze

2.2.3. The survey involved a systematic walkover of the accessible section of the proposed Scheme boundary, including a 250 m buffer. This comprised of an Extended Phase 1 assessment identifying habitats of ecological importance and features which indicate the potential presence of reptiles, amphibians including GCN, badgers, water vole, and other species of conservation significance. The Assessment was carried out in accordance with the Joint Nature Conservation Committee (JNCC) Phase 1 Habitat Methodology (JNCC, 2010), which was extended to record information regarding likelihood of protected species presence with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) Technical Guidance Series Guidelines for Preliminary Ecological Appraisal (CIEEM, 2013). No detailed surveys for protected species were undertaken as a part of these surveys.

2.2.4. The walkover involved searching for badger field signs such as setts, footprints, dung pits, guard hairs and runs (Bang and Dahlstrom, 2001); field signs were recorded based on classifications described in CIEEM (2013), Neal and Cheeseman (1996) and within Harris et al., (1994), and Andrews (2013).

2.2.5. Trees present along the route were assessed for potential roosting features (PRFs) in accordance with good practice guidelines from the Bat Conservation Trust (Collins, 2016). Trees were assessed for features such as woodpecker holes, rot holes, hazard beams, knot holes and other recognised PRFs from ground level.

2.2.6. All watercourses were assessed to determine their suitability for water vole (*Arvicola amphibious*), otter (*Lutra lutra) and white-clawed crayfish (Austropotamobius pallipes)*. To assess suitability for water vole, vegetation composition on the banks was assessed, water levels and any obvious water vole field signs such as mown grass and/or burrows were identified (Dean et al., 2016). To assess the watercourse's suitability for otters, features such as overhanging tree roots (used for den sites), and large rocks (used for spraint marking) were recorded (Chanin, 2003). To assess the watercourse's suitability for white-clawed crayfish, features such as cobbles / rocks, submerged logs and roots of wooded vegetation were recorded (Holdich, 2003).

2.2.7. Hedgerows within and directly adjacent to the proposed Scheme were surveyed to determine their ecological importance; whether they were species-rich as defined by the UK Biodiversity Action Plan (BAP), and whether they were protected according to the Hedgerow Regulations (1997). The hedgerows were systematically walked and species composition was recorded as well as evidence of protected species or species of conservation concern. The following characteristics of each hedgerow were assessed: length, location, and 'ecological importance'.

3. RESULTS AND DISCUSSIONS

3.1. Desktop Study

3.1.1. The desktop study identified sites of biological importance within 2 km of the draft DCO site boundary. Table 1 lists the statutory and non-statutory sites along with ancient woodland (listed on the Ancient Woodland Inventory (AWI)) identified by SER.

Table 1: Statutory, non-statutory, and ancient / semi-natural woodland sites.

Designation	Distance from the draft DCO site boundary	Reason for Designation	Relationship to the proposed Scheme
Statutory designated Sites			
Stowe Pool and Walk Mill Clay Pit Site of Special Scientific Interest (SSSI) (only Walk Mill Clay Pit is within the study area)	1.5 km north-east	The only section of this SSSI that is within the Scheme's catchment is Walk Mill Clay Pit. This site has historically supported a large and significant population of white-clawed crayfish.	Located to the north of the M6 Toll and east of the M6, therefore there are significant major barriers between the site and the proposed Scheme.
Non-statutory designated sites			
Lower Pool SBI & LWS	Within the draft DCO site boundary	A large ornamental pool with both emergent and floating vegetation.	The proposed Scheme would have a direct impact on this LWS.
Brookfield Farm, Shareshill, SBI & LWS	Within the draft DCO site boundary	An area of wet woodland comprising alder and willow carr that is drying out in some areas of the site. Sycamore is common in the drier parts of the wood.	The proposed Scheme crosses the western end of the SBI.
Saredon Hall Farm retained BAS (south-east of)	268 m north	An area of oak woodland with a small pond. Much of the wood is impenetrable with bramble (*Rubus* sp.) and nettle (*Urtica dioica)*. Additionally, there is a small pond to the south of the wood, fringed by glaucous sedge (*Carex flacca)*, reedmace (*Typha* sp.) and broad-leaved pondweed (*Potamogeton natans)* in the water.	The site is adjacent to the northern end of the proposed Scheme. The M6 Toll acts as a significant major barrier between the site and the route of the proposed Scheme.

Designation	Distance from the draft DCO site boundary	Reason for Designation	Relationship to the proposed Scheme
The Hag retained BAS	404 m east	Woodland dominated by sycamore, with some oak and much hawthorn around the edges. Within the wood is a very steep-sided pond without emergent vegetation. In the report from Staffordshire	There is arable land, hedgerows and woodland connecting the BAS to the proposed Scheme. There are no hydrological links between the site and the proposed Scheme.
Westcroft retained BAS (woods north of)	683 m south-	A mixed wood containing mainly pedunculate oak (*Quercus robur)*, sycamore and Scots pine (*Pinus sylvestris)*. The understorey is dominated by elder and hawthorn (*Crataegus monogyna)*.	The site is to the south-west of the southern section of the proposed Scheme. There are significant major barriers between the site and the proposed Scheme, including the M54 and a large industrial park.
Keeper's Wood, Hilton Park SBI & LWS	712 m east	Mature mixed deciduous/conifer plantation.	The site is linked to the proposed Scheme through arable farmland and hedgerows.
Westcroft Farm (land north of), Bushbury, SBI & LWS	1.2 km south-west	A linear strip of alder (*Alnus glutinosa)*/crack willow (*Salix fragilis)* woodland along the stream with sycamore (*Acer pseudoplatanus)* abundant in the canopy away from the stream. Hazel (*Corylus avellana)* frequents the understorey throughout the woodland, with scattered elder (*Sambucus nigra)* and holly (*Ilex aquifolium)*.	The site is to the south-west of the southern section of the proposed Scheme. There are significant major barriers between the site and the proposed Scheme, including the M54 and a large industrial park.
Hatherton Branch Canal retained BAS	1.5 km north	The section of canal between the M6 and Oak Lane is largely choked by reed sweet-grass (*Glyceria maxima)*. No trace of the original towpath can be seen. Ruderal vegetation grades between the sweet-	Located approximately 1km north of the northern section of the Scheme. Arable fields, hedgerows and drainage ditches may provide limited connectivity to the

Designation	Distance from the draft DCO site boundary	Reason for Designation	Relationship to the proposed Scheme
		grass swamp and the hedge on the south side.	northern section of the proposed Scheme.
Ashmore Lodge, Essington (disused mineral railway line), Retained BAS	1.5 km south-east	An old dismantled mineral line now covered by neutral grassland with some wooded areas.	Located to the south of the M54 and Bognop Road. These are considered to provide a major barrier between the site and the proposed Scheme.
Coven Heath SBI & LWS	1.6 km west	An area of wet heath, which is now drying, part of which has been ploughed.	Located to the southern end of the proposed Scheme. Separated from the proposed Scheme by Stafford Road.
Wryley and Essington Canal Local Nature Reserve (LNR), also designated as a LWS	1.4 km	This site has been restored and converted into a LNR over several years. Bat and GCN records are located within this nature reserve.	Located to the east of Warstone Road and the M6, therefore there are major barriers between the site and the proposed Scheme.
Hatherton Reservoir, Cheslyn Hay SBI & LWS	1.6 km north-east	Reservoir with high quality water and diverse emergent and submerged vegetation.	Located north-east of the proposed Scheme, a large industrial estate, quarry and the M6 act as major barriers. It appears that there is a hydrological connection through Wyrley Brook and Saredon Brook to a pond that is adjacent to the northern end of the proposed Scheme.
Hatherton Pines retained BAS	1.6 km north-east	An area of plantation coniferous woodland, situated between the two Hatherton Pools. The area of most importance is the grassland between the plantations which has a rich	Located to the north of the M6 Toll, and east of the M6 and the A4601, therefore there are significant major barriers between the site and the proposed

Designation	Distance from the draft DCO site boundary	Reason for Designation	Relationship to the proposed Scheme
		flora due to poor soil conditions, including kidney vetch (*Anthyllis vulneraria)* and bilberry (*Vaccinium myrtillus)*.	Scheme. No hydrological links.
Lodge Hill (north-east of) BAS	1.6 km north-east	A small damp depression at the edge of an arable field.	Located to the north of the M6 Toll, and, east of the M6 and the A4601, therefore there are significant major barriers between the site and the Scheme. No hydrological links
Essington Pools retained Biodiversity Alert Site (BAS)	1.9 km south-east	As well as the open water, there are two areas of woodland, an area of tall planting and amenity grassland. The amenity grassland is regularly mown.	Located to the south of the M54 and proposed Scheme, the site is on the opposite side of the village of Essington, which is considered a major barrier, there are no hydrological links.
Pennymore Hay Farm, Four Ashes SBI Local Wildlife Site (LWS)	2 km west	A remnant of species rich marsh which has been damaged by tipping.	The site is to the west of the northern section of the proposed Scheme. Separated from the proposed Scheme by Great Saredon Road.
Hatherton Bridge (by) Hatherton Site of Biological Importance (SBI)	2 km north-west	Rough semi-improved field with many ruderal species.	The site is to the west of the northern section of the proposed Scheme. Separated from the proposed Scheme by Great Saredon Road.
Ancient Woodland			
Essington Wood	1.6 km south-east	Ancient & Semi-Natural Woodland	Located to the east of the M6, therefore major barriers between the site and the proposed Scheme.
Burns Wood (east)	1.2 km east	Ancient & Semi-Natural Woodland	Located to the east of the M6, and south of

Designation	Distance from the draft DCO site boundary	Reason for Designation	Relationship to the proposed Scheme
			the A462 therefore major barriers between the site and the proposed Scheme.
Burns Wood (west)	1 km east	Ancient & Semi-Natural Woodland	No pathways to the receptor.
Spring Coppice	1 km east	Ancient & Semi-Natural Woodland	Located to the east of the M6, and south of the A462 therefore major barriers between the site and the proposed Scheme.
Beech Head	340 m east	Ancient & Semi-Natural Woodland	Located to the south of the M54, which is a major barrier between the site and the proposed Scheme. No pathways to the receptor.
Oxden Leasow	Within the draft DCO site boundary	Ancient & Semi-Natural Woodland	Adjacent to the northern boundary of the woodland.

3.1.2. The majority of the designated areas are located outside of the proposed Scheme boundary. These are considered to be unaffected by the proposed Scheme due to little or no connectivity and being designated for species which are not mobile.

3.1.3. The sites of biological importance north of Brookfield's farm and at lower pool are directly within the proposed Scheme extent and may be negatively impacted upon by the proposed Scheme; dependent on final design. The ancient & semi-natural woodland site 'Oxden Leasow' is within the draft DCO site boundary and may additionally be negatively impacted; dependent on final design.

3.2. Habitats

3.2.1. The following broad habitat descriptions are based on field survey results at the time of the survey. A map depicting the proposed Scheme, habitats noted and potential areas of protected species interest is provided in Annex B; codes for each habitat are provided within the text below.

3.2.2. The broad habitats recorded within the study area include the following:

- A1 Woodland
- A2 Scrub
- B4 Improved grassland
- B6 Poor semi-improved grassland
- G1 Standing water

- G2 Running water
- J1.1 Arable
- J1.2 Amenity Grassland
- J2 Hedgerows
- J2.4 Fence
- J3 Built up areas
- J3.6 Buildings
- J4 Bare ground

A1 Woodland

3.2.3. Across the proposed Scheme there were several areas of woodland as detailed in Table 2 and shown on the Phase 1 Habitat Map (Annex B).

Table 2: Description of woodland found within the study area.

Label Ref (Annex B, Figure 2)	Designated Site or Ancient woodland	Access	Type of woodland	Canopy and shrub layer species	Ground story species present	Microhabitats present
W1	No	No	-	-	-	-
W2	Yes – ASNW Oxden Leasow Wood	Yes	Broad-leaved plantation	Oak, lime sp. (*Tilia sp.*), sycamore, elm (*Ulmus procera)*, rowan (*Sorbus aucuparia)*, ash (*Fraxinus excelsior)*, hazel (*Corylus avellana)*, hawthorn, holly, horse-chestnut (*Aesculus hippocastanum)*.	Bluebells (*Hyacinthoides non-scripta)*, dog's mercury (*Mercurialis perennis)*, bramble scrub and grass species	-
W3	No	Yes	Broad-leaved semi-natural	Oak, ash, hazel, holly	Ancient woodland indicator species including bluebells and dog's mercury	Bank along west edge and mounds and banks within. Deadwood
W4	No	Yes	Broad-leaved plantation	Oak, ash, hawthorn	Bramble scrub and grass species	-
W5	No	Yes	Broad-leaved plantation	Oak, ash, hawthorn	Bramble scrub and grass species	-
W6	No	Yes	Broad-leaved semi-natural	Oak, ash, hawthorn	Bramble scrub and grass species	Deadwood
W7	No	Yes	Broad-leaved plantation	Oak, ash, hawthorn	Bramble scrub and grass species	-
W8	No	Yes	Broad-leaved plantation	Oak, ash, hawthorn	Bramble scrub and grass species	-
W9	No	Yes	Broad-leaved	Oak, ash, hawthorn	Bramble scrub and grass species	-

Label Ref (Annex B, Figure 2)	Designated Site or Ancient woodland	Access	Type of woodland	Canopy and shrub layer species	Ground story species present	Microhabitats present
			semi-natural			
W10	No	Yes	Broad-leaved plantation	Oak, ash, hawthorn, Lime sp	Bluebell, dogs mercury, Ferns, Bramble scrub and grass species	-
W11	No	Yes	Broad-leaved plantation	Oak, ash, hawthorn	Bramble scrub and grass species	-
W12	No	Yes	Broad-leaved semi-natural	Oak, ash, beech, hawthorn	Bramble scrub and grass species	Deadwood and dry ditch present
W13	No	Yes	Broad-leaved semi-natural	Oak, scots pine	Bluebell	PRF
W14	No	Yes	Broad-leaved semi-natural	Oak, ash, beech	Bramble and ruderal vegetation	Watercourse present
W15	No	Yes	Broad-leaved semi-natural	Beech, sycamore, Lime sp.	Ancient woodland indicator species including bluebells	Two bodies of standing water, one watercourse, standing deadwood, deadwood, and several PRF trees.
W16	Lower Pool SBI	Yes	Broad-leaved semi-natural	Oak, ash, beech, rowan (*Sorbus aucuparia)*, rhododendron (*Rhododendron* sp.)	Bramble and ruderal vegetation	Two bodies of standing water, one watercourse, standing deadwood, deadwood, and several PRF trees.
W17	No	Yes	Broad-leaved semi-	Sycamore and oak, holly and hawthorn understory	Bluebell, herb-Robert (*Geranium robertianum)*, garlic mustard (*Alliaria*	Standing deadwood, deadwood, and several PRF trees

Label Ref (Annex B, Figure 2)	Designated Site or Ancient woodland	Access	Type of woodland	Canopy and shrub layer species	Ground story species present	Microhabitats present
			natural		*petiolate)*, red campion (*Silene dioica)*, bramble and ruderal vegetation	
W18	No	No	Broad-leaved semi-natural	Willow sp.	Himalayan balsam (*Impatiens glandulifera)*	-
W19	Brookfield Farm (northeast of) SBI	Yes	Broad-leaved semi-natural	Oak, ash, willow	Ground flora of ramsons (*Allium ursinum)*, wood avens (*Gerum urbanum)*, marsh marigold (*Caltha palustris)*, meadowsweet (*Filipendula ulmaria)*, bluebell.	One watercourse, standing deadwood, deadwood, and several PRF trees.
W20	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W21	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W22	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W23	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W24	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W25	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W26	No	Yes	Broad-	Ash, oak, beech	Bramble, Semi-improved	-

Label Ref (Annex B, Figure 2)	Designated Site or Ancient woodland	Access	Type of woodland	Canopy and shrub layer species	Ground story species present	Microhabitats present
			leaved plantation		grassland	
W27	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W28	No	No	Broad-leaved plantation	-	-	-
W29	No	No	Broad-leaved plantation	-	-	-
W30	No	Yes	Broad-leaved semi-natural	Ash, oak, beech	Bramble	-
W31	No	Yes	Broad-leaved plantation	Ash, hawthorn, beech	Bramble, Semi-improved grassland	-
W32	No	Yes	Broad-leaved semi-natural	Ash, hawthorn, beech	Bramble, Semi-improved grassland	-
W33	No	Yes	Broad-leaved plantation	Ash, hawthorn, beech	Bramble, Semi-improved grassland	-
W34	No	Yes	Broad-leaved plantation	Ash, hawthorn, beech	Bramble, Semi-improved grassland	-
W35	No	Yes	Broad-leaved plantation	Ash, hawthorn, beech	Bramble, Semi-improved grassland	-
W36	Yes – BAS – South east of	Yes	Broad-leaved	Oak, alder, hazel, holly, elder, dogwood (*Cornus*	Red campion, Dog's mercury	-

Label Ref (Annex B, Figure 2)	Designated Site or Ancient woodland	Access	Type of woodland	Canopy and shrub layer species	Ground story species present	Microhabitats present
	Saredon Hall Farm		semi-natural	*sanguinea)*	Bramble, Japanese knotweed present	
W37	No	Yes	Broad-leaved semi-natural	Ash, oak, beech, blackthorn	Bramble, Semi-improved grassland	-
W38	No	Yes	Broad-leaved plantation	Blackthorn (*Prunus spinose)*, ash	-	-
W39	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W40	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W41	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W42	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-
W43	No	Yes	Broad-leaved plantation	Ash, oak, beech	Bramble, Semi-improved grassland	-

A2 Scrub

3.2.4. Throughout the study area there were patches of both dense (A2.1) and areas of scattered scrub (A2.2), usually dominated by bramble, except for one area of scrub being predominantly dominated by gorse (*Ulex europaeus*).

B4 Improved grassland

3.2.5. Fields present within the extent of the study area were predominantly improved grassland currently in use for pastoral farming. Improved grassland is identified as grassland habitat which has been heavily affected by farming methods such as grazing, herbicide application, etc. resulting in a uniform species diversity. Grasses indicative of such habitat including perennial ryegrass (*Lolium perenne*). In addition, there were patches of common nettles (*Urtica dioica*) and thistles (*Cirsiurn sp.)* indicative of nutrient enrichment from cattle and / or fertilisers.

B6 Poor semi-improved grassland

3.2.6. Several fields within the study area were classified as poor semi-improved grassland habitat, most of which were used for occasional recreational purposes (predominantly car boot sales) and for agricultural purposes; cattle-grazing. Poor semi-improved grassland is identified as grassland habitat which has been affected by farming methods such as grazing, herbicide application, etc. and thus is less than diverse than unimproved grassland habitat. Grasses indicative of such habitat including perennial ryegrass; however, in addition to such grasses, broad-leaved herbs were present. Furthermore, there were patches of localised common nettles and thistles indicative of nutrient enrichment from cattle and fertilisers.

G1 Standing water

3.2.7. Forty-eight bodies of standing water were identified within the study area (see Phase 1 habitat map for individual locations). Each waterbody is detailed within Table D1, Annex D. The ponds present within the study area were mainly restricted to ones stocked for fishing and therefore offered low value for protected species such as GCN, although ponds within woodlands offered more value as potential breeding habitat for GCN.

G2 Running water

3.2.8. Several streams were noted within the study area (see Phase 1 habitat map for individual locations). Many of the streams connected fishing lakes or were run off from fishing lakes. These have the potential to act as corridors for protected species through less suitable habitat such as arable fields. In addition, these watercourses were found to offer varying levels of potential to support otter and water vole; although, no signs were noted during the survey. See Table D2, Annex D for watercourse characteristics.

J1.1 Arable

3.2.9. Several fields throughout the study area were managed for crop production with many being recently seeded prior to the survey.

J2.1 Hedgerows

3.2.10. Several hedgerows and lines of trees bordered fields and roadways across the study area. There was a total of 43 hedgerows identified; of which, 24 were species-poor intact, 17 were species-poor defunct, one was species-rich defunct, and one was species-rich intact. The species found within these features included hawthorn, ash, elder (*Sambucus nigra*), and blackthorn. A detailed description of each hedgerow is provided in Table D3, Annex D.

Fences

3.2.11. Many of the fields were bordered by a variety of fences, including wooden and electric. The screening woodland present adjacent to the motorways was further bordered by highways standard 'three rail' wooden fences.

Built up areas

3.2.12. Areas of private residential dwellings were present within the study area; however, these were not surveyed due to access issues.

Buildings

3.2.13. There were several buildings present within the study area where the surveyors were granted external access. These ranged from residential dwellings to warehouses. All the buildings were considered to offer low-high bat roosting potential and therefore bat roosting surveys were conducted. Survey findings are reported separately in an annex report.

Bare ground

3.2.14. Areas of bare ground were found within the study area. These were predominantly areas of gravel in use for parking vehicles or access tracks to buildings.

Notable habitats

3.2.15. The hedgerows and woodlands present could offer sheltering and breeding habitat to various species, particularly birds, listed under Section 41 of the NERC Act. In addition, the standing water present could offer opportunities to such species including GCN.

3.2.16. The following habitats, found, are listed on Staffordshire's Local Biodiversity Action Plan, or could possibly be listed on the plan following further surveys to confirm:

- hedgerows;
- native woodland;
- wood-pasture & parkland;
- eutrophic standing water; and
- ponds.

3.3. Protected Species

Badgers

3.3.1. Badger field signs, including active setts, were recorded during the survey. Several of the habitats found across the survey area offered foraging opportunities for the species. The woodlands present offered opportunities for shelter, commuting and foraging. It was considered that the proposed Scheme would have an impact upon badgers; therefore, targeted badger surveys were undertaken. Survey findings are reported separately within a confidential annex report.

Bats

3.3.2. Numerous trees and buildings offered roosting opportunities for a number of species of bats, in addition to hedgerows and tree lines offering suitable flight lines to feeding habitats present within the study area and wider environment. It was considered that the proposed Scheme would have an impact upon bats; therefore, targeted bat surveys were undertaken. Survey findings are reported separately in an annex report.

Breeding Birds

3.3.3. Several habitats present within the study area offered opportunities for nesting birds, including ground nesting species within the large agricultural fields. Woodlands, hedgerows and denser areas of scrub further offered nesting opportunities for certain bird species. Yellowhammers (*Emberiza citronella*) for example are known to nest within gorse scrub. It was considered that the proposed Scheme would have an impact upon breeding birds; therefore, targeted breeding bird surveys were undertaken. Survey findings are reported separately in an annex report.

GCN

3.3.4. Several ponds and adjacent habitats within the study area offered limited opportunities for GCN. Woodlands adjacent to these ponds offered further opportunities for shelter (including hibernacula), commuting and foraging for GCN. It was considered that the proposed Scheme would have an impact upon GCN if found present within the study area; therefore, targeted GCN surveys were undertaken. Survey findings are reported separately in an annex report.

Hare

3.3.5. No signs of European hare (*Lepus europaeus)* were identified during the survey; several fields offered opportunities, albeit limited, for the species with wide expanses of long grass present. With several similar field structures present in the wider landscape and the site being confined geographically by the existing road network, it is not anticipated that this species will be impacted by the proposed Scheme.

Invasive flora

3.3.6. Japanese knotweed (*Fallopia japonica)*, Himalayan balsam and rhododendron were identified during the survey. The locations of these areas are shown on the phase one habitat map (Figure 1, Annex B) as target notes 1, 2, 3 and 5 (Annex C). An appropriate control and / or eradication program is recommended to be undertaken prior to the commencement of the proposed Scheme. Details of the control and / or eradication program should further be detailed within the Construction Environmental Management Plan.

Terrestrial Invertebrates

3.3.7. Several habitats within the study area offered opportunities for the terrestrial invertebrates. It was considered that the proposed Scheme would have an impact upon terrestrial invertebrates, dependent upon the final scheme design. Targeted invertebrate habitat suitability surveys were undertaken. Survey findings will be reported with the Environmental Statement.

Aquatic Invertebrates

3.3.8. The standing and running water present within the study area offered varied opportunities for aquatic invertebrates, including white-clawed crayfish. It is considered that the proposed Scheme would have an impact upon aquatic invertebrates, dependent upon the final scheme design; therefore, it is recommended that further targeted surveys for the species are undertaken.

Otters and water vole

3.3.9. Several waterbodies and watercourses within the study area offered opportunities for aquatic mammals. It was considered that the proposed Scheme would have an impact upon otters and water voles if found present within the study area; therefore, targeted otter and water vole surveys were undertaken. Survey findings are reported separately in an annex report.

Reptiles

3.3.10. Habitats present within the study area offered limited opportunities for reptiles. It was considered that the proposed Scheme would have an impact upon reptiles if found to be present within the study area; therefore, targeted reptile surveys were undertaken. Survey findings are reported separately in an annex report.

4. CONCLUSION AND RECOMMENDATIONS

4.1.1. Potential exists for protected species to be impacted upon by the proposed Scheme. Several areas of high value for protected species are present within the study area, including areas of semi-natural woodland with ancient woodland indicators species and waterbodies.

4.1.2. As such, it is recommended that further protected species surveys are conducted along the route of the proposed Scheme. These include:

- National Vegetation Classification survey (to identify any Ancient Woodland present).
- Bat hibernation surveys.
- Targeted terrestrial invertebrate surveys.
- Targeted aquatic invertebrate surveys (inclusive of white-clawed crayfish).

4.1.3. The following surveys are recommended for the areas within the study area which were not surveyed due to land access:

- Extended Phase 1 Habitat survey (inclusive GCN Habitat Suitability Surveys).
- Bat Roosting Potential surveys of trees and any structures present.
- Badger survey.
- Terrestrial and aquatic invertebrate surveys (inclusive of white-clawed crayfish).

4.1.4. The further targeted surveys will inform any amendments to scheme design (if required) and inform mitigation and biodiversity enhancement opportunities.

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All UK (and individual UK countries) legislation can be viewed at: http://www.legislation.gov.uk/browse

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Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). *Evaluating the suitability of habitat for the Great Crested Newt* (*Triturus cristatus*). Herpetological Journal 10 (4), 143-155.

Annex A Wildlife Legislation and Policy

The Wildlife & Countryside Act 1981 (as amended)

Provides for designation and protection of Sites of Special Scientific Interest (SSSI), which are areas that represent the most valuable habitats in the UK for nature conservation.

The Act creates the following offences:

- To intentionally kill, injure, or take any wild bird or their eggs or nests (with exception to species listed in Schedule 2). Special penalties are available for offences related to birds listed on Schedule 1, for which there are additional offences of disturbing these birds at their nests, or their dependent young.
- To intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5, and interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.
- Certain methods of killing, injuring, or taking wild animals listed in Schedule 6.
- To pick, uproot, trade in, or possess (for the purposes of trade) any wild plant listed in Schedule 8, and prohibits the unauthorised intentional uprooting of such plants.
- The release of certain non-native animals and planting of plants listed in Schedule 9.

It also provides a mechanism making any of the above offences legal through the granting of licences by the appropriate authorities.

Conservation of Habitats and Species Regulations 2017

The principal means by which the European Habitats Directive is transposed in England and Wales.

Provide for the designation and protection of a network of 'European Sites' (also termed Natura 2000), including Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

Regulation 41 creates the following offences relating to European Protected Species (EPS):

- deliberately capture, injure or kill any wild animal of a European Protected Species;
- deliberately disturb animals of any such species in such a way as to be likely to:
  - impair their ability to survive, breed, rear or nurture their young, hibernate or migrate, or
  - significantly affect the local distribution or abundance of the species to which they belong;
- deliberately take or destroy the eggs of such an animal; or
- damage or destroy a breeding site or resting place of such an animal.

The Regulations also make it an offence (subject to exceptions) to deliberately pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 5.

The actions listed above can be made lawful through the granting of licences (European Protected Species Licence) by the appropriate authorities (Natural England in England). Licences may be granted for a number of purposes, but only after the appropriate authority has determined that the following regulations are satisfied:

- The works under the licence are being carried out for the purposes of '*preserving public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment*'.
- There is 'no satisfactory alternative'.
- The action 'will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range'.

To apply for a licence, the following information is required:

- The species concerned.
- The relative size of the population at the site (note this may require a survey to be carried out at a particular time of the year).
- The impact(s) (if any) that the development is likely to have upon the populations.
- What measures will be conducted to mitigate for the impact(s).

Natural Environment & Rural Communities (NERC) Act 2006

Section 40 of NERC carries an extension of the earlier CRoW Act biodiversity duty to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. Section 41 requires the Secretary of State, as respects England, to publish a list of species and habitats which are of 'principal importance for the purpose of conserving biodiversity'. These lists generally reflect the species and habitats previously listed under the UK Biodiversity Action Plan.

National Planning Policy Framework

This framework replaces Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS 9) (ODPM 2005) and sets out the view of central Government on how planners should balance nature conservation with development. One of the key principles of the NPPF is:

The NPPF states that development plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas, including biodiversity. It also states that the aim of planning decisions should be to prevent harm to biodiversity conservation interests and to 'promote the preservation, restoration and re-creation of priority habitats, ecological networks and the recovery of priority species.

Where determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principals; '*if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused'; and, 'planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss'*.

This means that full ecological surveys should be carried out and suitable mitigation measures proposed prior to any planning application being submitted.

Biodiversity 2020: A strategy for England's wildlife and ecosystem services

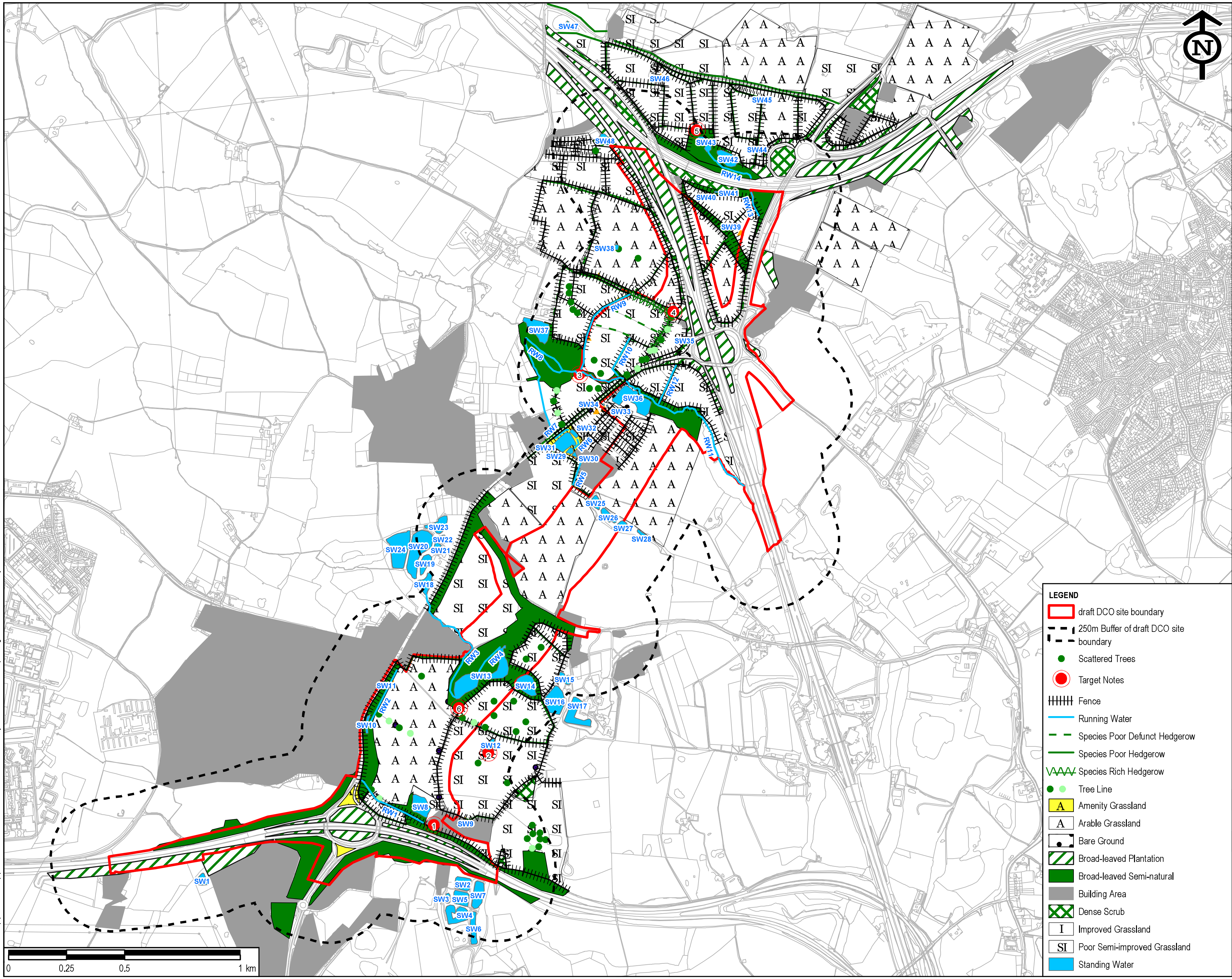
This biodiversity strategy for England builds on the Natural Environment White Paper and the earlier UK Biodiversity Action Plan. It provides a comprehensive picture of how Government is implementing our international and EU commitments and sets out the strategic direction for biodiversity policy up to 2020. Its mission is to:

> "*halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people*."

In relation to planning and development its priority is to:

> "*take a strategic approach to planning for nature within and across local areas. This approach will guide development to the best locations, encourage greener design and enable development to enhance natural networks. We will retain the protection and improvement of the natural environment as core objectives of the planning system*."

Annex B Phase 1 Habitat Maps



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First Issue	EC / AR	04/12/18	P01
Revision Details	By / Check	Date	Suffix

Purpose of issue: FOR INFORMATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of highways england

Project Title: M54 TO M6/M6 (TOLL) LINK ROAD

Drawing Title: FIGURE 1 PHASE 1 HABITAT SURVEY

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	20/12/2018

Internal Project No. 60529339 — Suitability S2

Scale @ A3 1:15,000 — Zone M54 to M6/M6 (Toll) Link Road

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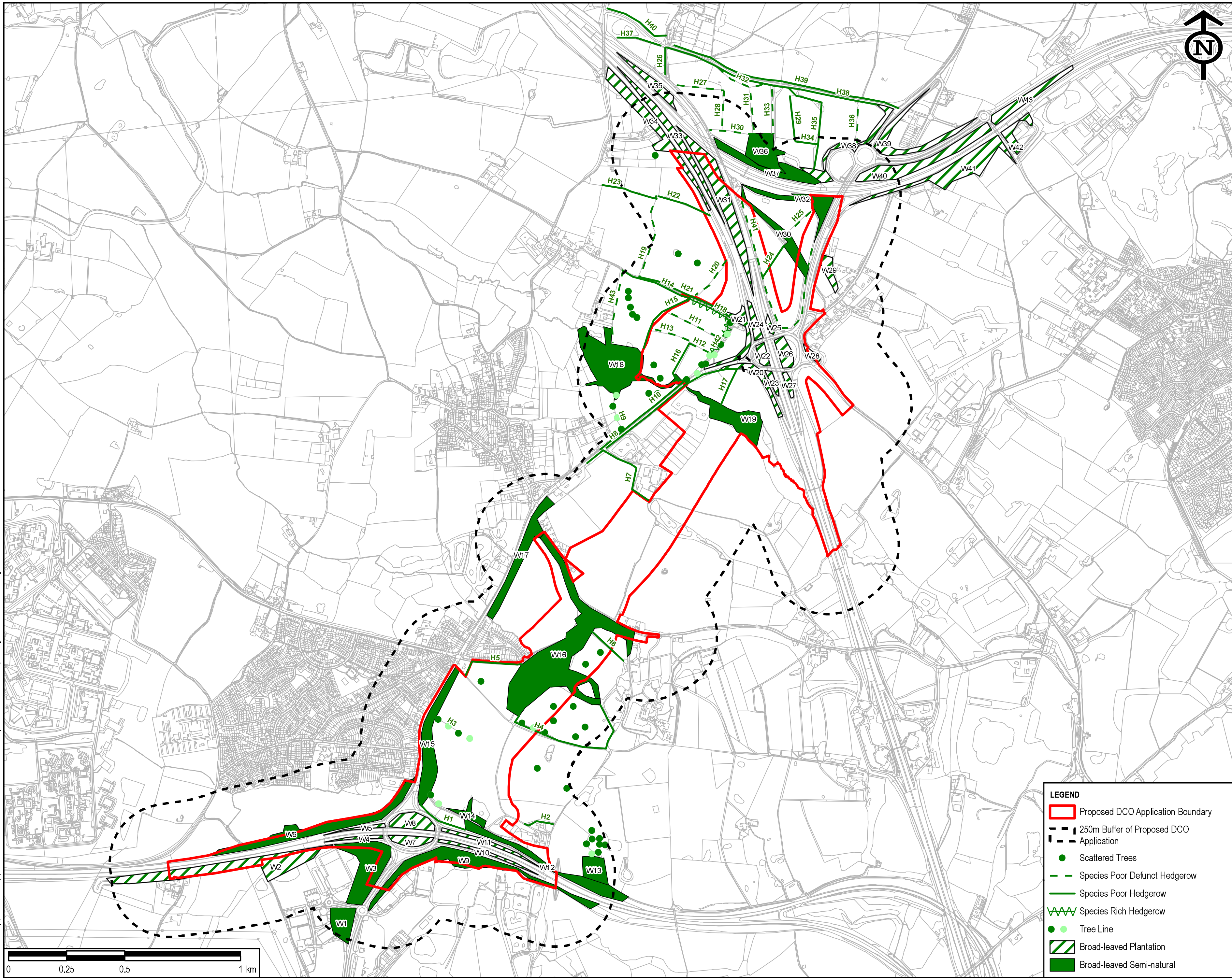

LEGEND

- Proposed DCO Application Boundary
- 250m Buffer of Proposed DCO Application
- Scattered Trees
- Species Poor Defunct Hedgerow
- Species Poor Hedgerow
- Species Rich Hedgerow
- Tree Line
- Broad-leaved Plantation
- Broad-leaved Semi-natural

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Highways England
The Cube
199 Wharfside Street
Birmingham
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Project Title

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Drawing Title

FIGURE 2
WOODLAND AND HEDGEROW HABITATS

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	02/01/2019

Internal Project No. 60529339	Suitability S2
Scale @ A3 1:15,000	Zone M54 to M6/M6 (Toll) Link Road

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AECOM
Royal Court
Basil Close, Chesterfield
Derbyshire, S41 7SL
Tel 01246 209221
Fax 01246 209229
www.aecom.com

AECOM

AECOM Infrastructure & Environment UK Limited
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Registered office: Scott House, Alencon Link, Basingstoke, Hampshire RG21 7PP

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Annex C Target Notes

Target Note	Feature
1	Japanese Knotweed identified
2	Japanese Knotweed identified
3	Himalayan Balsam identified
4	Asbestos identified
5	Japanese Knotweed identified
6	Rhododendron identified

Annex D Waterbodies and Watercourse

Table D1: Description of waterbodies found across the study area.

Label Ref (Figure 1, Annex B)	Access	Size (m^2)	Description
SW1	No	1596	-
SW2	No	3664	-
SW3	No	905	-
SW4	No	5760	-
SW5	No	3570	-
SW6	No	3552	-
SW7	No	4832	-
SW8	Yes	5995	Large fishing lake heavily stocked with carp *Cyprinus s*p., major presence of waterfowl, aquatic vegetation present – reed beds.
SW9	Yes	1	Small ditch, appeared to have poor water quality, filled with rubbish. No vegetation present.
SW10	Yes	1000	Poor water quality, fish likely absent, no waterfowl present, little aquatic vegetation or terrestrial vegetation present.
SW11	Yes	500	Appeared to have poor water quality, fish likely absent, no water fowl present, little aquatic vegetation or terrestrial vegetation present.
SW12	Yes	909	Appeared to have good water quality, reed beds present, minor presence of water fowl, fish likely absent.
SW13	Yes	15000	Appeared to have good water quality, reed beds present, minor presence of water fowl, fish present, several aquatic invertebrates noted.
SW14	Yes	5994	Appeared to have good water quality, reed beds present, minor presence of water fowl, fish present.
SW15	No	3000	-
SW22	No	1216	-
SW23	No	3304	-
SW25	No	2066	-
SW26	No	2763	-
SW27	No	2066	-
SW28	No	500	-
SW29	Yes	570	Fishing lake, appeared to have poor water quality, no aquatic vegetation present, little vegetation present on banks, minor presence of water fowl
SW30	Yes	150	Fishing lake, appeared to have poor water quality, no aquatic vegetation present, little vegetation present on banks, minor presence of water fowl

Label Ref (Figure 1, Annex B)	Access	Size (m^2)	Description
SW31	Yes	5468	Fishing lake, appeared to have poor water quality, no aquatic vegetation present, little vegetation present on banks, minor presence of water fowl
SW32	Yes	729	Fishing lake, appeared to have poor water quality, no aquatic vegetation present, little vegetation present on banks, minor presence of water fowl
SW33	Yes	5	Small ditch likely produced from scrapes of machinery. No aquatic vegetation present, appeared to have bad water quality. No presence of water fowl.
SW34	Yes	5	Small ditch likely produced from scrapes of machinery. No aquatic vegetation present. Appeared to have bad water quality. No presence of water fowl.
SW35	Yes	10	Appeared to have poor water quality, no aquatic vegetation present. No signs of waterfowl presence. Fish likely absent.
SW36	Yes	11167	Fishing lake, appeared to have poor water quality, no aquatic vegetation present, little vegetation present on banks. Waterfowl present.
SW38	Yes	507	Appeared to have poor water quality, no aquatic vegetation present, major presence of waterfowl, fish presence possible, close proximity to a watercourse.
SW39	Yes	400	Appeared to have poor water quality, no aquatic vegetation present, minor presence of waterfowl, fish presence possible.
SW40	Yes	549	Appeared to have poor water quality, no aquatic vegetation present, major presence of waterfowl, fish presence possible.
SW41	Yes	300	Appeared to have poor water quality, no aquatic vegetation present, minor presence of waterfowl, fish presence possible.
SW42	Yes	4403	Appeared to have poor water quality, aquatic vegetation present, major presence of waterfowl, fish presence likely.
SW43	Yes	2500	Appeared to have poor water quality, no aquatic vegetation present, major presence of waterfowl, fish presence likely.
SW44	Yes	10	Appeared to have poor water quality, no aquatic vegetation present, minor presence of waterfowl, fish presence likely absent.
SW45	Yes	15	Appeared to have poor water quality, no aquatic vegetation present, minor presence of waterfowl, fish presence likely absent.
SW46	No	10	Appeared to have poor water quality, no aquatic vegetation present, major presence of waterfowl, fish presence likely absent.
SW47	No	2750	-
SW48	No	3500	-

Table D2: Description of watercourses found across the study area.

Label Ref (Figure 1, Annex B)	Width (m)	Depth (m)	Description
RW1	1	1	Slow flowing, stony/silty sediment bottom, ruderal vegetation present on both banks, adjacent to a line of trees, appeared to have poor water quality
RW2	1.5	1	Drainage ditch - sediment bottom, ruderal vegetation present on both banks, adjacent to a line of trees, appeared to have poor water quality
RW3	1.5	<0.5m	Slow flowing, sediment and stone bottom, ruderal vegetation present on both banks for most of its length, appeared to have poor water quality
RW4	1	1	Slow flowing, sediment bottom, ruderal vegetation present on both banks, appeared to have good water quality
RW5	1.5	1.5	Slow flowing, sediment bottom, ruderal vegetation present on both banks, adjacent to a line of trees, appeared to have good water quality
RW6	1	1	Slow flowing – run off from one waterbody into the next, appeared to have bad water quality
RW7	1.5	<0.5	Appeared to have poor water quality, culverts beneath A460, sediment bottom
RW8	1.5	1	Slow flowing, sediment bottom, ruderal vegetation present on both banks, adjacent to a line of trees, appeared to have good water quality
RW9	1	1	Drainage ditch flows into watercourse – appeared to have poor water quality, sediment bottom, aquatic vegetation present, vegetation on both banks
RW10	1	<0.5	Drainage ditch flows into watercourse – appeared to have poor water quality, sediment bottom, vegetation on both banks
RW11	2	>1	Slow flowing, banks vegetated with Himalayan Balsam and common nettle, appeared to have good water quality
RW12	1	<0.5	Drainage ditch - appeared to have bad water quality, adjacent to line of trees
RW13	1.5	0.5	Appeared to have good water quality, adjacent to line of trees, sediment and stone bottom
RW14	1.5	0.5	Appeared to have good water quality, adjacent to line of trees, sediment and stone bottom

Table D3: Description of hedgerows found across the study area

Label Ref (Figure 2)	Width (m)	Height (m)	Length (m)	Defunct (D) or intact (I)?	Sp rich (R) or poor (P)?	Species composition (T = tree)	Ground flora	Managed?[1]
H1	1.5	1.5	220	I	P	Hawthorn	Common nettles, Perrenial Rye.	Yes
H2	2	3	130	I	P	Cypress leylandii	None noted	Yes
H3	4	5	210	D	P	Oak, ash	Perennial Rye, false oat grass (*Arrhenatherum elatius)*, Common couch (*Elymus repens)*.	No
H4	2	1.5-2	450	I	P	Hawthorn, Cypress leylandii (T)	Common grass species including: Common couch Perennial Rye	Yes
H5	2	2	65	I	P	Hawthorn, Cypress leylandii, oak (T)	Perennial Rye	Yes
H6	1.5	1.5	180	I	P	Hawthorn	Perennial Rye, common couch, timothy sp. (*Phleum pratense)*	Yes
H7	1.5	1.5	380	I	P	Hawthorn	None noted	Yes
H8	1.5	1.5	430	I	P	Hawthorn	Common grass species including: Common couch Perennial Rye Common nettles, creeping thistle (*Cirsium arvense)*	Yes
H9	2.5	4	170	D	P	Alder (*Alnus glutinosa*), elder, hawthorn, oak	Common grass species including: Common couch Perennial Rye Common nettles, white dead nettle (*Lamium album)*	Partially
H10	1.5	1.5	450	I	P	Hawthorn	Common grass species including: Common couch	Yes

[1] Managed hedgerows were classified as hedgerows which had been subject to management methods so that the trees no longer took their natural shape. Partially managed hedgerows were hedgerows where signs of management methods were identified; however, the management was not regular, resulting in the species present regaining their natural shape. Unmanaged hedgerows were hedgerows where no signs of management methods were identified, and the shape of the species present was considered natural.

Label Ref (Figure 2)	Width (m)	Height (m)	Length (m)	Defunct (D) or intact (I)?	Sp rich (R) or poor (P)?	Species compositi on (T = tree)	Ground flora	Managed? [1]
							Perennial Rye	
H11	2	2.5	230	D	P	Alder, elder, hawthorn, oak	Common grass species including: Common couch Perennial Rye Common nettle	Partially
H12	2.5	2.5	260	D	P	Holly, oak (T), hawthorn	Common grass species including: Common couch Perennial Rye Common nettle	Partially
H13	2.5	2.5	151	D	R	Hawthorn, holly, oak, alder, elder	Common grass species including: Common couch Perennial Rye Common nettle	Partially
H14	1.5	2	320	D	P	Hawthorn, hazel, blackthorn, oak	Common grass species including: Common couch Perennial Rye Common nettle	Yes
H15	2	2.5	315	I	P	Alder, elder, hawthorn, oak (T), holly	Common grass species including: Common couch Perennial Rye Common nettle	Partially
H16	2	4	190	I	P	Hawthorn, ash, holly, oak	Common nettles, white dead nettle	Partially
H17	2	2	255	I	P	Oak, ash, alder	Common grass species including: Common couch Perennial Rye Common nettle	No
H18	2	2	360	I	R	Hawthorn, blackthorn, holly, elm, dog rose Rosa canina	Common grass species including: Common couch Perennial Rye	Yes
H19	1.5	1	366	D	P	Oak, hawthorn	Common grass species including: Common couch Perennial Rye	No
H20	1.5	1.5	231	D	P	Oak, hawthorn	Common grass species including:	No

Label Ref (Figure 2)	Width (m)	Height (m)	Length (m)	Defunct (D) or intact (I)?	Sp rich (R) or poor (P)?	Species composition (T = tree)	Ground flora	Managed?[1]
							Common couch Perennial Rye	
H21	2	3	414	I	P	Holly, oak, birch (*Betula sp.*), alder	Common grass species including: Common couch Perennial Rye	Yes
H22	2	2	260	I	P	Holly, blackthorn, oak, alder, elder	Common grass species including: Common couch Perennial Rye	Yes
H23	2	2	239	I	P	Holly, oak, blackthorn, hawthorn	Common grass species including: Common couch Perennial Rye	Yes
H24	2	2	161	I	P	Hazel, blackthorn, hawthorn, oak	Common grass species including: Common couch Perennial Rye	Yes
H25	2	2.5	180	D	P	Hawthorn, blackthorn, sycamore Acer pseudoplatanus, holly, beech	Common couch & Perennial Rye	No
H26	1.5	2	114	I	P	Hawthorn	Common couch & Perennial Rye	Yes
H27	1.5	2.5	200	D	P	Hawthorn, ash, holly	Common couch & Perennial Rye	No
H28	2	2	170	D	P	Hawthorn, blackthorn, oak, hazel	Common couch & Perennial Rye	No
H29	2	4	190	I	P	Elm, ash, alder, oak	Common grass species including: Common couch Perennial Rye	Partially
H30	2	3	180	D	P	Hawthorn, blackthorn, oak, hazel	Common grass species including: Common couch Perennial Rye	No
H31	2	4	203	D	P	Elm, hawthorn, ash, alder, oak	Common grass species including: Common couch Perennial Rye	Partially
H32	2	4	222	D	P	Elm, ash, alder, oak	Common grass species including: Common couch	Yes

Label Ref (Figure 2)	Width (m)	Height (m)	Length (m)	Defunct (D) or intact (I)?	Sp rich (R) or poor (P)?	Species composition (T = tree)	Ground flora	Managed?[1]
							Perennial Rye	
H33	2	4	205	D	P	Hawthorn, ash, alder, oak	Common grass species including: Common couch Perennial Rye	No
H34	2	4	90	I	P	Hawthorn, ash, alder, oak	Common grass species including: Common couch Perennial Rye	Partially
H35	2	4	406	I	P	Hawthorn, ash, alder, oak	Common grass species including: Common couch Perennial Rye Common nettle	Partially
H36	2.5	3	172	D	P	Hazel, hawthorn, blackthorn	Common grass species including: Common couch Perennial Rye	No
H37	2	2	162	I	p	Hawthorn	None noted.	Partially
H38	2-2.5	2	711	I	P	Hawthorn, alder (T), oak (T), ash (T)	Common grass species including: Common couch Perennial Rye	Yes
H39	2	2	1005	I	P	Hawthorn, blackthorn	Common grass species including: Common couch Perennial Rye	Yes
H40	2	2	285	I	P	Hawthorn	Common grass species including: Common couch Perennial Rye	Yes
H41	1	1	1008	D	P	Hawthorn	Common grass species including: Common couch Perennial Rye	No
H42	2.5	3	230	I	P	Oak, ash, hawthorn, alder	Common grass species including: Common couch Perennial Rye	No
H43	1.5	1	250	D	P	Hawthorn, alder	Common grass species including: Common couch Perennial Rye	No

Appendix 8.2: Great Crested Newt Assessment Report

Contents

1. INTRODUCTION

1.1. Background

1.1.1 The A460 currently provides a link between the M6 Junction 11, M54 Junction 1, and M6 Toll Junction T8 via Featherstone, Staffordshire. The A460 is a single carriageway road which experiences significant congestion from vehicles travelling between the M6 north, M54 and M6 Toll. To alleviate congestion Highways England are proposing a new two lane dual carriageway link road, approximately 2.5km (1.6 miles) in length between the M54 Junction 1 and the M6 Junction 11, herein referred to as the 'proposed Scheme'. This would provide free flow links to and from the M54 and connect into an improved M6 Junction 11.

1.1.2 A suit of ecological surveys have been undertaken to support the Environmental Statement including great crested newt (*Triturus cristatus) surveys*.

1.1.3 Previous great crested newt surveys were completed in 2015 as part of the options selection process which included presence / likely absence surveys of several waterbodies within 500 m of the scheme options presented in the EAR (Highways England, 2015a). These surveys did not record any great crested newts. Several waterbodies could not be accessed, so it was assumed following a reasonable precautionary approach that those waterbodies that couldn't be accessed supported great crested newts until further surveys could be completed.

1.2. Study area and location

1.2.1 The proposed Scheme would be located in the county of Staffordshire in a landscape which consists predominantly of arable farmland interspersed with areas of grassland, woodland, several waterbodies. There are major roadways which intersect the local landscape including the M6, M6 Toll, M54, and A460. Residential areas within the surrounding landscape include the small villages of Featherstone and Shareshill which are directly adjacent to the A460, the civil parish of Great Saredon adjacent to the M6 Toll, as well as scattered small holdings and various farmhouses.

1.2.2 The study area for the great crested newt assessment includes all land within and up to 500 m from the draft DCO site boundary as shown on Figure 1, Appendix B.

1.3. Survey Aims and Objectives

1.3.1 The aims and objectives of the great crested newt assessment are to:

- determine presence or likely absence of great crested newt within the study area based on desk study data and field survey visits;
- provide baseline information to inform design development and environmental assessment, and
- identify the risk of encountering great crested newts whilst undertaking construction works for the proposed Scheme, should all consent and permissions be granted.

1.4. Legislation

1.4.1 Great crested newt are legally protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to:

I. intentionally or recklessly obstruct access to any structure or place that great crested newt uses for shelter or protection;

II. intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection; or

III. possess, sell or transport live or dead great crested newt, or any part of a great crested newt.

1.4.2 Great crested newt receives further protection as a European Protected Species under the Conservation of Habitats and Species Regulations 2017. This makes it an offence to:

I. deliberately capture, injure or kill any great crested newt;

II. deliberately disturb a great crested newt, especially if the disturbance will likely impair their ability to survive, breed, or reproduce;

III. deliberately take or destroy eggs of such an animal;

IV. deliberately disturb a great crested newt which will impair their ability to hibernate or migrate.

V. to significantly affect the local distribution or abundance of great crested newt; or

VI. damage or destroy a breeding site or resting place of a great crested newt.

1.4.3 Full details on the above legislation is provided in Annex A.

2. METHODOLOGY

2.1. Desktop study

2.1.1 A desktop study was completed in 2015, which included obtaining records of great crested newts within 2km of the PCF Stage 2 (options selection) Scheme options, an early iteration of the proposed Scheme. Data was obtained from Staffordshire Ecological Record Centre (SER) and the Ecological records centre for Birmingham and the Black Country (EcoRecord). An updated data search was obtained from SER in 2017.

2.1.2 In April 2018, a data search utilising freely available information from Magic Map and NBN Atlas was undertaken for great crested newt records. A review of the 2015 surveys was also undertaken.

2.1.3 OS maps and aerial imagery have been used to identify the presence of water bodies within the Study Area. Each water body identified has been screened to determine if there is a major barrier to great crested newt movement between the water body and the Scheme boundary. The following constitute major barriers to dispersal and are unlikely to be traversed by great crested newts:

- Rivers and larger brooks. Newts do not generally like running water, though they will inhabit slow-flowing watercourses such as backwaters, ditches and canals.
- Main roads such as A-roads, motorways or any other road with high traffic volume (i.e. high traffic volume during the night when great crested newt are more likely to be dispersing / commuting).
- Major urban infrastructure including extensive areas of hardstanding, buildings and dense networks of minor roads with little green space

2.1.4 If such a barrier is present between the waterbody and the draft DCO site boundary, that waterbody has been screened out of requiring any further assessment, as any great crested newts present would not be at risk from the proposed Scheme.

2.2. Habitat Suitability Index

2.2.1 Waterbodies not isolated from the proposed Scheme by one or more major barriers are then assessed for their suitability for great crested newt breeding habitat utilising the Habitat Suitability Index (HSI) assessment methodology.

2.2.2 The HSI developed by Oldham *et al*., (2000) includes analysis of location (S1), size (S2), pond drying (S3), water quality (S4), shade (S5), fowl (S6), fish (S7), ponds (S8), terrestrial habitat (S9), macrophytes (S10). These ten categories are given a numerical value between 0-1 per the index, then an overall value is calculated using:

HSI = (SI1 x SI2 x SI3 x SI4 x SI5 x SI6 x SI7 x SI8 x SI9 x SI10)1/10

2.2.3 This will give an HSI value between 0-1 which corresponds to a pond suitability value. See Table 1 below for the categories of suitability.

Table 1: Suitability categories for HSI scores.

HSI	Pond Suitability
<0.5	Poor
0.5 - 0.59	Below average
0.6 – 0.69	average
0.7 – 0.79	Good
> 0.8	Excellent

2.3. Presence, Likely Absence Surveys

2.3.1 Waterbodies considered suitable to support great crested newts are subject to further surveying using three of the following methods detailed in the Great Crested Newt Mitigation Guidelines (2001):

- torch surveys;
- bottle trapping;
- netting; and
- egg searching.

2.3.2 Each survey visit constituted one evening visit where bottle traps were set in the pond and torching was undertaken; the following morning the bottle traps were checked and at least one additional method was undertaken.

2.4. Limitations

2.4.1 This report utilises HSI (Oldham *et al*., 2000) calculations of water bodies and adjacent habitats obtained on the day of the initial survey visit. It does not record any changes in ecological features that may only appear at other times of the year and therefore were not evident at the time of the initial visit.

2.4.2 Access to certain land plots was not permitted. It is possible that suitable features for great crested newt have been missed; however, in certain cases sufficient information could be gained to inform the requirement for further surveys from satellite imagery or from surveying the waterbodies from the adjacent land boundary. These limitations are discussed in reference to individual waterbodies later within the report.

2.4.3 One area, within a land plot, was not fully assessed due to the density of vegetation present at the time of survey. The location of this area is E 395694, N 307626. This area was assessed from adjoining land where access had been obtained. From OS maps it can be identified that there is a waterbody present within this area.

2.4.4 Areas of private residential dwellings and their associated curtilages were not surveyed due to land access not having been obtained; however, this is not considered a significant limitation as no water bodies were identified within these areas from the desk top study.

2.4.5 Presence / likely absence surveys were not undertaken on Pond 27 due to health and safety restrictions (presence of calves within the field following the HSI) preventing access to the waterbody.

2.4.6 Several waterbodies have not been subject to any field surveys. Where this is the case, a reasonable precautionary approach has been adopted where it is assumed that these water bodies support great crested newts until further survey work is undertaken in the spring of 2019.

3. RESULTS AND DISCUSSION

3.1. Desktop Study

3.1.1 SER and EcoRecord (updated in 2018) returned several records for great crested newt within the wider area, particularly concentrated to the east of the M6. All of these records were outside of the proposed Scheme extent, and beyond the four major roads referred to in Section 1.

3.1.2 The Magic Map Application revealed no licence applications for great crested newts within 2 km of the proposed Scheme extent. The nearest licence application is approximately 2.1 km to the east, past the M6. The NBN atlas also revealed many records for great crested newt within the wider area, although many of these records are not recorded accurately, with a grid reference of only 2 digits.

3.1.3 No great crested newt or signs of their presence were recorded during the surveys undertaken in 2015 (Highways England, 2015).

3.2. Habitat Suitability Index

3.2.1 A total of 127 waterbodies are present within the study area. These are shown in Figure 1, Annex B.

3.2.2 HSI assessments have been conducted at 30 of these water bodies, by suitably qualified ecologists; Stuart Graham BSc (Hons), MSc, CEcol, CEnv, MCIEEM and Dean Cordelle BSc (Hons), Grad CIEEM on the 18, 23 & 25 April and 15 & 16 May 2018.

3.2.3 The conditions experienced during the surveys were as follows:

April

- 18 – 16°C, cloud with sunny intervals, no precipitation, and a light breeze
- 23 – 11°C, cloudy, no precipitation, light breeze
- 25 – 9°C, cloudy, no precipitation, light breeze

May

- 15 - 20°C, light cloud, no precipitation, light breeze
- 16 - 14°C, light cloud, no precipitation, light breeze

3.2.4 The location, connectivity and HSI (where available) for all 127 waterbodies is stated in Table 2. Images of a number of waterbodies are provided in Annex C.

3.2.5 Waterbodies not surveyed in 2018 will be subject to surveys in spring 2019.

Table 2: Waterbody location, connectivity to the proposed Scheme and HSI Score.

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
1	SJ 93200 04750	Unclear from satellite imagery	82	73	218	Yes	TBC	To be completed Spring 2019
2	SJ 93550 04450	Unclear from satellite imagery	1769	56	83	Yes	TBC	To be completed Spring 2019
3	SJ 93650 04220	Unclear from satellite imagery	225	299	359	Yes	TBC	To be completed Spring 2019
4	SJ 93870 04340	Unclear from satellite imagery	415	34	192	Yes	TBC	To be completed Spring 2019
5	SJ 93890 04300	Unclear from satellite imagery	100	45	206	Yes	TBC	To be completed Spring 2019
6	SJ 93880 04230	Unclear from satellite imagery	286.2	77	267	Yes	TBC	To be completed Spring 2019
7	SJ 93850 04220	Unclear from satellite imagery	77	103	292	Yes	TBC	To be completed Spring 2019
8	SJ 94253 04196	Unclear from satellite imagery	5709	240	283	Yes	TBC	To be completed Spring 2019
9	SJ 94264 04076	Unclear from satellite imagery	4145	311	387	Yes	TBC	To be completed Spring 2019
10	SJ 94408 04325	Not present on satellite imagery	2422	181	243	Yes	TBC	To be completed Spring 2019
11	SJ 94622 04493	Unclear from satellite imagery	175	23	91	Yes	TBC	To be completed Spring 2019
12	SJ 94671 04443	Fisheries – fishing pegs can be seen	4470	13	70	Yes	TBC	To be completed Spring 2019
13	SJ 94671 04443	Fisheries – fishing pegs can be seen	3670	16	85	Yes	TBC	To be completed Spring 2019
14	SJ 94662 04374	Fisheries – fishing pegs can be seen	3508	79	144	Yes	TBC	To be completed Spring 2019

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
15	SJ 94605 04374	fisheries – fishing pegs can be seen	750	110	183	Yes	TBC	To be completed Spring 2019
16	SJ 94676 04312	fisheries – fishing pegs can be seen	5157	143	204	Yes	TBC	To be completed Spring 2019
17	SJ 94716 04256	fisheries – fishing pegs can be seen	3262	144	198	Yes	TBC	To be completed Spring 2019
18	SJ 94648 04227	fisheries – fishing pegs can be seen	5415	209	266	Yes	TBC	To be completed Spring 2019
19	SJ 94677 04109	fisheries – fishing pegs can be seen	5857	306	352	Yes	TBC	To be completed Spring 2019
20	SJ 94910 04042	fisheries – fishing pegs can be seen	1184	265	339	Yes	TBC	To be completed Spring 2019
21	SJ 94951 04008	Large waterbody with what appears to be managed grassland immediately surrounding with pockets of trees.	3341	300	374	Yes	TBC	To be completed Spring 2019
22	SJ 94669 04693	Small ditch, bad water quality, filled with rubbish. No vegetation present.	2	37	45	Yes	0.36	To be completed Spring 2019
23	SJ 94474 04791	Large waterbody with amenity grassland and lines of trees immediately surrounding the pond. In use for recreational fishing.	5183	0	0	Within the draft DCO site boundary	0.31	To be completed Spring 2019
24	SJ 94231 04830	Shallow ditch within wet woodland area, no aquatic vegetation present, likely only present during periods of heavy rainfall.	110	0	9	Within the draft DCO site boundary	0.43	To be completed Spring 2019
25	SJ 94264 05126	Poor water quality, fish likely absent, no impact of water fowl, little aquatic vegetation or terrestrial vegetation present.	564	0	0	Within the draft DCO site boundary	0.8	complete
26	SJ 94340	Poor water quality, fish likely absent, no	171	0	0	Within the	0.69	complete

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
	05310	impact of water fowl, little aquatic vegetation or terrestrial vegetation present.				draft DCO site boundary		
27	SJ 94795 05043	Good water quality, reed beds present, low impact of water fowl, fish likely absent. Area of raised bank immediately present to the south dominated by Japanese Knotweed.	668	13	94	Yes	0.85	To be completed Spring 2019
28	SJ 94357 05290	Large waterbody surrounded by mature woodland with an understory of Rhododendron present. Waterbody in use for recreational fishing.	14385	0	0	Within the draft DCO site boundary	0.45	To be completed Spring 2019
29	SJ 94692 05316	Shallow drainage ditch likely only wet during periods of heavy rainfall. No aquatic vegetation present.	100	0	15	Within the draft DCO site boundary	0.47	To be completed Spring 2019
30	SJ 94777 05412	Shallow ditch likely only wet during periods of heavy rainfall. Appears to link with waterbody 29. No aquatic vegetation present. Heavily shaded by mature trees and Rhododendron.	20	0	7	Within the draft DCO site boundary	0.46	To be completed Spring 2019
31	SJ 94943 05314	Good water quality, reed beds present, low impact of water fowl, fish present.	5611	0	164	Yes	0.45	To be completed Spring 2019
32	SJ 95064 05230	Fisheries – fishing pegs can be seen	7362	122	287	Yes	TBC	To be completed Spring 2019
33	SJ 95146 05169	Large ornamental waterbody within Hilton Hall Estate.	6063	213	346	Yes	TBC	To be completed Spring 2019
34	SJ 95105 05325	Cannot be seen from satellite imagery.	1787	100	231	Yes	TBC	To be completed Spring 2019
35	SJ 94519 05736	fisheries – fishing pegs can be seen	3308	57	292	No - West side of A460	Not Requir	No

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
							ed	
36	SJ 94511 05831	fisheries – fishing pegs can be seen	2320	113	258	No - West side of A460	Not Required	No
37	SJ 94461 05858	fisheries – fishing pegs can be seen	11903	134	228	No - West side of A460	Not Required	No
38	SJ 94403 05874	fisheries – fishing pegs can be seen	10705	204	323	No - West side of A460	Not Required	No
39	SJ 94570 05898	No longer present on satellite imagery	972	101	198	No - West side of A460	Not Required	No
40	SJ 94588 05930	Waterbody appears to be surrounded by amenity grassland and is presumed to be fisheries due to all other waterbodies within the immediate vicinity in use as fisheries.	942	89	165	No - West side of A460	Not Required	No
41	SJ 94584 05991	fisheries - creel beds can be seen	3618	101	168	No - West side of A460	Not Required	No
42	SJ 94608 06040	Unclear from satellite imagery	56	98	177	No - West side of A460	Not Required	No
43	SJ 95473 05685	Badger bait marking surveys conducted in Jan-March 2019 have revealed that this pond is absent.	257	215	306	Yes	Not Required	No
44	SJ 95281 05810	Badger bait marking surveys conducted in Jan-March 2019 have revealed that	93	37	128	Yes	Not Requir	No

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
		this pond is absent.					ed	
45	SJ 95870 05499	Unclear from satellite imagery – blocked from view by woodland.	290	396	583	Yes	TBC	To be completed Spring 2019
46	SJ 95898 05493	Unclear from satellite imagery – blocked from view by woodland.	30	398	591	Yes	TBC	To be completed Spring 2019
47	SJ 95914 05463	Unclear from satellite imagery – blocked from view by woodland.	533	419	615	Yes	TBC	To be completed Spring 2019
48	SJ 95923 05441	Unclear from satellite imagery – blocked from view by woodland.	338	467	665	Yes	TBC	To be completed Spring 2019
49	SJ 96013 05486	Unclear from satellite imagery – blocked from view by woodland.	134	371	570	Yes	TBC	To be completed Spring 2019
50	SJ 95894 05623	Unclear from satellite imagery – blocked from view by woodland.	91	265	454	Yes	TBC	To be completed Spring 2019
51	SJ 95773 05678	Unclear from satellite imagery – blocked from view by woodland.	143	290	443	Yes	TBC	To be completed Spring 2019
52	SJ 95797 05715	Unclear from satellite imagery – blocked from view by woodland.	312	232	390	Yes	TBC	To be completed Spring 2019
53	SJ 95904 05733	Unclear from satellite imagery – blocked from view by woodland.	383	143	325	Yes	TBC	To be completed Spring 2019
54	SJ 95436 05942	Badger bait marking surveys conducted in Jan-March 2019 have revealed that this pond is heavily stocked with fish and used for recreational fishing.	548	92	104	Yes	TBC	To be completed Spring 2019
55	SJ 95367 05978	Badger bait marking surveys conducted in Jan-March 2019 have revealed that this pond is heavily stocked with fish and used for recreational fishing.	1851	14	26	Within the draft DCO site boundary	TBC	To be completed Spring 2019
56	SJ 95287 06029	Badger bait marking surveys conducted in Jan-March 2019 have revealed that	2276	0	0	Within the draft DCO site	TBC	To be completed Spring 2019

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
		this pond is heavily stocked with fish and used for recreational fishing.				boundary		
57	SJ 95239 06087	Badger bait marking surveys conducted in Jan-March 2019 have revealed that this pond is heavily stocked with fish and used for recreational fishing.	1672	0	0	Within the draft DCO site boundary	TBC	To be completed Spring 2019
58	SJ 95158 06291	Fishing pond	286	113	157	Yes	0.18	To be completed Spring 2019
59	SJ 95139 06305	Fishing pond	583	95	180	Yes	0.43	To be completed Spring 2019
60	SJ 95115 06347	Fishing pond	4700	34	147	Yes	0.42	To be completed Spring 2019
61	SJ 95154 06379	Fishing pond	564	16	127	Yes	0.28	To be completed Spring 2019
62	SJ 95289 06498	Shallow ponds created scrapes from heavy machinery. No aquatic vegetation present. No longer present (as of end of April 2018) as the land was levelled by the landowner.	2	24	25	Yes	0.37	No
63	SJ 95281 06502	Shallow ponds created scrapes from heavy machinery. No aquatic vegetation present. No longer present (as of end of April 2018) as the land was levelled by the landowner.	3	16	17	Yes	0.37	No
64	SJ 95378 06546	Fishing lake	9771	5	11	Yes	0.18	To be completed Spring 2019
65	SJ 95627 06770	Poor water quality, no emergent aquatic vegetation present. No signs of waterfowl presence. Fish likely absent.	4	0	1	Within the draft DCO site boundary	0.53	To be completed Spring 2019
66	SJ 95746	Unclear from satellite imagery –	53	183	237	Yes	TBC	To be completed

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
	06017	blocked from view by woodland.						Spring 2019
67	SJ 95775 06050	Unclear from satellite imagery – blocked from view by woodland.	1091	121	179	Yes	TBC	To be completed Spring 2019
68	SJ 95633 06417	Shallow dry ditch	80	0	45	Within the draft DCO site boundary	Not Required	No
69	SJ 95017 06805	Satellite imagery shows a large waterbody surrounded by woodland.	6865	156	328	Yes	TBC	To be completed Spring 2019
70	SJ 95135 06631	Shallow drainage ditch which connects to a flowing watercourse. Poor water quality with rubbish present, sediment bottom, aquatic vegetation present, vegetation on both banks.	114	30	156	Yes	0.25	To be completed Spring 2019
71	SJ 95188 06739	Shallow drainage ditch which connects to a flowing watercourse. Poor water quality, sediment bottom, aquatic vegetation present, vegetation on both banks.	429	0.5	203	Within the draft DCO site boundary	0.47	To be completed Spring 2019
72	SJ 95339 06640	Drainage ditch flows into watercourse – poor water quality, sediment bottom, vegetation on both banks	179	0	25	Within the draft DCO site boundary	0.57	To be completed Spring 2019
73	SJ 95550 06571	Drainage ditch - Bad water quality, adjacent to line of trees. No aquatic vegetation present. Sediment bottom.	163	0	1	Within the draft DCO site boundary	0.46	To be completed Spring 2019
74	SJ 94757 06972	Satellite imagery shows a small waterbody adjacent to a hedgerow.	103	484	664	Yes	TBC	To be completed Spring 2019
75	SJ 94913 07022	Satellite imagery shows a waterbody within a large grassland field which appears to have been in use for grazing livestock.	702	343	583	Yes	TBC	To be completed Spring 2019

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
76	SJ 94869 07109	Unclear from Satellite imagery.	60	438	674	Yes	TBC	To be completed Spring 2019
77	SJ 94971 07087	Satellite imagery shows a waterbody within a large grassland field which appears to have been in use for grazing livestock. Trees are present on the banks of the waterbody.	1387	315	549	Yes	TBC	To be completed Spring 2019
78	SJ 96386 05675	Satellite imagery shows a large waterbody surrounded by woodland.	4928	400	546	Yes	TBC	To be completed Spring 2019
79	SJ 96229 06047	Unclear if present from Satellite imagery.	92	207	250	Yes	TBC	To be completed Spring 2019
80	SJ 96279 06090	Satellite imagery shows a medium sized waterbody within a large grassland field which appears to be in use for agricultural purposes.	1663	244	275	Yes	TBC	To be completed Spring 2019
81	SJ 96514 05895	Unclear if present from Satellite imagery.	128	467	563	Yes	TBC	To be completed Spring 2019
82	SJ 95336 07184	Poor water quality, no aquatic vegetation present, major impact of waterfowl, fish presence possible. Surrounded by agricultural fields.	484	168	206	Yes	0.45	To be completed Spring 2019
83	SJ 95363 07007	Shallow ditch adjacent to the Mill lane with poor water quality, rubbish present within the ditch. Water fowl present but presumed to use it for commuting purposes only.	202	2.5	183	Yes	0.47	To be completed Spring 2019
84	SJ 95806 07258	Poor water quality, no aquatic vegetation present, minor impact of waterfowl, fish presence possible.	121	17	138	Yes	0.59	To be completed Spring 2019
85	SJ 95722	Poor water quality, no aquatic	509	54	183	Yes	0.3	To be completed

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
	07406	vegetation present, major impact of waterfowl, fish presence possible.						Spring 2019
86	SJ 95735 07433	Poor water quality, no aquatic vegetation present, minor impact of waterfowl, fish presence possible.	256	92	222	Yes	0.45	To be completed Spring 2019
87	SJ 95987 07192	Satellite imagery shows a waterbody partially surrounded by woodland and grassland.	710	0	10	Within the draft DCO site boundary	TBC	To be completed Spring 2019
88	SJ 96407 06864	Satellite imagery reveals a pond adjacent to bare ground, and a hedgerow on the western extent.	396	426	444	Yes	TBC	To be completed Spring 2019
89	SJ 96575 06476	Satellite imagery shows the waterbody to be immediately surrounded by small patches, with bare ground (in use for parking) surrounding.	2240	464	456	Yes	TBC	To be completed Spring 2019
90	SJ 96531 06458	Satellite imagery shows the waterbody to be immediately surrounded by small patches, with bare ground (in use for parking) surrounding.	288	407	399	Yes	TBC	To be completed Spring 2019
91	SJ 96514 06471	Satellite imagery shows the waterbody to be immediately surrounded by small patches, with bare ground (in use for parking) surrounding.	318	418	410	Yes	TBC	To be completed Spring 2019
92	SJ 95875 07517	Satellite imagery shows a small waterbody immediately surrounded by rough grassland.	79	89	330	Yes	TBC	To be completed Spring 2019
93	SJ 95813 07582	Satellite imagery shows a large waterbody bordered by woodland to the south and grassland to the north which was found to be horse grazed.	1406	129	366	Yes	TBC	To be completed Spring 2019

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
94	SJ 95786 07579	Satellite imagery shows a large waterbody bordered by woodland to the south and grassland to the north which was found to be horse grazed.	2322	123	346	Yes	TBC	To be completed Spring 2019
95	SJ 95708 07602	Unclear from satellite imagery – surrounded by woodland.	694	139	282	Yes	TBC	To be completed Spring 2019
96	SJ 95727 07656	Unclear from satellite imagery – surrounded by woodland.	539	200	355	Yes	0.46	To be completed Spring 2019
97	SJ 95925 07653	Poor water quality, no aquatic vegetation present, minor impact of waterfowl, fish likely absent.	15	162	465	Yes	TBC	To be completed Spring 2019
98	SJ 95961 07808	Poor water quality, no aquatic vegetation present, minor impact of waterfowl, fish presence likely absent.	267	202	610	Yes	TBC	To be completed Spring 2019
99	SJ 95524 07916	Surveys from the adjacent land boundary revealed a small pond surrounded by grazed grassland.	25	299	535	No	0.25	To be completed Spring 2019
100	SJ 95124 08146	Satellite imagery shows the waterbody to be surrounded by rough grassland and scrub.	829	337	818	No	TBC	To be completed Spring 2019
101	SJ 92711 04187	Unclear if present from satellite imagery	530	253	588	Yes	TBC	To be completed Spring 2019
102	SJ 92186 04236	Waterbody present within a golf course, immediately surrounded by lines of trees, with grassland (presumed amenity) within the wider habitat	238	219	1056	Yes	TBC	To be completed Spring 2019
103	SJ 91072 04250	Satellite imagery reveals large waterbodies surrounded by scrubland.	4963	380	2132	Yes	TBC	To be completed Spring 2019
104	SJ 90975 04382	Satellite imagery reveals large waterbodies surrounded by grassland.	1353	449	2228	Yes	TBC	To be completed Spring 2019

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
105	SJ 91133 04875	Appears absent from satellite imagery.	454	449	2113	Yes	TBC	To be completed Spring 2019
106	SJ 92368 04978	Appear to be man-made waterbodies surrounded by woodland.	2269	393	938	Yes	TBC	To be completed Spring 2019
107	SJ 92397 05001	Appear to be man-made waterbodies surrounded by woodland.	1606	422	901	Yes	TBC	To be completed Spring 2019
108	SJ 94702 06532	Unclear if present from satellite imagery	806	441	528	Yes	TBC	To be completed Spring 2019
109	SJ 94636 06450	Unclear if present from satellite imagery	315	395	510	Yes	TBC	To be completed Spring 2019
110	SJ 95250 07668	Unclear if present from satellite imagery	<20	6	348	Yes	TBC	To be completed Spring 2019
111	SJ 94712 07857	Unclear if present from satellite imagery	352	474	900	Yes	TBC	To be completed Spring 2019
112	SJ 96620 07332	Unclear if present from satellite imagery	188	337	715	Yes	TBC	To be completed Spring 2019
113	SJ 96620 07332	Unclear if present from satellite imagery	192	338	669	Yes	TBC	To be completed Spring 2019
114	SJ 96538 07126	Satellite imagery shows a medium sized waterbody situated along a hedgerow, surrounded by agricultural land. Trees are present upon the banks.	992	454	536	Yes	TBC	To be completed Spring 2019
115	SJ 95459 04575	Unclear from satellite imagery	1000	242	408	Yes	TBC	To be completed Spring 2019
116	SJ 95554 04628	Appears dry from satellite imagery	537	343	517	Yes	TBC	To be completed Spring 2019
117	SJ 95636 04694	Unclear from satellite imagery	461	433	608	Yes	TBC	To be completed Spring 2019
118	SJ 95636 04694	Unclear from satellite imagery	45	445	609	Yes	TBC	To be completed Spring 2019

Waterbody Ref. (Figure 1)	Location	Description	Approx. Size (m^2)	Distance from (m)		Connected to the proposed Scheme	HSI Score	Further Surveys
				draft DCO site boundary	proposed Scheme			
119	SJ 95696 04566	Unclear from satellite imagery	605	417	634	Yes	TBC	To be completed Spring 2019
120	SJ 95637 04447	From satellite imagery appears to be a small waterbody isolated within a grassland field.	248	322	553	Yes	TBC	To be completed Spring 2019
121	SJ 95817 04462	Unclear from satellite imagery	588	447	678	Yes	TBC	To be completed Spring 2019
122	SJ 95794 04558	Unclear from satellite imagery	811	471	687	Yes	TBC	To be completed Spring 2019
123	SJ 95794 04558	Unclear from satellite imagery	280	495	713	Yes	TBC	To be completed Spring 2019
124	SJ 95817 04462	Unclear from satellite imagery	89	48	711	Yes	TBC	To be completed Spring 2019
125	SJ 95082 03895	Appears possibly absent/dry from satellite imagery – scrub patch isolated within arable field.	170	389	470	Yes	TBC	To be completed Spring 2019
126	SJ 95028 05167	Small waterbody adjacent to a hedgerow. Aquatic vegetation present, poor water quality.	60	174	314	Yes	0.54	To be completed Spring 2019
127	SJ 94746 05300	Small man-made pond which appeared to be once used for rearing small fish/fry. No aquatic vegetation present, poor water quality.	20	136	43	Within the draft DCO site boundary	0.52	To be completed Spring 2019

3.3. Presence, Likely Absence Surveys

3.3.1 Waterbodies 25 and 26 were subject to presence / likely absence surveys in 2018.

3.3.2 The surveys were conducted by the following suitably qualified Ecologists:

- Keely Bigland BSc (Hons) (Great Crested Newt Class 1 Licence holder);
- Stephanie Nieto BSc (Hons), MSc;
- Henry James BSc (Hons); and
- Mark Nelson MSc GradCIEEM (Great Crested Newt Class 1 licence holder).

3.3.3 Each survey visit was led by a great crested newt licence holder. Environmental conditions experienced during the surveys are shown in Table 3.

Table 3: Environmental conditions recorded during the surveys.

Date	Trapping session	Air temperature (°C)	Precipitation (0-3)	Wind disturbance (Y/N)	Bright moonlight (Y/N)
24 April	Evening	10	2	N	N
	Morning	7	-	-	-
26 April	Evening	12	1	N	Y
	Morning	6	-	-	-
16 May	Evening	13	0	N	N
	Morning	9	-	-	-
22 May	Evening	20	0	N	N
	Morning	15	-	-	-

3.3.4 Precipitation was scored between 0 and 3, where 0 represented none, 1 = yesterday, 2 = immediately prior, 3 = during the survey.

3.3.5 These surveys revealed no presence of great crested newts. They did identify the presence of smooth newt (*Lissotriton vulgaris*) and common frog (*Rana temporaria*).

4. CONCLUSION AND RECOMMENDATIONS

4.1.1 The data search indicates great crested newts are present within the wider environment, however, these records were all recorded beyond the major roads present. The surveys undertaken in 2015 and 2018 have not returned any positive results for great crested newt presence, although not all waterbodies have been accessed or subject to survey work. Further assessment of these water bodies will be undertaken in the spring of 2019 to determine the presence or likely absence of great crested newts in these water bodies and therefore the likelihood of great crested newts being affected by the proposed Scheme.

4.1.2 Following a reasonable precautionary approach, it is assumed that waterbodies that haven't been surveyed support low to medium sized populations of great crested newts.

4.1.3 Further survey work will include initial HSI assessments of each water body, followed by presence/ likely absence surveys and population assessments if great crested newts are found to be present.

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Annex A Wildlife Legislation and Policy

The Wildlife & Countryside Act 1981 (as amended)

Provides for designation and protection of Sites of Special Scientific Interest (SSSI), which are areas that represent the most valuable habitats in the UK for nature conservation.

The Act creates the following offences:

- To intentionally kill, injure, or take any wild bird or their eggs or nests (with exception to species listed in Schedule 2). Special penalties are available for offences related to birds listed on Schedule 1, for which there are additional offences of disturbing these birds at their nests, or their dependent young.
- To intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5, and interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.
- Certain methods of killing, injuring, or taking wild animals listed in Schedule 6.
- To pick, uproot, trade in, or possess (for the purposes of trade) any wild plant listed in Schedule 8, and prohibits the unauthorised intentional uprooting of such plants.
- The release of certain non-native animals and planting of plants listed in Schedule 9.

It also provides a mechanism making any of the above offences legal through the granting of licences by the appropriate authorities.

Conservation of Habitats and Species Regulations 2017

The principal means by which the European Habitats Directive is transposed in England and Wales.

Provide for the designation and protection of a network of 'European Sites' (also termed Natura 2000), including Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

Regulation 41 creates the following offences relating to European Protected Species (EPS):

- deliberately capture, injure or kill any wild animal of a European Protected Species;
- deliberately disturb animals of any such species in such a way as to be likely to:
- impair their ability to survive, breed, rear or nurture their young, hibernate or migrate, or
- significantly affect the local distribution or abundance of the species to which they belong;
- deliberately take or destroy the eggs of such an animal; or
- damage or destroy a breeding site or resting place of such an animal.

The Regulations also make it an offence (subject to exceptions) to deliberately pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 5.

However, the actions listed above can be made lawful through the granting of licences (European Protected Species Licence) by the appropriate authorities (Natural England in England). Licences may be granted for a number of purposes, but only after the appropriate authority has determined that the following regulations are satisfied:

- the works under the licence are being carried out for the purposes of ‘preserving public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment’.
- there is ‘no satisfactory alternative’
- the action 'will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range'.

- To apply for a licence, the following information is required:
- The species concerned.
- The relative size of the population at the site (note this may require a survey to be carried out at a particular time of the year).
- The impact(s) (if any) that the development is likely to have upon the populations.
- What measures will be conducted to mitigate for the impact(s).

Natural Environment & Rural Communities (NERC) Act 2006

Section 40 of NERC carries an extension of the earlier CRoW Act biodiversity duty to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. Section 41 requires the Secretary of State, as respects England, to publish a list of species and habitats which are of 'principal importance for the purpose of conserving biodiversity'. These lists generally reflect the species and habitats previously listed under the UK Biodiversity Action Plan.

National Planning Policy Framework

This framework replaces Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS 9) (ODPM 2005) and sets out the view of central Government on how planners should balance nature conservation with development. One of the key principles of the NPPF is:

The NPPF states that development plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas, including biodiversity. It also states that the aim of planning decisions should be to prevent harm to biodiversity conservation interests and to 'promote the preservation, restoration and re-creation of priority habitats, ecological networks and the recovery of priority species'.

Where determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principals; 'if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused'; and, 'planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss'.

This means that full ecological surveys should be carried out and suitable mitigation measures proposed prior to any planning application being submitted.

Biodiversity 2020: A strategy for England's wildlife and ecosystem services

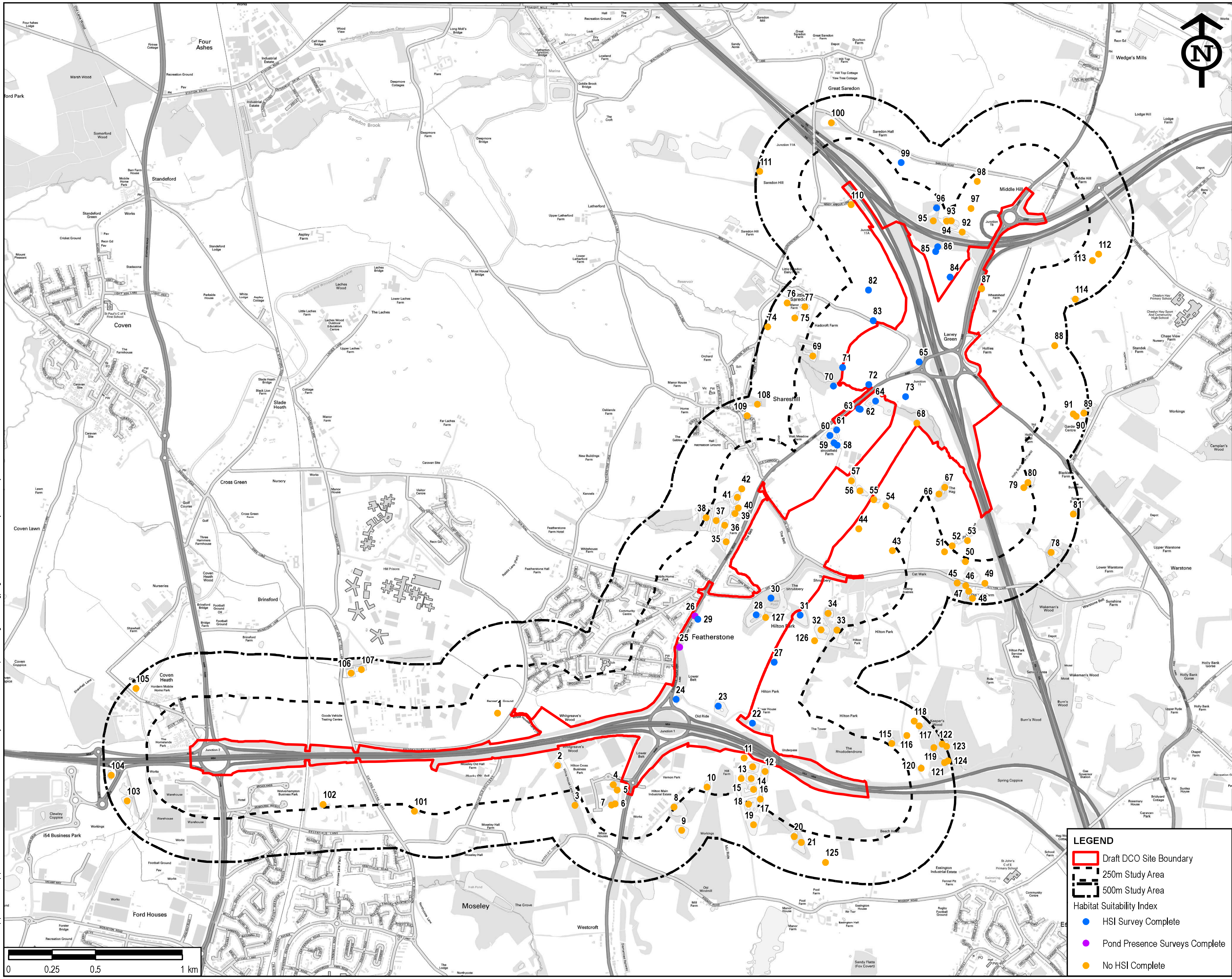
This biodiversity strategy for England builds on the Natural Environment White Paper and the earlier UK Biodiversity Action Plan. It provides a comprehensive picture of how Government is implementing our international and EU commitments and sets out the strategic direction for biodiversity policy up to 2020. Its mission is to:

"halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people."

In relation to planning and development its priority is to:

"take a strategic approach to planning for nature within and across local areas. This approach will guide development to the best locations, encourage greener design and enable development to enhance natural networks. We will retain the protection and improvement of the natural environment as core objectives of the planning system."

Annex B Figure 1 Habitat Suitability Index Survey



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5. THE BOUNDARY SHOWN IS NOT A RED LINE BOUNDARY IN THE CONTEXT OF AREA OF INTEREST FOR DEVELOPMENT CONSENT ORDER. IT IS THE ANTICIPATED LAND TAKE REQUIREMENT FOR THE SCHEME OUTSIDE OF THE EXISTING HIGHWAY BOUNDARY BASED ON A 10M OFFSET FROM THE TOE OF EARTHWORKS. IT DOES NOT CURRENTLY INCLUDE ANY ADDITIONAL LAND THAT MAY BE REQUIRED FOR MITIGATION OR TEMPORARY WORKS.

Revision Details	By	Check	Date	Suffix
First Issue	EC	AR	31/10/18	P01
			07/05/2019	

Purpose of issue

FOR INFORMATION

Client
Highways England
The Cube
199 Wharfside Street
Birmingham
B1 1RN

Working on behalf of highways england

Project Title

M54-M6 LINK ROAD

Drawing Title

FIGURE 1
HABITAT SUITABILITY INDEX SURVEYS

Designed	Drawn	Checked	Approved	Date
DM	EC	AR	TP	07/05/2019

Internal Project No. 60536736 | Suitability S2

Scale @ A3 1:20,000 | Zone M54 to M6/M6 (Toll) Link Road

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Royal Court
Basil Close, Chesterfield
Derbyshire, S41 7SL
Tel: 01246 209221
Fax: 01246 209229
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Location | Type | Role | Number

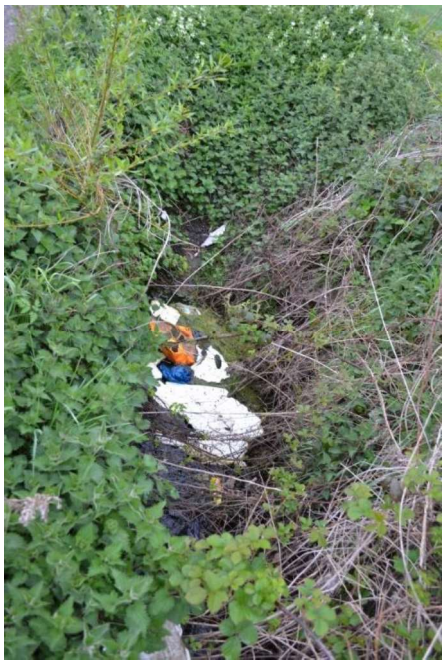
Rev P01

Plot Date: 07 May 2019 14:56:50
File Name: \\Ukkds2pfpsw001v\ie\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Pier Figures\Ecology\Figure X - Habitat Suitability Index Surveys.mxd

Annex C Site Photographs

	Image 1: Pond 27: example of pond with excellent HSI score in 2018.
	Image 2: Pond 25: example of pond with excellent HSI score in 2018.
	Image 3: Pond 23: example of a lake used for fishing in 2018.

	Image 4: Pond 31: example of fishing pegs present at fishing lakes.
	Image 5: Pond 64: example of a lake used for fishing in 2018.
	Image 6: Ponds 61 & 60: example of two ponds used for fishing in 2018.

	Image 7: Waterbodies 70 and 71: example of a drainage ditch considered unsuitable for presence of GCN.

Appendix 8.3: Otter and Water Vole Assessment Report

Contents

1. INTRODUCTION

1.1. Background

1.1.1. The A460 currently provides a link between the M6 Junction 11, M54 Junction 1, and M6 Toll Junction T8 via Featherstone, Staffordshire. The A460 is a single carriageway road which experiences significant congestion from vehicles travelling between the M6 north, M54 and M6 Toll. To alleviate congestion Highways England are proposing a new two lane dual carriageway link road, approximately 2.5km (1.6 miles) in length between the M54 Junction 1 and the M6 Junction 11 (herein referred to as the 'proposed Scheme'). This would provide free flow links to and from the M54 and connect into an improved M6 Junction 11.

1.1.2. A suit of ecological surveys have been undertaken to support the Environmental Statement including otter (*Lutra lutra)* and water vole (*Arvicola amphibious)* surveys.

1.1.3. Previous otter and water vole surveys were completed in 2015, as part of the options selection process, which included several waterbodies either being directly crossed or passing adjacent to the scheme options as presented in the EAR (Highways England, 2015). These surveys did not record any signs of otter or water vole. Several waterbodies could not be accessed or assessed fully, so it was assumed following a reasonable precautionary approach that those waterbodies that could not be accessed or assessed fully supported otters and water voles until further surveys could be completed.

1.2. Study area and location

1.2.1. The proposed Scheme would be located in the county of Staffordshire in a landscape which consists predominantly of arable farmland interspersed with areas of grassland, woodland, small watercourses and several waterbodies. There are major roads which intersect the local landscape including the M6, M6 Toll, M54, and A460. Residential areas within the surrounding landscape include the small villages of Featherstone and Shareshill which are directly adjacent to the A460, the civil parish of Great Saredon adjacent to the M6 Toll, as well as scattered small holdings and various farmhouses.

1.2.2. The study area for the otter and water vole assessment includes all land within and up to 100 m of the draft DCO site boundary as shown on Figure 1, Annex C.

1.3. Survey Aims and Objectives

1.3.1. The aim and objectives of the otter and water vole survey assessment are to:

- determine presence or likely absence of otter and water vole within the study area based on desk study data and field survey visits;
- provide baseline information to inform design development and environmental assessment; and
- identify the risk of encountering otter and water vole whilst undertaking construction works for the proposed Scheme, should all consents and permissions be granted.

1.4. Legislation

1.4.1. Otter and water vole are legally protected under Schedule 5 of the *Wildlife and Countryside Act* 1981 (as amended), which makes it an offence to:

I. intentionally kill, disturb or injure a water vole;

II. intentionally or recklessly damage or destroy a breeding or resting place of a water vole;

III. intentionally or recklessly obstruct access to water vole or otter resting or sheltering places; or

IV. possess, sell or transport live or dead water vole or otter, or any part of a water vole or otter.

1.4.2. In addition, otter and water voles area a Priority Species under the UK Post-2010 Biodiversity Framework(JNCC, Defra 2012), and has been adopted as a Species of Principal Importance in England under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

1.4.3. Otter receives further protection as it is a European Protected Species under the Conservation of Habitats and Species Regulations 2017. This makes it an offence to:

I. deliberately capture, injure or kill any otter;

II. deliberately disturb an otter, especially if the disturbance will likely impair their ability to survive, breed, reproduce, rear or nurture their young;

III. deliberately disturb an otter which will impair their ability to hibernate or migrate;

IV. significantly affect the local distribution or abundance of otter; or

V. damage or destroy a breeding site or resting place of an otter.

2. METHODOLOGY

2.1. Desktop study

2.1.1. A desktop study was completed in 2015, which included obtaining records of otter and water vole within 2 km of the PCF Stage 2 (options selection) Scheme options which included an early iteration of the proposed Scheme design. Data was obtained from Staffordshire Ecological Record Centre (SER) and the Ecological records centre for Birmingham and the Black Country (EcoRecord). An updated data search was obtained from SER in 2017.

2.1.2. In April 2018, a data search utilising freely available information from Magic Map and NBN Atlas was undertaken for otter and water vole, In addition to this SER and EcoRecord were approached in 2018 to identify records for the species within 5 km of the centre of the proposed Scheme extent recognising the large territorial ranges utilised by otters and potential connectivity with population in the wider environment. OS maps and aerial imagery were accessed to identify the presence of standing and running water within the study area. This search included the proposed Scheme and a 2 km buffer.

2.1.3. A review of the Otter and Water Vole Report produced in 2015 (Highways England, 2015) was also undertaken.

2.2. Field Survey

2.2.1. An extended Phase 1 habitat survey (Highways England, 2018) was undertaken in 2018 to identify areas of suitable habitat with potential to support otter and water vole. This survey included all accessible land plots within 250 m of the draft DCO site boundary.

2.2.2. In conjunction with and following the extended Phase 1 habitat survey, a suite of targeted otter and water vole surveys were undertaken on 18, 23 and 25 April 2018 and 15 and 16 May 2018. The targeted surveys focused on all watercourses highlighted as being present within or intersected the study area and which were identified as having potential to support otter and water vole as detailed in Table 1. The targeted surveys involved surveying both sides of a watercourse's banks, where access was permitted. Additional targeted surveys were undertaken on 26 September 2018 adopting the same methodology, where access was permitted. Figure 1 illustrates the watercourses which were surveyed.

2.2.3. The survey was conducted by suitably qualified Ecologists; Stuart Graham MSc, CEcol, CEnv, MCIEEM and Dean Cordelle BSc (Hons), Grad CIEEM and Chris Hall BSc (Hons), MSc FGS. Environmental conditions experienced during the surveys were as follows:

April

- 18 – 16°C, cloud with sunny intervals, no precipitation and a light breeze;
- 23 – 11°C, cloudy, no precipitation, light breeze; and
- 25 – 9°C, cloudy, no precipitation, light breeze.

May

- 15 - 20°C, light cloud, no precipitation, light breeze; and
- 16 - 14°C, light cloud, no precipitation, light breeze.

September

- 26 - 21°C, light cloud, no precipitation, light breeze.

2.2.4. All surveys were scheduled and undertaken in weather conditions considered suitable for conducting otter and water vole surveys i.e. dry and mild. There were no periods of heavy rainfall leading up to the survey, which could have washed field signs away.

2.3. Water Vole Survey Methodology

2.3.1. Water vole surveys were conducted adopting the guidelines in The Water Vole Mitigation Handbook (Dean et al., 2016) which recommends two surveys be undertaken at least two months apart over the course of the breeding season. Two surveys were conducted at the watercourses, each of which consisted of surveying 250 m up and downstream of the proposed Scheme and 2 m up the bank (where applicable). The surveys were conducted from both banks and within the channel, where accessible. The surveys included searching for water vole field signs such as sightings, footprints, faeces, feeding remains and stations, latrines and burrows. When these were encountered, a GPS was used to obtain an accurate location of the field sign.

2.4. Otter Survey Methodology

2.4.1. Whilst conducting the water vole surveys, surveys were extended to include the presence / likely absence of otter. Otter surveys were undertaken in accordance with the Competences for species surveys: Otter (CIEEM, 2013), and the Common Standards Monitoring Guidance for Mammals (JNCC, 2004). This was undertaken looking for habitats or suitability and field signs which include spraints which are generally found on prominent features such a rocks, logs, bridges and footprints. Other field signs looked for include feeding remains, holts and couches. When these were encountered, a GPS was used to obtain an accurate location of the field sign.

2.4.2. DMRB states that watercourses would be surveyed for a 2 km linear distance either side of the proposed Scheme, a total of four times in a calendar year. Each watercourse was surveyed for 250 m up and downstream of the proposed Scheme. Two visits were undertaken to each suitable watercourse; owing to the fact that surveys were undertaken in 2015 for otter it was not considered necessary to undertake four surveys in a calendar year.

2.4.3. The survey methodology did not include spot checks along the watercourse within 5 km of the proposed scheme. This was not considered necessary given that a commitment has been made that Highways England will ensure that the proposed Scheme maintains safe passage for otter at all watercourses potentially suitable (i.e. including those which are yet to be repopulated by otter).

2.5. Limitations

2.5.1. The suit of otter and water vole surveys undertaken throughout the study area were undertaken during the optimal period (April, May to September). However, some sections of watercourses could not be accessed due to overly dense vegetation present on the banks of the watercourses and covering the watercourses during the April / May 2018 surveys. A more comprehensive level of access was achieved during the surveys undertaken in September 2018 (where required) due to a reduction in vegetation height.

2.5.2. Water features WC8 and WC13 could not be accessed at the time of survey due to landowner access being refused. Surveys for these watercourses are to be undertaken in 2019. Further habitats and features of interest, which were not surveyed due to an absence of land access, were observed from within accessible landownership boundaries or from areas with public access, using binoculars where necessary. Therefore, watercourses present on land where access permission had not been granted was not subject to a survey.

2.5.3. The lack of evidence of a protected species does not preclude their possible presence at a later date. Any survey represents only a ‘snapshot’ of possible otter and water vole activity. Importantly, lack of activity / evidence of an otter and / or water vole resting feature does not guarantee their absence.

3. RESULTS

3.1. Desktop Study

3.1.1. Records from SER and EcoRecord returned a total of 22 records of otter within 5 km of the centre point of the proposed Scheme extent. The majority of the records relate to observations to the west of the proposed Scheme, with the closest being 240 m west of the draft DCO site boundary. No signs of otter were recorded during the surveys undertaken in 2015.

3.1.2. Records from SER and EcoRecord returned several records of water vole within 2 km of the proposed Scheme, with two records within 250 m of the draft DCO site boundary. In addition to this, two records of water vole were recorded in 2000 from a tributary of the River Penk. No water vole signs were recorded during the surveys undertaken in 2015.

3.2. Field Study

3.2.1. The otter and water vole survey results are summarised in Table 1. Photographs can be found in Annex B.

3.2.2. Table 1 shows the watercourses surveyed and their characteristics, including water quality, flow rate, and features present on the banks.

3.2.3. Water quality has been initially assessed as bad, poor, moderate or good based on visual observations made at the time of the survey. The assessment is based on the presence of obvious signs of pollution, suspended sediment, and poor vegetative structure within the watercourse.

3.2.4. No field signs indicative of the presence of either otter or water vole were observed during the watercourse surveys, where land access was available, undertaken in April, May and September 2018, refer to Table 1.

3.2.5. For water vole, there was an absence of sightings, footprints, faeces, feeding remains and stations, latrines and burrows within all watercourses. Similarly, for otter, there was an absence of sightings, spraints, food remains, holts and couches.

3.2.6. Evidence of brown rat (*Rattus norvegicus*) were noted during the surveys.

Table 1: Watercourses surveyed for otter and water vole

Figure Label	Assessment date	Width (m)	Depth (m)	Description	Scoped out of further survey	Survey 1			Survey 2		
						Date	Evidence of activity	Other notable activity	Date	Evidence of activity	Other notable activity
RW1	18/04/2018	1	1	Slow flowing, stony/silty sediment bottom, V shape embankments, dense ruderal vegetation present on both banks, adjacent to a line of trees. Appeared to have poor water quality. Water depth estimated to be 2>cm <5cm. Low suitability for resting and / or foraging otters and water vole with typical features absent. Watercourse holds very limited commuting potential due to a lack of connectivity with further sections of the watercourse along its reach as a result of being culverted to east and west. See Images 1 and 2, Annex B.	No	18 April 2018	None	None	26 Sept 2018	None	None
RW2	18/04/2018	1.5	1	Stagnant water, sediment bottom, V shape embankments along sections of its length, completely over shaded by trees, scattered scrub vegetation present on both banks. Appeared to have poor water quality, with quite allot of rubbish present. Water depth estimated to be 0>cm <30cm. Dried soon after survey. Low suitability for resting and / or foraging otters due to high level of human disturbance. Watercourse holds very limited commuting potential as it terminates at its northern and southern ends. See Image 3, Annex B	After first survey due to drying	18 April 2018	None	Water fowl and human prints	N/A	N/A	N/A

Figure Label	Assessment date	Width (m)	Depth (m)	Description	Scoped out of further survey	Survey 1			Survey 2		
						Date	Evidence of activity	Other notable activity	Date	Evidence of activity	Other notable activity
RW3	18/04/2018	1.5	<0.5	Slow flowing, stony/silty sediment bottom, Shallow V shaped embankment in places, opens up in others, ruderal vegetation present on both banks for most of its length. Appeared to have poor water quality with allot of rubbish present. Water depth estimated to be 2>cm <10cm. Low suitability for resting and / or foraging otters and water vole due to high level of human disturbance from car boot and neighbouring houses / dog walkers. Watercourse holds very limited commuting potential due to a lack of connectivity with further sections of the watercourse along its reach as a result of being culverted to east and west. See Images 4, 5 and 6, Annex B.	No	18 April 2018	None	None	26 Sept 2018	None	None
RW4	23/04/2018	1	1	Stagnant water / mud, sediment / leaf covered bottom, square cut embankments along the majority of its length, completely over shaded by trees, scattered scrub vegetation present predominantly on one bank. Appeared to have poor water quality / mud. Water depth estimated to be 0>cm <5cm. Dried soon after survey. Moderate suitability for resting otters provided within woodland area. Watercourse holds very limited commuting potential as it terminates at its northern and southern ends. See Image 4, Annex B.	After first survey due to drying	23 April 2018	None	None	N/A	N/A	N/A

Figure Label	Assessment date	Width (m)	Depth (m)	Description	Scoped out of further survey	Survey 1			Survey 2		
						Date	Evidence of activity	Other notable activity	Date	Evidence of activity	Other notable activity
RW5	18/04/2018	1.5	1.5	Slow flowing, sediment bottom, steep embankment in places, ruderal vegetation present on both banks for most of its length, adjacent to line of trees. Appeared to have good water quality. Water depth estimated to be <20cm. Low suitability for resting and / or foraging otters and water vole due to high level of human disturbance from guard dogs and human disturbance from cars / human traffic. Watercourse holds very limited commuting potential due to a lack of connectivity with further sections of the watercourse along its reach as a result of being culverted to east. See Image 8, Annex B	Yes	18 April 2018	None	None	N/A	N/A	N/A
RW6	23/04/2018	1	1	Very slow flowing, sediment bottom, shallow embankments, short section which ran between fishing lakes. Appeared to have bad water quality. Water depth estimated to be 0> cm <5cm. Low suitability for resting and / or foraging otters and water vole due to high level of human disturbance from guard dogs and human disturbance from cars / human traffic. Watercourse holds very limited commuting potential due to disturbance from guard dogs.	Yes	23 April 2018	None	None	N/A	N/A	N/A
RW7	23/04/2018	1.5	<0.5	Very slow flowing, sediment bottom, shallow embankments, short section which ran between fishing lakes. Appeared to have bad water quality. Water depth estimated to be 0> cm <5cm.	Yes	23 April 2018	None	None	N/A	N/A	N/A

Figure Label	Assessment date	Width (m)	Depth (m)	Description	Scoped out of further survey	Survey 1			Survey 2		
						Date	Evidence of activity	Other notable activity	Date	Evidence of activity	Other notable activity
				Low suitability for resting and / or foraging otters and water vole due to high level of human disturbance from guard dogs and human disturbance from cars / human traffic. Watercourse holds very limited commuting potential due to disturbance from guard dogs.							
RW8	18/04/2018	1.5	1	Surveyed from adjacent land – full survey not possible due to land access restrictions. Slow flowing, sediment bottom, ruderal vegetation present on both banks, adjacent to a line of trees, culverts under A460 to east and links with RW 7 on other side of A460. Appeared to have good water quality.	No - No Land access	N/A	N/A	N/A	N/A	N/A	N/A
RW9	23/04/2018	1	1	Stagnant water / mud, sediment bottom with leaves, shallow to deep sided embankments along sections of its length, completely over shaded by trees, scattered scrub vegetation present predominantly on one bank. Appeared to have poor water quality, with quite allot of rubbish present. Water depth estimated to be dry>cm <50cm. Dried soon after survey. Low suitability for resting and / or foraging otters due to high level of human and some equine disturbance. Watercourse holds very limited commuting potential as it terminates at its northern end. See Image 9, Annex B	After first survey due to drying	23 April 2018	None	Water fowl and human prints	N/A	N/A	N/A
RW10	23/04/2018	1	<0.5	Stagnant water / mud, sediment bottom with leaves, shallow to deep sided embankments along sections of its length, completely over shaded by trees, scattered scrub vegetation	After first survey due to	23 April 2018	None	Water fowl and human	N/A	N/A	N/A

Figure Label	Assessment date	Width (m)	Depth (m)	Description	Scoped out of further survey	Survey 1			Survey 2		
						Date	Evidence of activity	Other notable activity	Date	Evidence of activity	Other notable activity
				present predominantly on one bank. Appeared to have poor water quality, with quite allot of rubbish present. Water depth estimated to be dry>cm <50cm. Dried soon after survey. Low suitability for resting and / or foraging otters due to high level of human and some equine disturbance. Watercourse holds very limited commuting potential as it terminates at its northern end. See Image 10, Annex B	drying			prints			
RW11	25/04/2018	2	>1	Slow flowing, vegetated with Himalayan Balsam and common nettle, tree line / standard trees along its length. Appeared to have good water quality. Water depth estimated to be 5> cm <20cm. Moderate suitability for resting otters provided within woodland area although appears to completely flood during periods of high rainfall. Limited suitability for foraging and commuting otters due to absence of fish and it being culverted under the M6 to the east and A460 to the west. See Images 11 – 14, Annex B.	No	25 April 2018	None	Rat, canine and equine prints.	26 Sept 2018	None	Rat and equine prints.
RW12	25/04/2018	1	<0.5	Stagnant water / mud, sediment bottom, V shape embankments along sections of its length, completely over shaded by trees, scattered scrub vegetation present on both banks. Appeared to have poor water quality, with quite allot of rubbish present. Water depth estimated to be 0>cm <30cm. Dried soon after	After first survey due to drying	25 April 2018	None	None	N/A	N/A	N/A

Figure Label	Assessment date	Width (m)	Depth (m)	Description	Scoped out of further survey	Survey 1			Survey 2		
						Date	Evidence of activity	Other notable activity	Date	Evidence of activity	Other notable activity
				survey. Low suitability for resting and / or foraging otters due to high level of human disturbance. Watercourse holds very limited commuting potential it terminating at its northern and southern ends. See Image 15, Annex B.							
RW13	15/05/2018	1.5	0.5	Surveyed from adjacent land – full survey not possible due to land access restrictions. Slow flowing, sediment and stone bottom, ruderal vegetation present on both banks, adjacent to a line of trees, culverts under M6 to east and M6 Toll to north. Appeared to have good water quality.	No - No Land access	N/A	N/A	N/A	N/A	N/A	N/A
RW14	16/05/2018	1.5	0.5	Only partial access along northern reach, north of fishing lake. Slow flowing, sediment and stone bottom, vegetated with tall ruderal and common nettle, tree line / standard trees along its length. Appeared to have good water quality. Water depth estimated to be 5> cm <20cm. Low suitability for resting otters provided within section surveyed. Limited suitability for foraging and commuting within section surveyed due to absence of fish and it being culverted under Saredon Road to the north and known to be culverted under the M6 Toll to the south.	Partial – only partial access	16 May 2018	None	Equine and canine prints	26 Sept 2018	None	Equine prints

4. CONCLUSIONS AND RECOMMENDATIONS

4.1.1. The data search indicates that otters and water voles are present in the wider environment, with records provided relating to watercourses which run within or adjacent to the draft DCO site boundary.

4.1.2. No field signs indicative of the presence of either otter or water vole were observed during the 2015 and / or 2018 surveys of the watercourses surveyed. All watercourses surveyed, where land access was permitted, were found to be predominantly isolated from watercourses within the wider environment. The majority of the watercourses were noted as drying and / or being culverted, either within or outside of the study area with the majority appearing to receive a level of pollution. Although drying and pollution of a watercourse will not directly affect an otter's use of a watercourse, it would limit a watercourse use to commuting by adults and territory expansion by juveniles. These are more important qualities for water voles as their ability to commute is significantly restricted.

4.1.3. Further surveys will be undertaken in spring 2019 to assess watercourses that could not be accessed in 2018 and waterbodies and suitable areas of terrestrial habitat to establish the presence / likely absence of otters and water voles, and therefore the likelihood of otter and water vole being affected by the proposed Scheme.

4.1.4. Following a reasonable precautionary approach, it is assumed that watercourses and water bodies that haven't been surveyed support otter and / or water vole.

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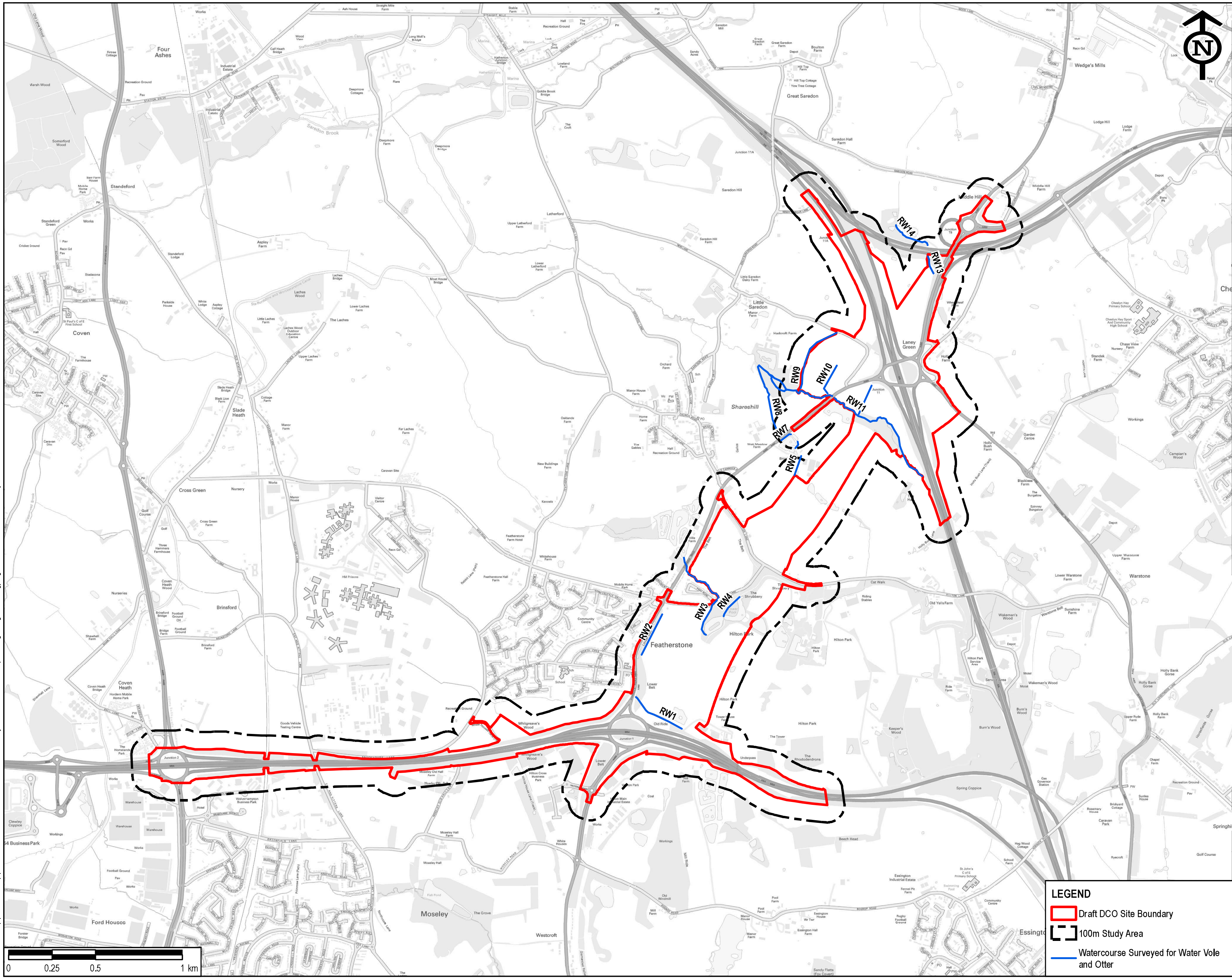
Annex A Figures

Figure 1: Otter and Water Vole Survey

Figure 2: Otter and Water Vole Records



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The Cube
199 Wharfside Street
Birmingham
B1 1RN

Working on behalf of highways england

Project Title

M54-M6 LINK ROAD

Drawing Title

FIGURE 1
WATER VOLE AND OTTER SURVEY

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	13/05/2019

Internal Project No. 60536736	Suitability S2
Scale @ A3 1:20,000	Zone M54 to M6/M6 (Toll) Link Road

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Royal Court
Basil Close, Chesterfield
Derbyshire, S41 7SL
Tel: 01246 209221
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Location | Type | Role | Number

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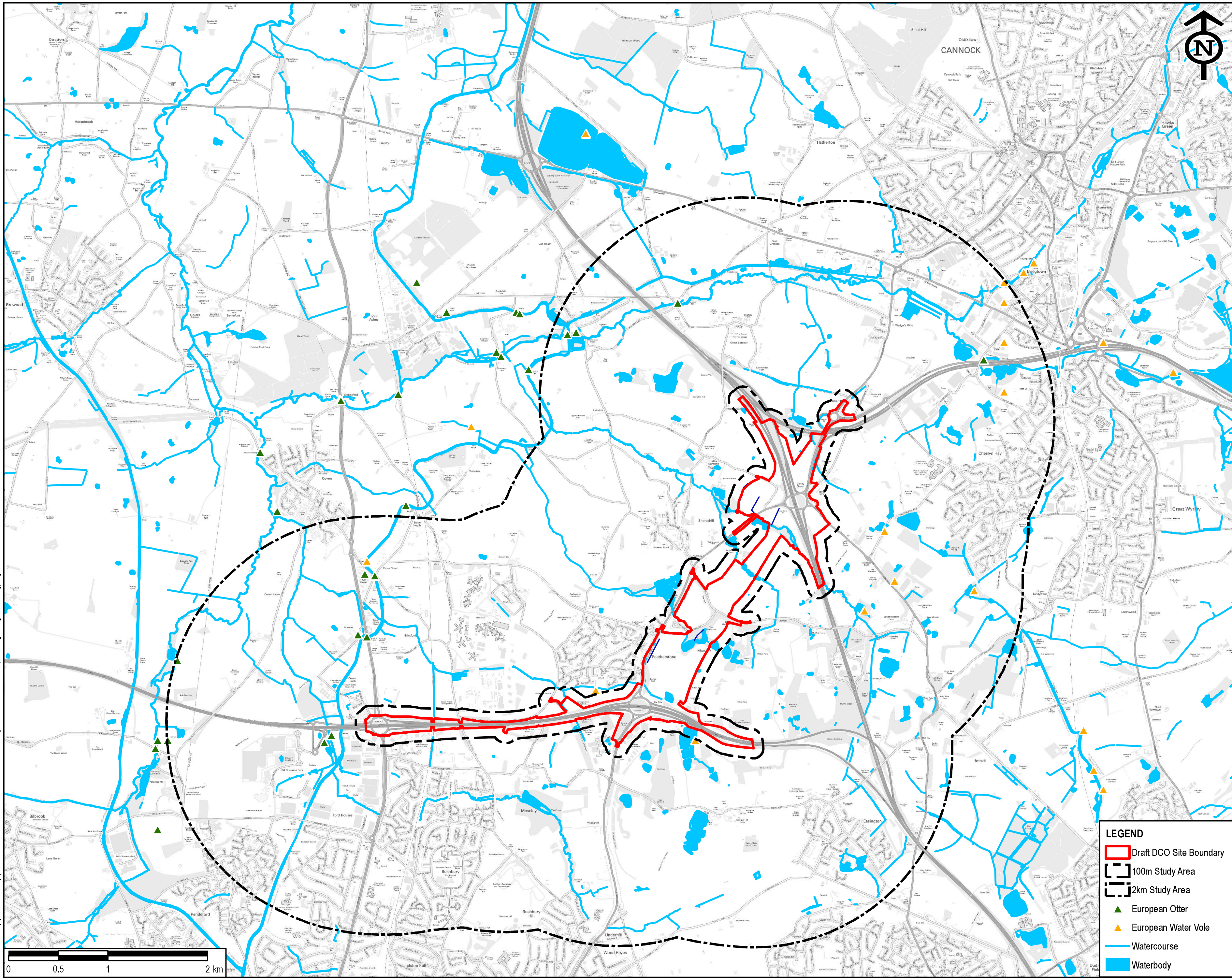
Plot Date: 13 May 2019 08:48:00
File Name: \\Ukldszpfpsw001\ukdszpfpsw001-v1\ie\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 3 Figures\Ecology\Fig X - Water Vole and Otter Survey.mxd



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199 Wharfside Street
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Project Title

M54-M6 LINK ROAD

Drawing Title

FIGURE 2
WATER VOLE AND OTTER RECORDS

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	10/05/2019

Internal Project No. 60536736 — Suitability S2

Scale @ A3 1:35,000 — Zone M54 to M6/M6 (Toll) Link Road

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File Name: \\Ukdsz2pfpsw001\ukdsz2pfpsw001-v1\e\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 3 Figures\Ecology\Fig X - Water Vole and Otter Records.mxd

Annex B Site Photographs

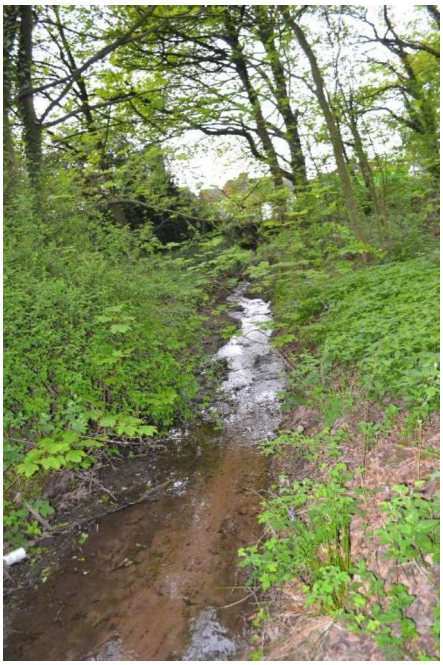
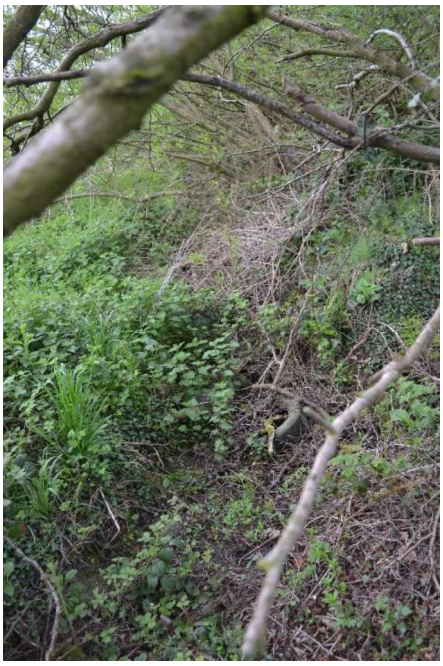
	Image 1: Watercourse 1 running into woodland before culverting under A460.
	Image 2: Culvert under A460 containing watercourse 1

	Image 3: Watercourse 2 showing dry after first survey.
	Image 4: Watercourse 3 within disturbed section of woodland. Shows that it frequently dries.

	Image 5: Different section of watercourse 3 within disturbed section of woodland. Shows that it frequently dries.
	Image 6: Culvert under A460 containing watercourse 3

	Image 7: Watercourse 4 running through woodland. Predominantly dry at time of survey
	Image 8: Watercourse 5, at bottom of hedgerow.
	Image 9: Watercourse 9. Section showing going into woodland and connecting with watercourse 11.

	Image 10: Watercourse 10. Section along hedgerow / treeline and connecting with watercourse 11.
	Image 11: Watercourse 11. Section to east of A460.
	Image 12: Culverted section of watercourse 11 to east of A460.

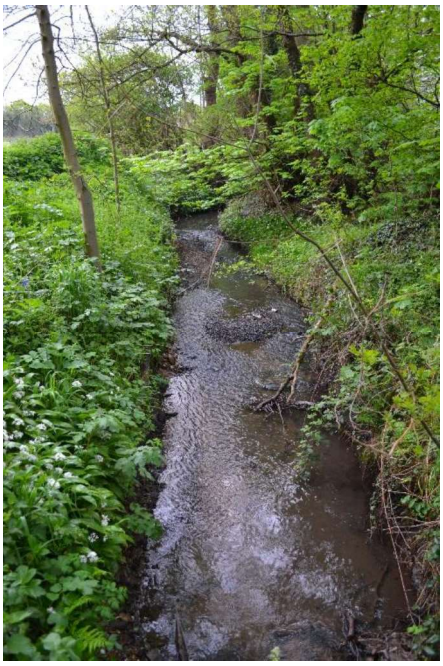
	Image 13: Watercourse 11. Section to west of A460.
	Image 14: Watercourse 11. Another section to west of A460.

	Image 15: Watercourse 12. Section running below hedgerow into watercourse 11.

Appendix 8.4: Reptile Assessment Report

Contents

Annexes

1. INTRODUCTION

1.1. Background

1.1.1. The A460 provides a link between the M6 Junction 11, M54 Junction 1, and M6 Toll Junction T8 by Featherstone, Staffordshire. The A460 is a single carriageway road which experiences significant congestion for vehicles travelling between the M6 north, M54 and M6 Toll. To alleviate congestion Highways England are proposing a new two lane dual carriageway road, approximately 2.5 km (1.6 miles) in length between the M54 Junction 1 and the M6 Junction 11, (herein referred to as the 'proposed Scheme'). This would provide free flow links to and from the M54 and connect into an improved M6 Junction 11.

1.1.2. A suit of ecological surveys have been carried out to support the Environmental Statement including reptile surveys.

1.2. Study Area and Location

1.2.1. The proposed Scheme is located in the county of Staffordshire in a landscape consisting predominantly of arable farmland interspersed with areas of grassland, woodland, small watercourses and several waterbodies. There are major roads which intersect the local landscape including the M6, M6 Toll, M54, and A460. Residential areas within the surrounding landscape include the small villages of Featherstone, Shareshill and Hilton which are directly adjacent to the A460, the civil parish of Great Saredon adjacent to the M6 Toll, as well as scattered small holdings and various farmhouses.

1.2.2. The study area for the reptile assessment includes all land up to and within 250m from the draft DCO site boundary as shown on Figure 1, Annex B.

1.2.3. Phase one surveys undertaken in April 2018 highlighted three areas of the study area which had the potential to support reptiles. The first area is a linear corridor spanning from a large fishing pond (waterbody 8) along a field edge adjacent to a stretch of woodland, this area was split into smaller areas labelled A, B, C, D, and E (see Annex D, images 4 and 5 respectively). These areas are shown in Figure 1, Annex B.

1.2.4. Some areas of the study area have not been subject to survey and therefore there is the potential that these areas could support populations of reptiles.

1.3. Survey Aims and Objectives

1.3.1. The aim and objectives of the survey work and subsequent report presented herein were to:

- determine presence or likely absence of reptiles within the study area based on desk study data and field surveys;
- provide baseline information to inform design development and environmental assessment; and
- identify the risk of encountering reptiles whilst undertaking construction works for the proposed Scheme, should all required consents be granted.

1.4. Legislation

1.4.1. Common reptiles (common lizard (*Zootocta vivpara)*, adder (*Vipera berus)*, grass snake (*Natrix helvetica)* and slow worm (*Anguis fragilis)*) are legally protected under

Schedule 9(1) and 9(5) of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally or recklessly kill or injure a reptile.

1.4.2. Please refer to Annex A for full details of legislation.

2. METHODOLOGY

2.1. Desktop study

2.1.1. A desktop study was completed in 2015, which included obtaining records for reptile within 2km of the PCF Stage 2 (options selection) Scheme options, an early iteration of the proposed Scheme. Data was obtained from Staffordshire Ecological Record Centre (SER), and the Ecological records centre for Birmingham and the Black Country (EcoRecord).

2.1.2. An updated desk study and data search was completed in 2017 including the area of the proposed Scheme and a 2km buffer obtained from SER. In addition to this, the SER and EcoRecord were approached in 2018 to identify records for reptile species within 5km of the centre of the proposed Scheme.

2.2. Field Survey

Artificial Refugia Survey

2.2.1. Refugia were set out on areas A-F on 26 April 2018, to allow time to bed-in prior to surveys commencing. As per the guidelines in Froglife (1999, 2015), seven surveys were undertaken between 11 May and the 21 May 2018 and 10 September to the 27 September 2018 by a competent surveyor throughout the three areas. Seven visits; in suitable weather conditions, is considered appropriate for surveys targeted at identifying presence / likely absence of reptiles across a site (Froglife, 1999; Natural England, 2011). The period of time in between 21 May and the 10 September 2018 was considered unsuitable for checks as the weather was above the acceptable range for reptile surveys, with the air temperature recorded above 20°C. The acceptable range for air temperature being between 9°C and 20°C (Froglife, 2015).

2.2.2. Artificial refugia were placed throughout the survey areas, at a density of 50 per hectare; as per the guidelines in Froglife (1999, 2015) and Sewel *et al* (2013) for a detailed survey. See Annex C, Table 2 for numbers of refugia per area. The artificial refugia type used for this survey was 0.5 m^2 pieces of roofing felt ('felts') and onduline mats, located in potential reptile hotspots – i.e. sunny areas near to cover (gullies and slopes, rides or paths through scrub, grassland, scrub and grassland interfaces and sun traps created by small open patches surrounded by dense vegetation (Froglife, 1999; Natural England, 2015). So as to avoid bias within the survey and impacts from public pressure, refugia were positioned in targeted areas on top of short or flattened vegetation (rather than bare ground), also overhung by vegetation and away from footpaths.

2.2.3. The refugia were checked periodically with care taken to replace them back in exactly the same position, visual observation of the exterior of the roofing felt or onduline was firstly undertaken to capture all incidents of reptiles basking on top of the refugia. If no basking reptiles were observed, care was taken to approach the tiles with minimum disturbance prior to lifting of the felts or tins.

Visual Encounter Survey

2.2.4. The three areas and immediate surroundings was systematically walked to check for reptiles on seven occasions between the 11 May to the 21[t] May 2018 and 10 September to the 27 September 2018, predominantly following the survey methodology detailed in Gent & Gibson (1998). Surveys were undertaken during optimum weather conditions, i.e. when the temperature is between 9 °C and 20 °C

(Gent & Gibson, 1998; Froglife, 1999), typically between 07:00-11:00Hrs and between 16:00-20:00Hrs, during periods of 'intermittent' or hazy sunshine, with little or no wind (Gent & Gibson, 1998), as literature suggests.

2.2.5. Both ground and vegetation were carefully checked (approximately 3-4 m ahead), with the sun kept behind the viewer.

2.2.6. Where pre-existing or natural refugia was observed during the survey (especially within survey areas C to E) these were also checked, with care taken to replace the refugia back in exactly the same position. As above, visual observation of the exterior of the refugia was firstly undertaken to capture all incidents of reptiles basking on top of the refugia. If no basking reptiles were observed, care was taken to approach the refugia with minimum disturbance prior to lifting.

2.2.7. The surveys were conducted by suitably qualified Ecologists:

- Stuart Graham BSc (Hons), MSc, CEcol, CEnv, MCIEEM;
- Dean Cordelle BSc (Hons), Grad CIEEM;
- Christopher Hall BSc, MSc, GradIEMA FGS;
- Henry James MSc, Grad IEMA; and
- Katie Warren BSc(Hons), Grad IEMA.

2.2.8. Environmental conditions experienced during the surveys are stated in Table 2.

Table 2: Weather conditions during the surveys.

Date (2018)	Temperature (°C)			Cloud cover (%)		Wind*		Precipitation**	
	At Start	At End	Beneath Matt	At Start	At End	At Start	At End	At Start	At End
11 May	11.7	14.1	13.3	75	100	2	2	0	0
18 May	13.8	18.2	17.6	10	30	1	2	0	0
21 May	15	20.5	19.7	0	10	2	2	0	0
10 September	17.7	17.4	19.2	75	80	3	4	0	0
24 September	12.1	13.2	14.6	25	30	1	2	0	0
25 September	16.1	15	17.2	25	30	2	2	0	0
27 September	19.1	15.2	16	75	75	2	1	0	0

*Wind was classified 1-5, with 1=calm and 5=strong winds
**Precipitation was classified 0-5, with 0=none and 5=heavy downpour

2.1. Limitations

2.1.1. The survey areas were highlighted during the Phase One Habitat Assessment. This survey highlighted the areas suitable for reptiles based on the areas where land access was available; however, this assessment was obtained on the day of the phase one survey visits. The surveys do not record any changes in ecological features that may only appear at other times of the year and therefore were not evident at the time of the initial visit.

2.1.2. Access to certain land plots was not permitted in addition to areas of private residential dwellings and their associated curtilages. It is possible that these areas support reptiles.

2.1.3. Due to the particularly hot weather experienced between May and September 2019, survey scheduling and spacings were modified and compressed to target weather conditions when it was most productive to encounter reptiles. With four surveys undertaken in September (three close together), artificial refugia would have had longer to bed into their respective habitats and increased the chance of being encountered by reptiles so this is not considered a significant limitation.

2.1.4. Area three was only surveyed twice due to health and safety concerns in accessing the area. .

2.1.5. Despite the limitations detailed above it is considered that there was sufficient information gathered during the survey to inform the PCF Stage 3 (preliminary design) Scoping Report, Biodiversity Chapter.

3. RESULTS AND DISCUSSION

3.1. Desktop Study

3.1.1. Records from SER and EcoRecord (updated in 2018) showed a single record of the common lizard within 5km of the centre of the proposed Scheme extent. The record relates to an observation at 1km sq resolution, indicating presence. No further information relating to the record was provided.

3.2. Site surveys

3.2.1. No reptiles were recorded during the presence / likely absence surveys of areas A-F. They did identify the presence of two smooth newts (*Lissotriton vulgaris)*, 46 common toad (*Bufo bufo),* and three common frogs (*Rana temporaria)*

4. CONCLUSION

4.1.1. For areas where land access was available at the time of survey, habitats present within the study area offered some potential for reptiles, albeit extremely limited. These areas were restricted to relatively undisturbed patches consisting predominantly of field edges neighbouring woodland and water features for aquatic species, such as grass snake.

4.1.2. All three areas surveyed revealed likely absence of reptiles from the accessible areas of the draft DCO site boundary. Area three was only surveyed twice; however, this area was considered least viable to support a reptile population due to the size and isolation from areas of suitable habitat in the wider environment.

4.1.3. Further surveys of areas of the study area that have not been subject to any survey work will be undertaken in 2019 to determine the presence or likely absence of reptiles. Until this survey work has been completed it has been assumed, following a reasonable precautionary approach, that small numbers of reptiles are present within the study areas and may be affected by the proposed Scheme.

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Annex A. Wildlife Legislation and Policy

The Wildlife & Countryside Act 1981 (as amended)

Provides for designation and protection of Sites of Special Scientific Interest (SSSI), which are areas that represent the most valuable habitats in the UK for nature conservation.

The Act creates the following offences:

- To intentionally kill, injure, or take any wild bird or their eggs or nests (with exception to species listed in Schedule 2). Special penalties are available for offences related to birds listed on Schedule 1, for which there are additional offences of disturbing these birds at their nests, or their dependent young.
- To intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5, and interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.
- Certain methods of killing, injuring, or taking wild animals listed in Schedule 6.
- To pick, uproot, trade in, or possess (for the purposes of trade) any wild plant listed in Schedule 8, and prohibits the unauthorised intentional uprooting of such plants.
- The release of certain non-native animals and planting of plants listed in Schedule 9.

It also provides a mechanism making any of the above offences legal through the granting of licences by the appropriate authorities.

Conservation of Habitats and Species Regulations 2017

The principal means by which the European Habitats Directive is transposed in England and Wales.

Provide for the designation and protection of a network of 'European Sites' (also termed Natura 2000), including Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

Regulation 41 creates the following offences relating to European Protected Species (EPS):

- deliberately capture, injure or kill any wild animal of a European Protected Species;
- deliberately disturb animals of any such species in such a way as to be likely to:
- impair their ability to survive, breed, rear or nurture their young, hibernate or migrate, or
- significantly affect the local distribution or abundance of the species to which they belong;
- deliberately take or destroy the eggs of such an animal; or
- damage or destroy a breeding site or resting place of such an animal.

The Regulations also make it an offence (subject to exceptions) to deliberately pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 5.

However, the actions listed above can be made lawful through the granting of licences (European Protected Species Licence) by the appropriate authorities (Natural England in England). Licences may be granted for a number of purposes, but only after the appropriate authority has determined that the following regulations are satisfied:

- the works under the licence are being carried out for the purposes of ‘preserving public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment’.
- there is ‘no satisfactory alternative’
- the action 'will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range'.

To apply for a licence, the following information is required:

- The species concerned.

- The relative size of the population at the site (note this may require a survey to be carried out at a particular time of the year).
- The impact(s) (if any) that the development is likely to have upon the populations.
- What measures will be conducted to mitigate for the impact(s).

Natural Environment & Rural Communities (NERC) Act 2006

Section 40 of NERC carries an extension of the earlier CRoW Act biodiversity duty to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. Section 41 requires the Secretary of State, as respects England, to publish a list of species and habitats which are of 'principal importance for the purpose of conserving biodiversity'. These lists generally reflect the species and habitats previously listed under the UK Biodiversity Action Plan.

National Planning Policy Framework

This framework replaces Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS 9) (ODPM 2005) and sets out the view of central Government on how planners should balance nature conservation with development. One of the key principles of the NPPF is:

The NPPF states that development plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas, including biodiversity. It also states that the aim of planning decisions should be to prevent harm to biodiversity conservation interests and to 'promote the preservation, restoration and re-creation of priority habitats, ecological networks and the recovery of priority species'.

Where determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principals; 'if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused'; and, 'planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss'.

This means that full ecological surveys should be carried out and suitable mitigation measures proposed prior to any planning application being submitted.

Biodiversity 2020: A strategy for England's wildlife and ecosystem services

This biodiversity strategy for England builds on the Natural Environment White Paper and the earlier UK Biodiversity Action Plan. It provides a comprehensive picture of how Government is implementing our international and EU commitments and sets out the strategic direction for biodiversity policy up to 2020. Its mission is to:

> *"halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people."*

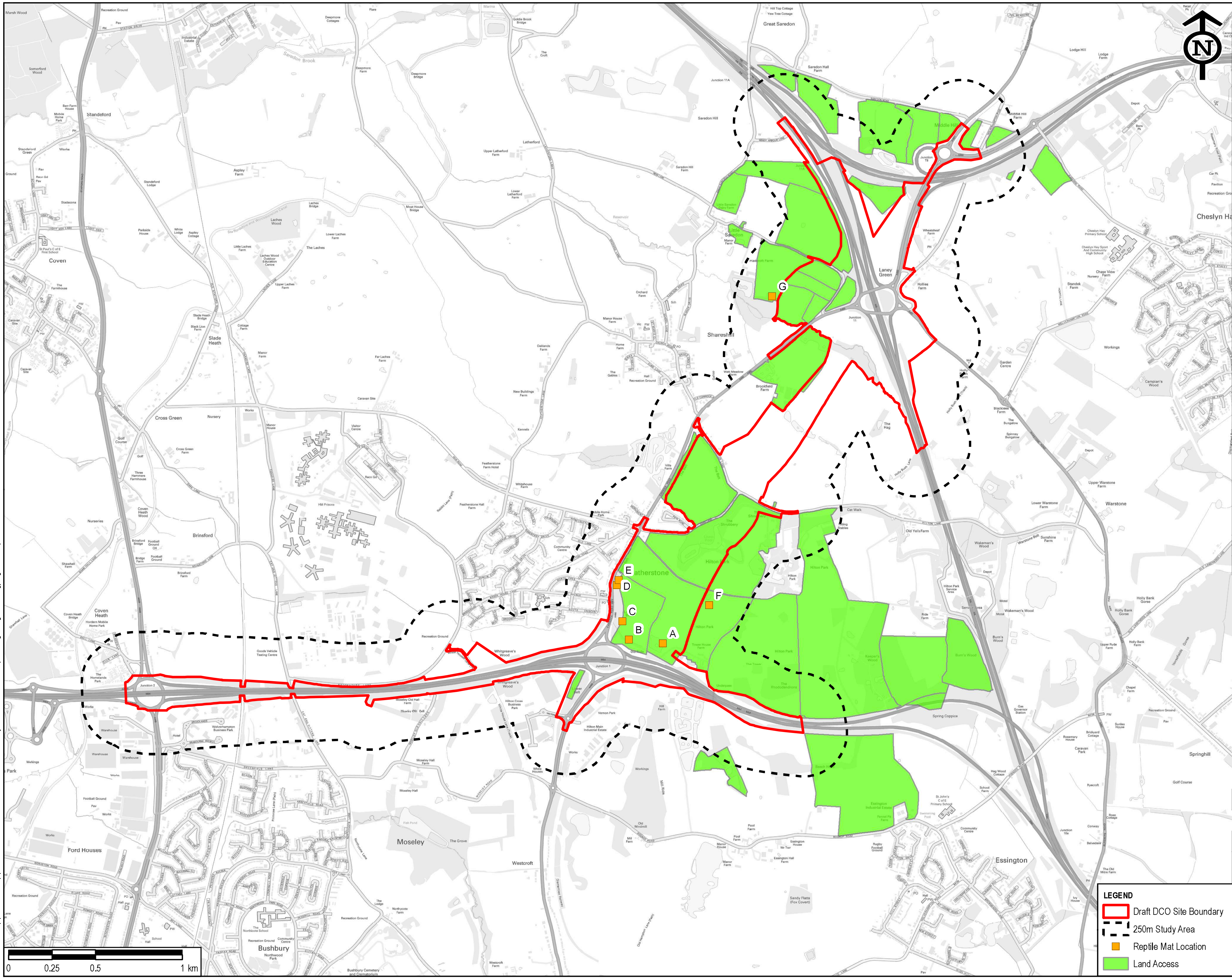
In relation to planning and development its priority is to:

> *"take a strategic approach to planning for nature within and across local areas. This approach will guide development to the best locations, encourage greener design and enable development to enhance natural networks. We will retain the protection and improvement of the natural environment as core objectives of the planning system."*

Annex B. Figures

Figure 1: Reptile Matt Locations

Figure 2: Reptile Records



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First Issue	EC / AR	04/12/18	P01
Revision Details	EC / AR	10/05/2019	Suffix

Purpose of issue: FOR INFORMATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of highways england

Project Title: M54-M6 LINK ROAD

Drawing Title: FIGURE 1 REPTILE MAT LOCATIONS

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	10/05/2019

Internal Project No.: 60536736 — Suitability: S2

Scale @ A3: 1:20,000 — Zone: M54 to M6/M6 (Toll) Link Road

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Royal Court
Basil Close, Chesterfield
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Tel: 01246 209221
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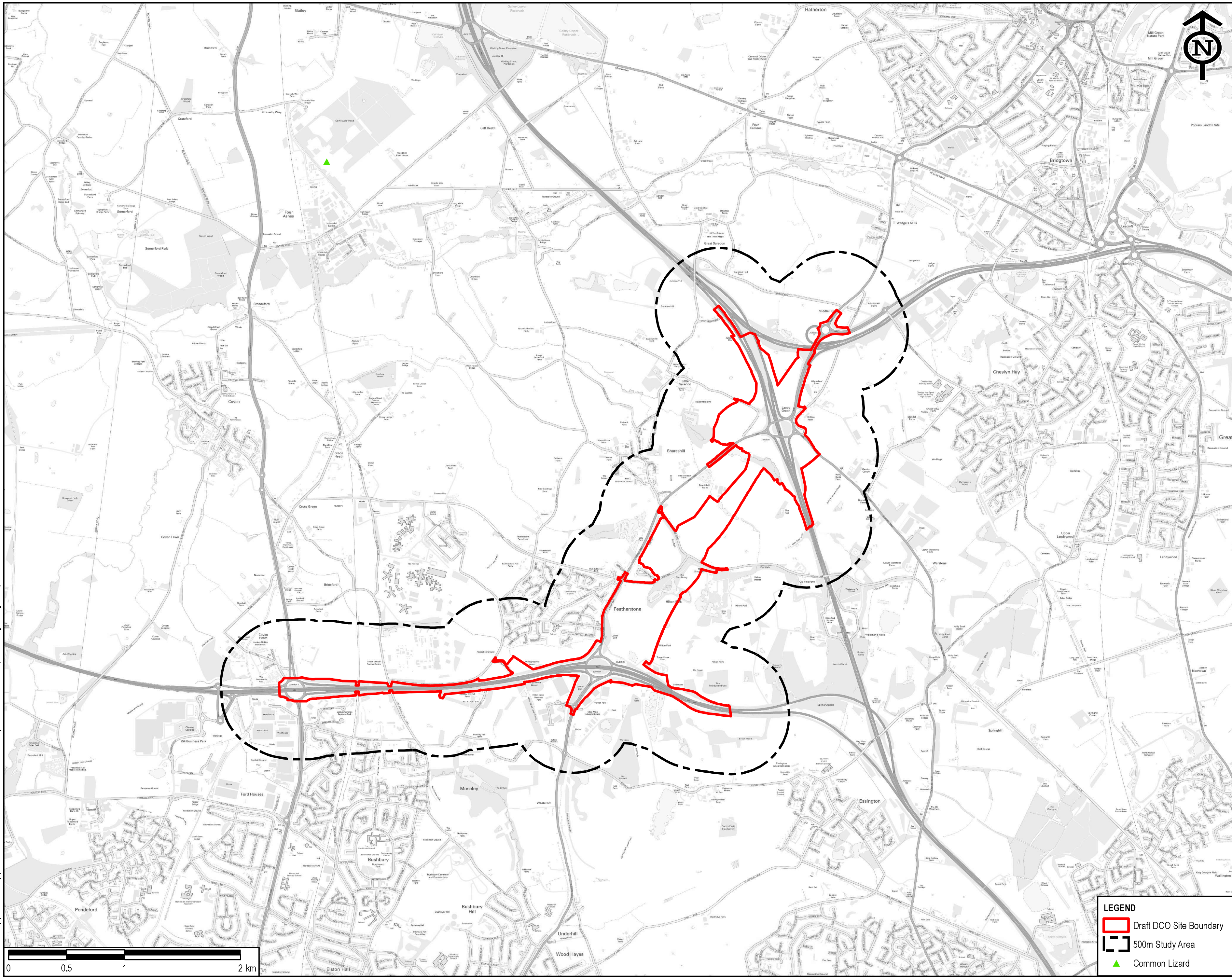

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Revision Details	By	Check	Date	Suffix
First Issue	EC	AR	04/12/18	P01

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Client

Highways England
The Cube
199 Wharfside Street
Birmingham
B1 1RN

Working on behalf of highways england

Project Title

M54-M6 LINK ROAD

Drawing Title

FIGURE 2
REPTILE RECORDS

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	29/04/2019

Internal Project No. 60536736 — Suitability S2

Scale @ A3 1:30,000 — Zone M54 to M6/M6 (Toll) Link Road

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Derbyshire, S41 7SL
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Annex C. Artificial Refugia

Table C1: Number of Artificial Refugia per Survey Area

Area	Number of Artificial Refugia
A	10
B	10
C	10
D	5
E	5
F	14
G	14

Annex D. Photographs

	Image 1: Survey area A. Tall grasses and ruderals have been cut over the winter. This are is left relatively undisturbed during spring to autumn months.
	Image 2: Survey area C. Undisturbed field margin adjacent to woodland.
	Image 3: Survey areas D and E. Undisturbed field margin adjacent to woodland.

	Image 4: Survey area F. Undisturbed area of tall grasses, nettles, bramble and Japanese knotweed adjacent to a pond (located 'off picture' right).
	Image 5: Survey area G. Undisturbed area of tall grasses and ruderals adjacent to an area of woodland.
	Image 6: Area considered to provide low suitability for reptiles: area of semi-improved grassland surrounded by a woodland belt with field margins. Area (up to and encroaching into field woodland margins) is extensively used and subject to a high level of public pressure.

	Image 7: Area considered to be of low suitability for reptiles: area of semi-improved grassland. Area is extensively grazed and subject to a high level of grazing pressure.
	Image 8: Area considered to be of low suitability for reptiles: area of semi-improved grassland. Area is extensively grazed and subject to a high level of grazing pressure.
	Image 9: Area considered to be of low suitability for reptiles: area of semi-improved grassland. Area is extensively grazed and subject to a high level of grazing pressure.

	Image 10: Area considered to be of low suitability for reptiles: area of semi-improved grassland. Area is extensively grazed and subject to a high level of grazing pressure.
	Image 11: Area considered to be of low suitability for reptiles: area of semi-improved grassland surrounded by a woodland belt with field margins. Area (up to and encroaching into field woodland margins) is extensively used and subject to a high level of public pressure.
	Image 12: Area considered to be of low suitability for reptiles: area of improved grassland. Area is extensively grazed and subject to a high level of grazing pressure. No field margins present around perimeter and manure pile is not a permanent fixture.

Appendix 8.5: Barn Owl Assessment Report

Contents

1. INTRODUCTION

1.1. Background

1.1.1. The A460 currently provides a link between the M6 Junction 11, M54 Junction 1, and M6 Toll Junction T8 via Featherstone, Staffordshire. The A460 is currently of single carriageway road which experiences significant congestion from vehicles travelling between the M6 north, M54 and M6 Toll. To alleviate congestion Highways England are proposing a new two lane dual carriageway link road, approximately 2.5 km (1.6 miles) in length between the M54 Junction 1 and the M6 Junction 11(herein referred to as the 'proposed Scheme'). This would provide free flow links to and from the M54 and connect into an improved M6 Junction 11.

1.1.2. A suit of ecological surveys, including Barn Owl (*Tyto alba)* have been carried out to support the Environmental Statement for the proposed Scheme.

1.2. Study Area and Location

1.2.1. The Scheme is located in the county of Staffordshire in a landscape consisting predominantly of arable farmland interspersed with areas of grassland, woodland, small watercourses and several waterbodies. There are several major roads which intersect the local landscape including the M6, M6 Toll, M54, and A460. Residential areas within the surrounding landscape include the small villages of Featherstone, Shareshill and Hilton which are directly adjacent to the A460, the civil parish of Great Saredon adjacent to the M6 Toll, as well as scattered small holdings and various farmhouses.

1.2.2. The study area for the barn owl assessment includes all land within and up to 500m of the draft DCO site boundary, as shown on Figure 1, Annex B.

1.3. Survey Aims and Objectives

1.3.1. The aim and objectives of the barn owl assessment is to:

- determine presence or likely absence of barn owl across the study area based on desk study and field survey visits;
- provide baseline information to inform design development and environmental assessment; and
- identify the risk of encountering barn owl whilst undertaking construction works for the proposed Scheme, should all consent and permissions be granted.

1.4. Legislation

1.4.1. All wild birds in the UK are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy the nest (whilst being built or in use) or its eggs. Barn Owl, listed in Schedule 1 of the 1981 Act (as amended), receive further protection which makes it an offence to intentionally or recklessly disturb barn owl while building a nest or in, on or near a nest containing eggs or young; or to disturb dependent young of such a bird (HMSO, 1981 & 2000).

1.4.2. Please refer to Annex A for full details of legislation.

2. METHODOLOGY

2.1. Desktop Study

2.1.1. A desktop study was completed in 2015, which included obtaining records for Barn Owl within 2km of the PCF Stage 2 (options selection) Scheme options which included an early iteration of the proposed Scheme. Data was obtained from Staffordshire Ecological Record Centre (SER), and the Ecological records centre for Birmingham and the Black Country (EcoRecord).

2.1.2. An updated desk study and data search was completed in 2017 including the proposed Scheme and a 2km buffer obtained from SER. In addition to this SER and EcoRecord were approached in 2018 to identify records for barn owl within 5 km of the centre of the proposed Scheme.

2.1.3. The Barn Owl Online Survey Website was also consulted to check for any records of varying observation types e.g. roost site, deceased barn owl and nesting. These records are centred on a 5 km grid reference and specific recorded locations are unknown.

2.2. Field Survey

2.2.1. The standard methodology for barn owl assessments for linear schemes (outlined by Sawyer, 2011) recommends a 1.5 km field survey area to identify potential risks from road collisions on the local barn owl population. A reduction in the field survey area from 1.5 km to 500 m was adopted for the proposed Scheme upon evaluation of the existing major road network (M6, M6Toll, M54 and A460) surrounding the proposed Scheme and lack of prime dispersal habitat / connectivity of such habitat. Although it is accepted that the existing A460 is flanked by tall vegetation in areas, the volume of traffic, in particular heavy goods vehicles, means that this road serves as a single carriageway obstruction along most of its length. The roads present within the existing major road network surrounding the proposed Scheme are all considered to provide an existing 'collision risk' to barn owls, therefore isolating the majority of the draft DCO site boundary from the wider landscape.

2.2.2. A daytime external and internal inspection of all accessible buildings and trees was undertaken to locate suitable nest sites, as well as evidence of barn owls. In addition, the habitat present across the study area was assessed for its potential as foraging habitat for barns owls in line with best practice guidelines (Barn Owl Trust, 2014).

2.2.3. The survey was conducted by suitably experienced and qualified Ecologists; Stuart Graham (licenced surveyor) MSc, CEcol, CEnv, MCIEEM and Dean Cordelle BSc (Hons), Grad CIEEM on the 18, 23 and 25 April and 15 and 16 May 2018. Environmental conditions experienced during the surveys were as follows:

April

- 18 – 16°C, cloud with sunny intervals, no precipitation and a light breeze
- 23 – 11°C, cloudy, no precipitation, light breeze
- 25 – 9°C, cloudy, no precipitation, light breeze

May

- 15 - 20°C, light cloud, no precipitation, light breeze
- 16 - 14°C, light cloud, no precipitation, light breeze

2.3. Daytime Inspection of Potential Roosting and Nesting Sites

2.3.1. Any trees or buildings with barn owl potential were searched during daylight hours for potential or active nest and roost sites. Features investigated included:

- buildings, including used and disused agricultural, domestic, industrial and other types;
- mature trees, isolated or in clusters in open fields, hedgerow or on the woodland edge, of at least 0.5 m in width containing a hole >80 mm backed by a large, dark cavity;
- stacks of hay bales both inside and outside buildings; and
- appropriate nest boxes inside or outside buildings, on trees, poles or other structures.

2.3.2. A preliminary inspection of any potential nest or roost sites was made from the ground with the aid of binoculars and torch. Signs of barn owl presence searched for included the following:

- adult barn owls;
- young or juvenile barn owls;
- nesting material;
- eggs and egg shells;
- pellets;
- feathers; and
- white splashing caused by droppings.

2.3.3. The following criteria was set against any presence or absence for barn owls in accessible areas:

- **Site potentiality:** the sites potential to be or have previously been a roost or nest site. The suitability will be recorded as none, low, medium or high.
- **No evidence:** no evidence of barn owls was found but a clear statement of the probability that evidence has been covered, lost or removed is made.
- **Old roost site:** evidence of roosting was found but no sign of occupation within the last two years. No evidence of nesting, past or present.
- **Recent roost site:** evidence of roosting within the past two years was found but no evidence of nesting past or present.
- **Current pair roosting:** evidence of two barn owls roosting within the past month was found but no evidence of nesting, past or present.
- **Nest site:** evidence that barn owls are currently nesting or have nested at some time in the past was found.

2.4. Daytime aerial Inspection of Potential Roosting and Nesting Sites

2.4.1. Any trees with barn owl potential were inspected, at height, during daylight hours for potential nest and roost sites or active nest and roost sites. Features investigated included those listed in Sections 2.3.1 and 2.3.2.

2.4.2. Any consultation or findings from discussions with landowners will also be summarised.

2.5. Daytime Assessment of Potential Foraging Habitat

2.5.1. Habitats across the study area, which on the basis of their appearance and structure offered potential foraging habitat, were recorded and classified as follows:

- **Type 1:** habitats which provide optimum habitat for field voles (*Microtus agrestis)* and are therefore of the highest value to barn owls. This habitat type is usually permanent, unimproved or semi-improved grassland, heterogeneous in appearance, and usually of mixed height. Unmanaged fields, wasteland, ditches,

riverbanks, field margins and road verges are the most common examples of this habitat type.

- **Type 2:** habitats sub-optimal for field voles but of value to barn owls in areas with sporadic Type 1 habitats. This type of semi-improved grassland is characterised by having a more even-height sward.
- **Type 3:** habitats offering poorer habitat for field voles and as such are of lower value to barn owls. These improved grasslands are characterised by having a homogeneous sward, and being heavily grazed by sheep, horses or cattle or used for public amenity.

2.6. Limitations

2.6.1. Access to certain land plots was not permitted and therefore they were surveyed from adjacent land where possible. It is possible that features of interest were missed; however, sufficient information could be gained to inform the requirement for further surveys so this is not considered a significant limitation.

2.6.2. One area, within a land plot, was not fully assessed due to the density of vegetation present at the time of survey. The location of this area was E 395694, N 307626. This area was assessed from adjoining land where access was granted.

2.6.3. Areas of private residential dwellings and their associated curtilages were not surveyed due to land access not being permitted.

3. RESULTS AND DISCUSSION

3.1. Desktop Study

3.1.1. Records from SER, Barn Owl Trust Online Survey and EcoRecord (updated in 2018) show several scattered records for barn owl. The closest barn owl record / observation (record type: field observation) is present within the draft DCO site boundary on the M54 Junction 2. Records show the nearest nesting barn owls to be 1.3 km south-west of the proposed Scheme to the south of the M54.

3.2. Daytime Inspection of Potential Roost and Nest Sites

Roost and Nest sites

3.2.1. No barn owl nesting sites were identified during the surveys. Accessible barns were assessed as having low or negligible potential and no current or historical signs of occupation by barn owl were identified. Two trees were assessed as having high potential, the remainder have no potential. These were consequentially subject to aerial inspection, showing no current or historical signs of occupation by barn owls. A summary of the results for the daytime inspection for potential roosting and nesting sites is shown in Table 1, images are presented in Annex C.

Table 1: Barn owl presence, absence and suitability.

Structure and Location (Grid Ref.)	Distance from the draft DCO site boundary	Present/ Absent at Time of Survey	Suitability	Notes
Buildings				
SJ 94761 04641 (Barn A)	<50 m north	Absent	Low	Access was permitted into the barns but there were no current or historical signs of occupation by barn owls. There were no roosting or nesting places apart from the floor on both levels.
Farm Building (Confidential location, Barn B)	200 m west	Possibly present but not surveyed as access to land/ buildings denied.	Unknown. Landowner reported the presence of owls.	Landowner has said that owls are present but has denied access to the land. Bat surveys have recorded barn owls flying from this location in a northwards direction towards the M6.
SJ 9522 0620 (Barn C)	<50 m west	Absent	Low	Access was permitted into the barns but there were no current or historical signs of occupation by barn owls.
SJ 9550 0653 (Barn D)	<0 m	Absent	Low	Access was permitted into the barns but there were no current or historical signs of occupation by barn owls.
Trees				
SJ 9488204878 (Tree 1)	240 m east	Absent	High	Rotting Cavity in Horse Chestnut. No current or previous signs of barn owl recorded at time of surveying.
SJ	165 m west	Absent	Medium	Oak. No current or historical

Structure and Location (Grid Ref.)	Distance from the draft DCO site boundary	Present/ Absent at Time of Survey	Suitability	Notes
9511206985 (Tree 2)				signs of barn owl recorded at time of surveying.
SJ 95767 06335	>10 m south	Absent	High	Oak. No current or historical signs of barn owl recorded at time of surveying.

3.3. Daytime Assessment of Potential Foraging Habitat

3.3.1. The study area comprises mostly open arable and pasture fields, with good connectivity between them, but limited to the wider environment. There are areas of unimproved or semi-improved heterogeneous grassland as well as field margins, drainage ditches and hedgerows that provide good foraging habitat.

3.3.2. No barn owl / owl boxes were identified within the study area, where land access was available, during the course of the surveys.

3.3.3. Habitats across the study area are considered to be sub-optimal, providing 'Type 2' habitats (habitats sub-optimal for field voles but of value to barn owls in areas with sporadic Type 1 habitats). This was re-iterated by barn owls, observed during bat transect surveys, commuting away from known roosts adjacent to the study area and not utilising the study area.

4. CONCLUSION AND RECOMMENDATIONS

4.1.1. The habitats present immediately within the study area, where land access was permitted, are sub-optimal for barn owl, limited to small patches of unimproved or semi-improved heterogeneous grassland as well as field margins, drainage ditches and hedgerows that provide good foraging habitat.

4.1.2. It was considered likely that due to the largely isolated nature of the proposed Scheme due to the presence of the existing major road network, in combination with the low amount of suitable habitat, barn owl prey populations have not been able to thrive within the study area, therefore there is little opportunity for barn owls to utilise the area for foraging.

4.1.3. All surveys undertaken revealed likely absence of barn owl from the study area. A barn owl roost (approximately 200 m west of the draft DCO site boundary) has been reported from an adjacent farm complex and barn owls have been observed commuting over a small section of the study area, from this location, to foraging grounds in the wider environment (north of the M6). This roost is 450 m west of the draft DCO site boundary with the nearest section being the A460, M6 proposed junction improvement. All recorded flight routes recorded have been northwards, not in the direction of the proposed Scheme. It is therefore considered that if barn owls are present within the farm complex, the proposed Scheme would not severe the barn owls from the local foraging grounds.

4.1.4. Further survey will be undertaken in 2019 on those areas of the study area which haven't been accessed or subject to any survey work. Until this survey work has been completed, it has been assumed following a reasonable precautionary approach that very small numbers of barn owl are present within the study area and may commute through and forage within the study area.

REFERENCES

All UK (and individual UK countries) legislation can be viewed at: http://www.legislation.gov.uk/browse

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Annex A. Wildlife Legislation and Policy

The Wildlife & Countryside Act 1981 (as amended)

Provides for designation and protection of Sites of Special Scientific Interest (SSSI), which are areas that represent the most valuable habitats in the UK for nature conservation.

The Act creates the following offences:

- To intentionally kill, injure, or take any wild bird or their eggs or nests (with exception to species listed in Schedule 2). Special penalties are available for offences related to birds listed on Schedule 1, for which there are additional offences of disturbing these birds at their nests, or their dependent young.
- To intentionally kill, injure, or take, possess, or trade in any wild animal listed in Schedule 5, and interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.
- Certain methods of killing, injuring, or taking wild animals listed in Schedule 6.
- To pick, uproot, trade in, or possess (for the purposes of trade) any wild plant listed in Schedule 8, and prohibits the unauthorised intentional uprooting of such plants.
- The release of certain non-native animals and planting of plants listed in Schedule 9.

It also provides a mechanism making any of the above offences legal through the granting of licences by the appropriate authorities.

Conservation of Habitats and Species Regulations 2017

The principal means by which the European Habitats Directive is transposed in England and Wales.

Provide for the designation and protection of a network of 'European Sites' (also termed Natura 2000), including Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

Regulation 41 creates the following offences relating to European Protected Species (EPS):

- deliberately capture, injure or kill any wild animal of a European Protected Species;
- deliberately disturb animals of any such species in such a way as to be likely to:
  - impair their ability to survive, breed, rear or nurture their young, hibernate or migrate; or
  - significantly affect the local distribution or abundance of the species to which they belong;
- deliberately take or destroy the eggs of such an animal; or
- damage or destroy a breeding site or resting place of such an animal.

The Regulations also make it an offence (subject to exceptions) to deliberately pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 5.

However, the actions listed above can be made lawful through the granting of licences (European Protected Species Licence) by the appropriate authorities (Natural England in England). Licences may be granted for a number of purposes, but only after the appropriate authority has determined that the following regulations are satisfied:

- The works under the licence are being carried out for the purposes of ‘preserving public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment’.
- There is ‘no satisfactory alternative’.
- The action 'will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in their natural range'.

To apply for a licence, the following information is required:

- The species concerned.
- The relative size of the population at the site (note this may require a survey to be carried out at a particular time of the year).
- The impact(s) (if any) that the development is likely to have upon the populations.
- What measures will be conducted to mitigate for the impact(s).

Natural Environment & Rural Communities (NERC) Act 2006

Section 40 of NERC carries an extension of the earlier CRoW Act biodiversity duty to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. Section 41 requires the Secretary of State, as respects England, to publish a list of species and habitats which are of 'principal importance for the purpose of conserving biodiversity'. These lists generally reflect the species and habitats previously listed under the UK Biodiversity Action Plan.

National Planning Policy Framework

This framework replaces Planning Policy Statement 9: Biodiversity and Geological Conservation (PPS 9) (ODPM 2005) and sets out the view of central Government on how planners should balance nature conservation with development. One of the key principles of the NPPF is:

The NPPF states that 'development plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas, including biodiversity. It also states that the aim of planning decisions should be to prevent harm to biodiversity conservation interests and to 'promote the preservation, restoration and re-creation of priority habitats, ecological networks and the recovery of priority species'.

Where determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principals; 'if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused'; and, 'planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss'.

This means that full ecological surveys should be carried out and suitable mitigation measures proposed prior to any planning application being submitted.

Biodiversity 2020: A strategy for England's wildlife and ecosystem services

This biodiversity strategy for England builds on the Natural Environment White Paper and the earlier UK Biodiversity Action Plan. It provides a comprehensive picture of how Government is implementing our international and EU commitments and sets out the strategic direction for biodiversity policy up to 2020. Its mission is to:

> *"halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people."*

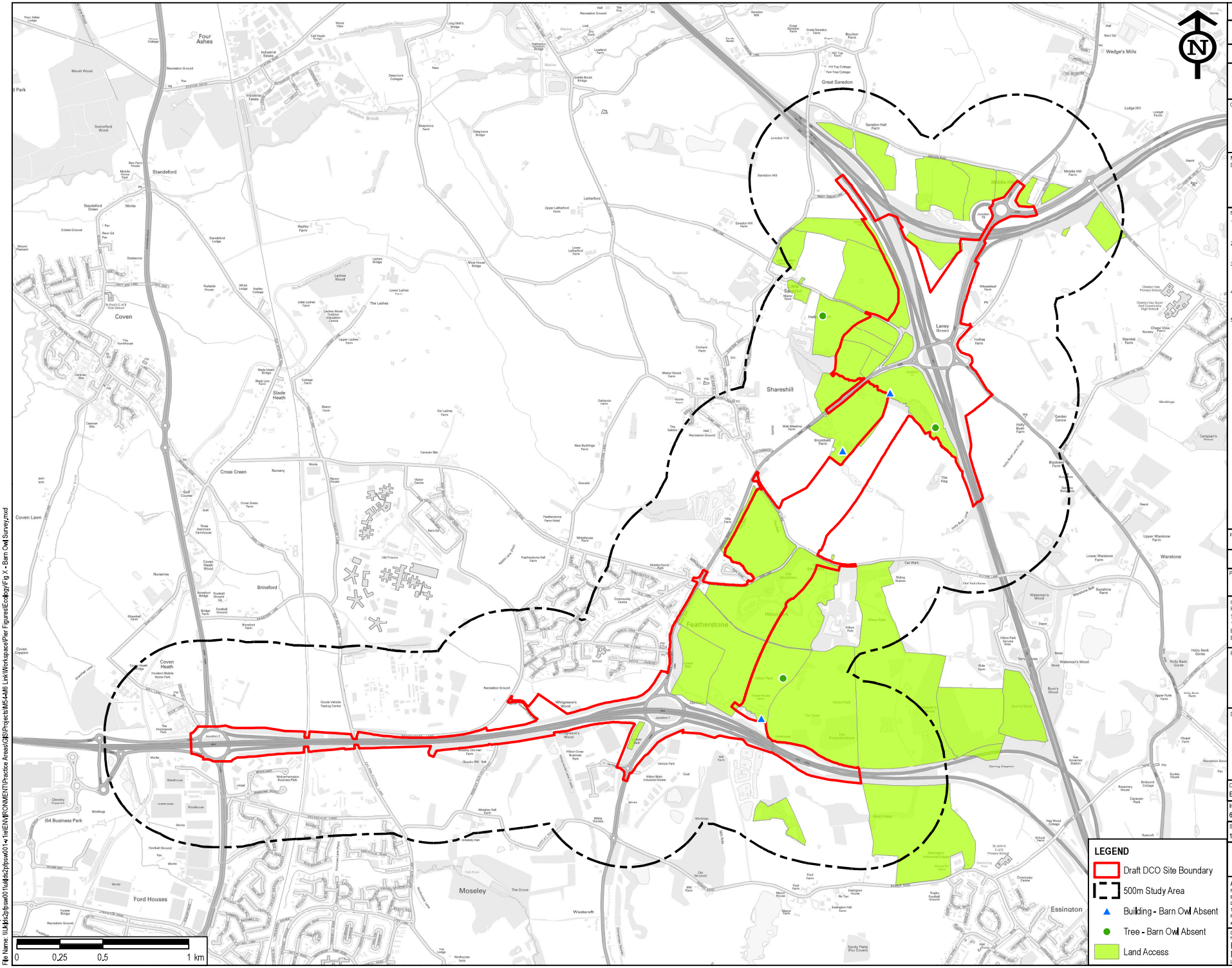
In relation to planning and development its priority is to:

> *"take a strategic approach to planning for nature within and across local areas. This approach will guide development to the best locations, encourage greener design and enable development to enhance natural networks. We will retain the protection and improvement of the natural environment as core objectives of the planning system."*

Annex B. Figures

Figure 1: Barn Owl Survey Area

Figure 2: Barn Owl Survey



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First Issue	EC / AR	04/12/18	P01
Revision Details	By / Check	Date	Suffix

Purpose of issue
FOR INFORMATION

Client
Highways England
The Cube
199 Wharfside Street
Birmingham
B1 1RN

Working on behalf of
highways england

Project Title
M54-M6 LINK ROAD

Drawing Title
FIGURE 1
BARN OWL SURVEY AREA

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	08/05/2019

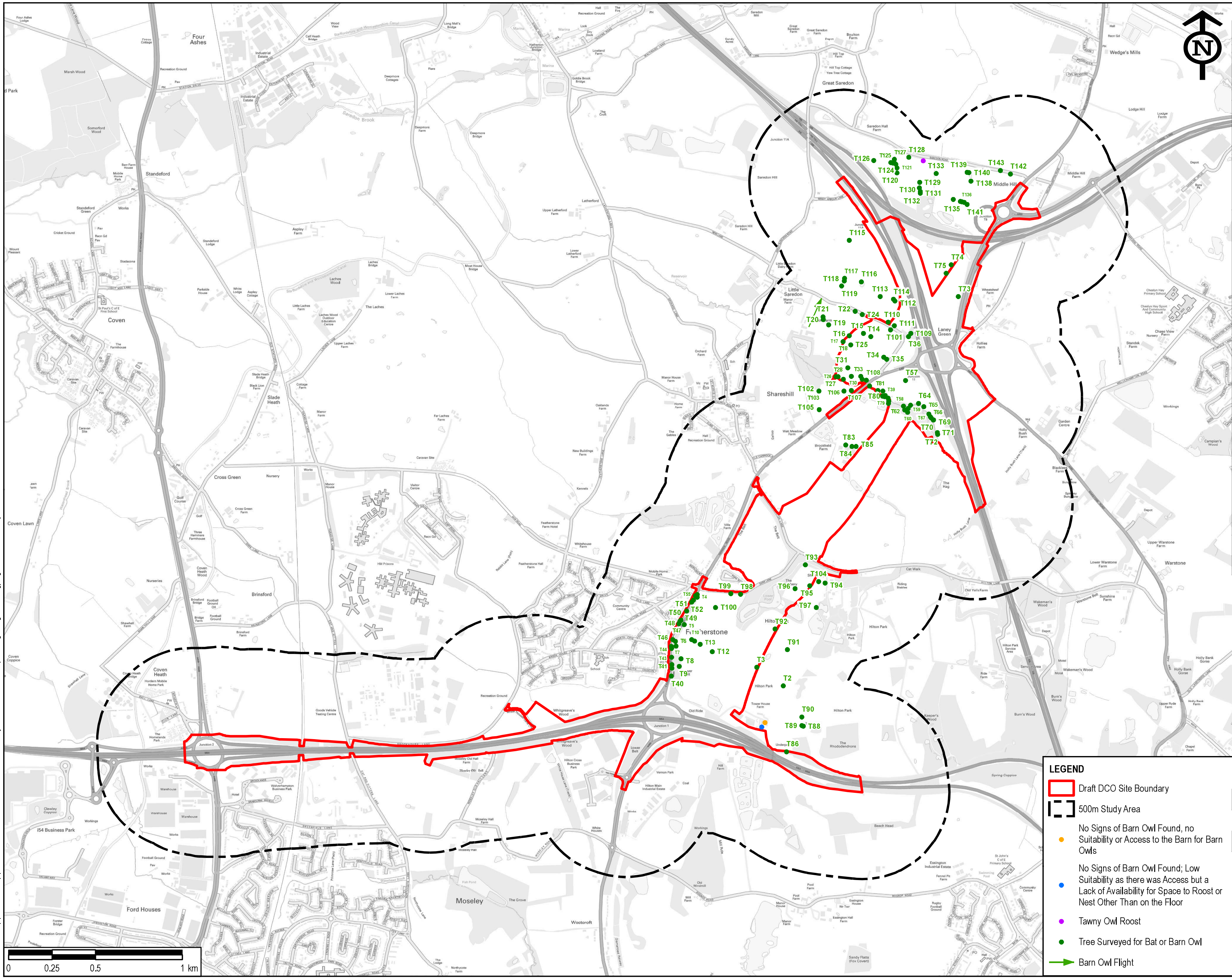
Internal Project No.	Suitability
60536736	S2
Scale @ A3	Zone
1:20,000	M54 to M6/M6 (Toll) Link Road

LEGEND
- Draft DCO Site Boundary
- 500m Study Area
- Building - Barn Owl Absent
- Tree - Barn Owl Absent
- Land Access

AECOM
Royal Court
Basil Close, Chesterfield
Derbyshire, S41 7SL
Tel: 01246 209221
Fax: 01246 209229
www.aecom.com

Drawing Number	Originator	Volume		Rev
Highways England PIN				
HE514465	-ACM	- EGN -		P01
M54_SW_PR_Z		-DR - EG -	0007	
Location		Type	Role	Number

Plot Date: 08 May 2019 13:37:43
File Name: \\UKMS-2pfpsw001\ukms2pfpsw001-v1\e\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspaces\Pier Figures\Ecology\Fig X - Barn Owl Survey.mxd



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First Issue	EC / AR	04/12/18	P01
Revision Details	By / Check	Date	Suffix

Purpose of issue
FOR INFORMATION

Client
Highways England
The Cube
199 Wharfeside Street
Birmingham
B1 1RN

Working on behalf of highways england

Project Title
M54-M6 LINK ROAD

Drawing Title
FIGURE 2
BARN OWL SURVEY

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	10/05/2019

Internal Project No.	Suitability
60536736	S2
Scale @ A3: 1:20,000	Zone: M54 to M6/M6 (Toll) Link Road

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AECOM
Royal Court
Basil Close, Chesterfield
Derbyshire, S41 7SL
Tel: 01246 209221
Fax: 01246 209229
www.aecom.com

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Registered in England Registered number: 880328
Registered office: Scott House, Alencon Link, Basingstoke, Hampshire RG21 7PP

Drawing Number	Originator	Volume	Rev
Highways England PIN HE514465 M54_SW_PR_Z (Location)	-ACM	- EGN - -DR - EG - 0021 (Type, Role, Number)	P01

Plot Date: 10 May 2019 14:56:28
File Name: \\Ukkds2pfpsw001\ukds2pfpsw001-v1\ie\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 3 Figures\Ecology\Fig X - Barn Owl Survey Version 2.mxd

Annex C. Photographs

	Image 1: Barn A. Two story, open sided barn located in the southern section of the proposed Scheme.
	Image 2: Barn A complex. Single story closed sided barns located within the same complex as Barn A.
	Image 3: Tree 1. Mature tree with an open trunk cavity located towards the southern section of the proposed Scheme.

	Image 4: Tree 1. Mature tree with cavities located towards the north-western section of the proposed Scheme.
	Image 5: Mature tree with cavities located within the centre section of the proposed Scheme.
	Image 6: Mature tree with cavity located towards the southern section of the proposed Scheme.

	Image 7: Barn C: Barn complex of single and two-story buildings located within the northern section of the proposed Scheme.
	Image 7: Barn C: Open fronted sections of the barn complex located within the northern section of the proposed Scheme.
	Image 8: Barn D: Small, open fronted building located within the northern section of the proposed Scheme.

Appendix 13.1: Environment Agency Data

Table 13.1A: Summary Water Quality Data Provided by the Environment Agency (received 11/12/18)

Water Quality Parameter	Unit	EQS (for Good Status)	Count	Min	Max	Mean	Percentiles ('thP')		
							10	90	98
pH	pH Units	6-9	48	7.5	8.3	7.84	7.6	8.1	8.2
Conductivity @ 25°C	uS/cm	N/A	21	477	1524	1092	604	1482	1513
Water Temperature	°C	28 (98thP)	22	5.1	17.1	11.5	6.8	15.19	16.47
Ammonia	mg/l	0.3 (90thP)	2 2	0.05	2.23	0.42	0.07	1.37	2.0
Suspended solids @105°C	mg/l	N/A	4	4.38	13.5	7.18	4.7	11.1	13.0
Alkalinity to pH 4.5	mg/l	N/A	21	78	227	182	146	221	224.6
Orthophosphate (reactive as P)	mg/l	0.054	21	0.03	0.722	0.24	0.05	0.47	0.68
Dissolved Oxygen	mg/l	N/A	21	6.02	11.7	9.02	6.57	11	11.5

Table 13.1B: Groundwater Abstractions

License	Description	National Grid Ref	Abstraction Number on map
03/28/03/0072	Public Water Supply	SJ9107	A1
03/28/03/0189	Water Supply Related	SJ9208	A2
03/28/03/0215	Hilton Industrial Estate Industrial Process Water	SJ94010405	A3
03/28/03/0127	Spray Irrigation, Saredon, tributary of Saredon Brook.	SJ943072	A4
03/28/03/0205	Spray Irrigation, Staffs & Worcester canal	SJ95020902	A5
03/28/03/0236	Spray Irrigation, Essington Fruit Farm	SJ96540382	A6
03/28/03/0188	Spray Irrigation, Hollybush Garden Centre	SJ96450649	A7
Private Water Supply	Well (Latherford Farm)	SJ 93751 07323	A8: PWS

License	Description	National Grid Ref	Abstraction Number on map
Private Water Supply	Spring (close to Saredon Hill Farm)	SJ 95309 08085	A9: PWS