M42 Junction 6 Improvement

TR010027

5.2 Annex K (part 4)

S47 Consultation Materials

Regulation 5(2)(q)

Planning Act 2008

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

Volume 5

January 2019

Infrastructure Planning

Planning Act 2008

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

M42 Junction 6 Improvement

Development Consent Order 202[ ]

5.2 Consultation Report
Annex K (part 4): S47 Consultation Materials

Regulation Number	Regulation 5(2)(q)
Planning Inspectorate Scheme Reference	TR010027
Application Document Reference	5.2 Consultation Report Annex K (part 4)
Author	M42 Junction 6 Improvement, Project Team, Highways England

Version	Date	Status of Version
Rev 1	January 2019	DCO Application

Annex K Content

Part 1

1. s48 Notice
2. Statutory Public Consultation Brochure
3. Copy of the S47 Letters which went out to the local community, businesses, local organisations and people who had previously contacted Highways England about the Scheme
4. Copy of S47 Notice in the Birmingham Mail (04/01/2018)
5. Copy of S47 Notice in the Solihull News (05/01/2018)
6. Statutory Public Consultation poster/flyer
7. Statutory Public Consultation Exhibition Boards
8. Statutory Public Consultation Public Advert in the Birmingham Mail (21/12/2017)
9. Statutory Public Consultation Public Advert in the Solihull News (12/01/2018)
10. Statutory Public Consultation Public Advert in the Solihull News (22/12/2017)
11. Preliminary Environmental Information Report – Non-Technical Summary

Part 2

12. Scheme Plans – Overview of Scheme plan, aerial imagery of Scheme plan and redline boundary plan

Part 3

13. Preliminary Environmental Information Report

Part 4

14. Preliminary Environmental Information Report – Appendices (a)

Part 5.1

15. Preliminary Environmental Information Report – Appendices (b)

Part 5.2

16. Preliminary Environmental Information Report – Appendices (b)

Part 5.3

17. Preliminary Environmental Information Report – Appendices (b)

Appendix 6.1: Designated Heritage Assets

Reference	Grid Reference	Description	Shown on Figure
1017243	SP 20220 80785	Moated site at Moat House. **Scheduled Monument**.	6.2
1017529	SP 18982 79243	Moated site at Eastcote Hall. **Scheduled Monument**.	6.2
1017815	SP 20308 80770	Churchyard cross in St Mary and St Bartholomew's churchyard. **Scheduled Monument**.	6.2
1045849	SP1802079398	Henwood Mill. **Listed Building Grade II**.	6.2
1045901	SP 19019 79306	Dovecote at Eastcote Hall. **Listed Building Grade II**.	6.2
1055725	SP 20336 81020	Manor Cottage. **Listed Building Grade II**.	6.2
1055754	SP 20103 80904	Hampton Manor. **Listed Building Grade II**.	6.2
1055777	SP 20278 80771	Church of Saint Mary and Saint Bartholomew. **Listed Building Grade I**.	6.2
1055786	SP 20344 80802	White Lion Public House. **Listed Building Grade II**.	6.2
1057655	SP 20212 80774	The Moat House. **Listed Building Grade II***.	6.2
1075949	SP 18798 82253	Grange Farmhouse. **Listed Building Grade II**.	6.1
1075950	SP 17653 82117	Castle Hills Farmhouse. **Listed Building Grade II**.	6.2
1075961	SP 19010 79246	Eastcote Hall. **Listed Building Grade II***.	6.2
1075967	SP 19491 79140	Wharley Hall. **Listed Building Grade II**.	6.2
1076716	SP 17852 79890	Bogay Hall. **Listed Building Grade II***.	6.2
1076762	SP 20332 80872	22-30, High Street. **Listed Building Grade II**.	6.2
1076763	SP 20336 80895	32-42, High Street. **Listed Building Grade II**.	6.2
1076764	SP 20308 80770	Churchyard Cross. **Listed Building Grade II**.	6.2
1076765	SP 20334 80970	The Lodge, Hampton Manor. **Listed Building Grade II**.	6.2
1076769	SP 20274 80716	Church Farmhouse. **Listed Building Grade II**.	6.2
1253299	SP 19437 79210	Eastcote Manor. **Listed Building Grade II**.	6.2
1261972	SP 20113 80880	The clock tower attached to Hampton Manor. **Listed Building Grade II***.	6.2
1342829	SP 20396 80680	Fentham Club. **Listed Building Grade II**.	6.2
1342830	SP 18612 80308	Walford Hall Farmhouse. **Listed Building Grade II***.	6.2
1342867	SP 20067 80897	Garden terrace, walls and steps at Hampton Manor. **Listed Building Grade II**.	6.2
1343224	SP 18827 82409	Church Of Saint Peter. **Listed Building Grade I**.	6.1
1343225	SP 20838 82742	Pasture Farmhouse. **Listed Building Grade II**.	6.1
1343230	SP 19421 79299	Eastcote House. **Listed Building Grade II**.	6.2
1367098	SP 20650 84038	Park Farmhouse. **Listed Building Grade II***.	6.1

Reference	Grid Reference	Description	Shown on Figure
1370065	SP 19488 79177	Barn At Wharley Hall. **Listed Building Grade II**.	6.2
1393163	SP 20320 80824	K6 kiosk. **Listed Building Grade II**.	6.2
	SP 20284 80899	Hampton in Arden. **Conservation Area**.	6.2
	SP 18729 82362	Bickenhill. **Conservation Area**.	6.1

Appendix 6.2: Known Non-Designated Heritage Assets

Reference	Grid Reference	Period	Description	Shown on Figure
MSI1569	SP 18 81	Post-Medieval	Find spot. A series of post-medieval artefacts found by metal detecting – three coins, a crotal, and a buckle.	6.4
MSI1593	SP 19432 81424	Medieval	Find spot. Hampton in Arden – artefacts found by metal detecting – coin and two strap fittings.	6.4
MSI1639	SP 18470 82837	Bronze Age	Find spot. Bickenhill – palstave found by metal detecting.	6.3
MSI1675	SP 18500 82900	Medieval	Find spot. Bickenhill – harness fitting found by metal detecting.	6.3
MSI1428	SP 18293 81481	Medieval	Find spot. Hampton in Arden – silver coin found by metal detecting.	6.4
MSI1466	SP 19432 81424	Post-Medieval	Find spot. Hampton-in-Arden – two coins found by metal detecting.	6.4
MSI1814	SP 18293 81481	Roman	Find spot. Solihull – chance find of vessel.	6.4
MSI1376	Linear	Iron Age to Medieval	Linear. Salter Street trackway. Ancient trackway originating in Droitwich and traceable across the Arden.	6.4
10829 MSI149	SP 2007 8373	Early Medieval to Modern	Westaneford, Holywell Brook, north of Middle Bickenhill. Old trackway between Hampton and Coleshill.	6.3
10926 MSI184	SP 1880 8280	Medieval	Ridge and furrow.	6.3
10504 MSI185	SP 2031 8311	Medieval	Middle Bickenhill. Manor and settlement founded as a secondary colony settlement of Bickenhill.	6.3
5727 MSI756	SP 2031 8295	Medieval	Holloway south of Cottage Farm. Old road between Bickenhill and Meriden.	6.3
6960 MSI955	SP 2030 8278	Neolithic to Post-Medieval	Large rectangular enclosure lying roughly ENE-WSW south of Cottage Farm. Identified by cropmarks.	6.3
5660 MSI732	SP 1849 7955	Medieval	Lynchets north of Henwood.	6.4
9063 MSI1161	SP 1805 8152	Unknown	Enclosure or settlement identified by cropmarks, unknown date, north-east of Woodhouse Farm, Bickenhill.	6.4
9062 MSI1160	SP 1815 8091	Neolithic to Post-Medieval	Undefined ‘site’ described as triangular feature identified by cropmarks with other surrounding features depicting a differently aligned field system. North-west of Barbers Coppice, Catherine de Barnes.	6.4

Reference	Grid Reference	Period	Description	Shown on Figure
5822 MSI825	SP 1802 8043	Early Medieval to Medieval	Catherine de Barnes, settlement identified by documentary evidence.	6.4
3118 MSI570	SP 1829 8330	Medieval	Windmill east of Hurdle Farm.	6.3
9902 MSI1225	SP 1896 8205	Neolithic to Post-Medieval	Ring ditch identified by cropmarks, 10m west from a track off St Peter's Lane, Bickenhill.	6.3
5667 MSI739	SP 1932 8232	Unknown	Quarry pit east of Bickenhill. Unknown date.	6.3
10828 MSI148	SP 1970 8275	Medieval	Old road, Bickenhill to Meriden. Earlier road line from Church Bickenhill to Stonebridge and Meriden.	6.3
10827 MSI147	SP 1867 8118	Post-Medieval to Modern	Gorsey Lane, Hampton in Arden. Old road – no visible remains.	6.4
5757 MSI769	SP 1896 8105	Post-Medieval to Modern	Pits, M42 corridor. Two pits shown on OS first edition and on 1983 1:10,000. Possible industrial function.	6.4
5758 MSI770	SP 1886 8106	Post-Medieval to Modern	Pit, M42 corridor. Shown on OS first edition. Possible industrial function.	6.4
10836 MSI156	SP 1884 8063	Post-Medieval to Modern	Two buildings east of Hampton Lane farm, Catherine de Barnes. Identified by 1812 Enclosure map, now demolished.	6.4
10835 MSI155	SP 1866 8058	Medieval to Post-Medieval	Marlpit opposite Hampton Lane Farm, Catherine de Barnes. Now filled in. Marl was excavated in both the medieval and post-medieval periods.	6.4
10834 MSI154	SP 1860 8052	Iron Age to Early Medieval	Circumstantial evidence for defences north of Walford Hall Farm. No physical remains.	6.4
10837 MSI157	SP 1878 8050	Neolithic to Post-Medieval	Linear feature identified by cropmarks, north-east of Walford Hall Farm.	6.4
10832 MSI152	SP 1845 8032	Neolithic to Post-Medieval	Possible field systems and enclosures identified by cropmarks on aerial photographs, west of Walford Hall Farm.	6.4
10493 MSI79	SP 1859 8031	Medieval	Moat, Walford Hall Farm, Hampton. The present house was built beside an earlier moated site.	6.4
10833 MSI153	SP 1874 8007	Neolithic to Post-Medieval	A linear ditch parallel to the motorway, identified by cropmarks, south-east of Walford Hall Farm. Appears to stop at a ploughed out mound or pit.	6.4
5797	SP 1933 8079	Medieval	Ridge and furrow identified by cropmarks. An undated enclosure is visible in the	6.4

Reference	Grid Reference	Period	Description	Shown on Figure
MSI809			north corner of the field.	
5661 MSI733	SP 1932 8104	Unknown	A circular enclosure visible on aerial photographs taken in the 1970s, along with a ploughed out mound. South of Shadow Brook Lane.	6.4
5419 MSI720	SP 1941 8138	Unknown	Possible rectangular cropmark north of Bickenhill Lane.	6.4
5663 MSI735	SP 1942 8151	Neolithic to Modern	Site of lynchet or Holloway, Home Farm, Hampton in Arden.	6.4
5664 MSI736	SP 1950 8176	Medieval	Pit or quarry, and ridge and furrow, Home Farm, Hampton in Arden.	6.4
5665 MSI737	SP 1963 8181	Unknown	Pits of a possible quarry, Home Farm, Hampton in Arden. Identified from first edition 25 inch OS map.	6.4
5666 MSI738	SP 1951 8189	Unknown	Soil mark of a pit for a possible quarry identified from aerial photographs.	6.4
5409 MSI718	SP 1965 8199	Unknown	Circular features identified by cropmarks, Hampton in Arden, Unknown date and function.	6.4
5728 MSI757	SP 1985 8450	Neolithic to Post-Medieval	Earthwork of a boundary bank, south-west of Bickenhill Common Farm.	6.3
5668 MSI740	SP 1992 8409	Post-Medieval	Earthworks of a farmhouse and rabbit warren, Warren Farm, Bickenhill.	6.3
6198 MSI884	SP 1880 8240	Medieval to Modern	Site of Bickenhill Medieval Manor and settlement. Earthworks visible.	6.3
5761 MSI773	SP 1911 8175	Medieval to Modern	Unknown features, possibly a terrace and pit, marked on OS map of 1938, rear of Shadow Brook Lane.	6.3
5787 MSI799	SP 1887 7958	Medieval	Ridge and furrow south of Friday Lane identified by aerial photographs.	6.4
5794 MSI806	SP 1916 8018	Medieval	Ridge and furrow south of Aspbury's Copse, Hampton in Arden. Identified by aerial photographs.	6.4
5798 MSI810	SP 1981 8083	Medieval	Ridge and furrow north of Hampton Lane, Hampton in Arden identified as cropmarks.	6.4
5802 MSI815	SP 1967 8226	Medieval	Ridge and furrow adjacent to the M42, near Bickenhill, identified by cropmarks.	6.4

Reference	Grid Reference	Period	Description	Shown on Figure
1841 NMRSP18SE28 1468115	SP 1826 8121	Modern	Starfish Bombing Decoy SF2E. A bombing decoy bunker site identified off Catherine-de-Barnes Lane. Extant brick building. Dates to the Second World War and is a rare example of this type of monument.	6.4
MSI1842	SP 1811 8138	Post-Medieval	Parson's Piece Field, Catherine-de-Barnes. Recorded on map from 1812. Unknown why it was given this name.	6.4
MSI1855	SP 1870 8363	Modern	Bickenhill Landing Grounds. Two fields used by flying circuses between 1933 and 1936.	6.3
10506 MSI87	SP 1889 8248	Medieval	Manor house, Church Bickenhill. Site of possible manor house. Circumstantial evidence only.	6.3
1363576 NMR977	Linear	Post-Medieval	London and Birmingham Main Line Railway completed 1838.	6.3
1366099 NMR1067	Linear	Post-Medieval	Derby and Birmingham Junction Railway completed 1839.	6.3
1395007 NMRSP18SE14	SP172 840	Modern	Birmingham Elmdon Airport. Word War Two military airfield opened in 1939, now a civil airport. Used as an Elementary Flying Training School during the Second World War and had been redeveloped by the 1980s into the Birmingham (Elmdon) Airport. Some of the wartime defenced remains.	6.3
1470031 NMRSP18SE29	SP 18999 82437	Post-Medieval to Modern	Slight earthwork remains of building platforms, holloways, and ridge and furrow south and east of Yew Tree Farm to the south of Church Lane, Bickenhill. Most seem to be associated with the farm in recent history.	6.3
14004 MSI1233	SP 20081 84470	Mesolithic	Find spot of a flint blade of possible Mesolithic date.	6.3
10535 MSI112	SP 1946 8394	Post-Medieval	Pendigo Farmhouse. Buried remains of a farmhouse under the Birmingham NEC.	6.3
10503 MSI84	SP 2058 8382	Early Medieval to Post-Medieval	Hill Bickenhill Deserted Settlement. A lost hamlet represented by Park Farm.	6.3
5726	SP 2019 8294	Medieval	Ridge and furrow visible as cropmarks.	6.3
10974 MSI196	SP 1820 8285	Medieval	Ridge and furrow south of Coventry Road, Bickenhill, visible as slight earthworks.	6.3
9066 MSI1164	SP 1838 8280	Medieval	Ridge and furrow west of Clock Lane, Bickenhill. Visible as earthworks.	6.3
10975	SP 1860 8280	Medieval	Ridge and furrow east of Clock Lane, south of Coventry Road, Bickenhill. Curved	6.3

Reference	Grid Reference	Period	Description	Shown on Figure
MSI 197			earthworks visible under pasture. Site now covered by a roundabout.	
8585 MSI1014	SP 1795 8215	Medieval	Ridge and furrow north of Castle Hills. Earthworks aligned east – west.	6.3
10499 MSI81	SP 1880 8240	Medieval	Centre point of the medieval parish of Bickenhill.	6.3
8587 MSI1016	SP 1900 8238	Medieval	Ridge and furrow east of Yew Tree Farm, Bickenhill.	6.3
8588 MSI1017	SP 1929 8252	Medieval	Ridge and furrow east-north-east of Bickenhill. Earthworks under pasture, aligned roughly north-south.	6.3
8586 MSI1015	SP 1903 8192	Medieval	Ridge and furrow south-east of Bickenhill. Runs adjacent to the stream and has an irregular wide pattern.	6.3
5801 MSI814	SP 1920 8150	Medieval	Ridge and furrow north of Shadow Brook Lane. Visible as cropmarks on aerial photographs.	6.4
5800 MSI813	SP 1950 8140	Medieval	Ridge and furrow adjacent to Home Farm. Visible as cropmarks on aerial photographs.	6.4
5799 MSI811	SP 1970 8120	Medieval	Ridge and furrow south of Shadow Brook Lane. Visible as cropmarks on aerial photographs.	6.4
9061 MSI1159	SP 1945 8103	Medieval	Ridge and furrow north of Shadow Brook Lane. Reversed S pattern visible as earthworks and aligned roughly north-south.	6.4
5804 MSI817	SP 1880 8090	Medieval	Ridge and furrow north of Hampton Lane Farm. Identified on aerial photographs.	6.4
5803 MSI816	SP 1870 8070	Medieval	Ridge and furrow adjacent to Hampton Lane Farm. Identified on aerial photographs.	6.4
5795 MSI807	SP 1920 8035	Medieval	Ridge and furrow south of Aspbury's Copse. Identified on aerial photographs.	6.4
5796 MSI808	SP 1935 8040	Medieval	Ridge and furrow south of Aspbury's Copse. Identified on aerial photographs.	6.4
9060 MSI1158	SP 1980 9060	Medieval	Ridge and furrow west of The Limes, Hampton. Visible as extensive earthworks.	6.4
5792 MSI804	SP 1870 8020	Medieval	Ridge and furrow adjacent to Walford Hall Farm. Identified on aerial photographs.	6.4

Reference	Grid Reference	Period	Description	Shown on Figure
5793 MSI805	SP 1880 8025	Medieval	Ridge and furrow adjacent to Walford Hall Farm. Visible as cropmarks on aerial photographs.	6.4
5796 MSI768	SP 1935 8040	Medieval	Ridge and furrow south of Aspbury's Copse. Visible as cropmarks on aerial photographs.	6.4
5672 MSI742	SP 1870 7990	Roman	Find spot. A single sherd of Roman pottery found during fieldwalking, south of Walford Hall Farm.	6.4
1734 MSI303	SP 1890 7960	Roman	Find spot. A single sherd of Roman pottery found during fieldwalking. Barston survey.	6.4
1745 MSI314	SP 1890 7960	Prehistoric	Flint scatter recovered during fieldwalking. Barston survey.	6.4
1428 MSI1683	SP 18293 81481	Medieval	Find spot of a silver coin.	6.4

Appendix 7 Landscape and Visual Viewpoint Table

Table 1: VIEWPOINT A – A452 / Garden Centre see Figure 7.1

Receptors	Existing Outlook- Summer	Winter Year of Opening View	Summer of Design Year
Views from the A452. Value: Low Susceptibility; Low Sensitivity : Low	Direct view of the A452 but very limited views from the A452 through and over roadside vegetation towards the NEC complex. The distant view features electricity pylons against the skyline which broadly follow the M42 corridor. The M42 runs within cutting concealing traffic movements, lighting and gantries The woodland surrounding the NEC car parking areas and the tall buildings associated with the NEC forms the background of the view.	The works at junction 6 of the M42 would not be visible from this location due to the intervening landscape and vegetation . The widening of the M42 carriageway north of junction 6 would result in some minor low level vegetation loss along the largely open southbound verge that would not be noticeable from this viewpoint. However, there would be a significant loss of the established screening vegetation on the northbound verge and alongside the NEC. **The magnitude of change is likely to be negligible resulting in neutral effects**	Re-instatement planting along the M42 verges would restore the vegetation along the skyline and return the view to the existing outlook. **The magnitude of change is likely to be no change resulting in neutral effects options in the design year.**

Table 2: VIEWPOINT B – NEC/Hotel Car Park see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Views from the Hilton Hotel car park and users of the hotel and the NEC complex. Value: Low Susceptibility; Low Sensitivity : Low	Direct filtered views to the east south-east across the car parking areas of the NEC development towards the M42 corridor, screened from view by the established screening belt along the northbound carriageway. The view changes with use of the car park varying between empty and full during events, when traffic movement would be constant feature. The nearby electricity pylons are a dominant feature rising above the	The proposed scheme would result in some significant loss of established screening vegetation on the northbound verge and alongside the NEC car park From this viewpoint most of the trees forming the background of the view would be removed. This would create some limited and partial views of traffic movements. Additional views of gantries, lighting columns and signage along the motorway corridor would be opened up, and the electricity pylons in the car park become much more distinct against the	Mitigation planting would include reinstatement of planting along new verges on the M42 corridor. Planting would restore the screening vegetation forming the background of the view. Potential remains for reduced levels of screening but there would be no significant change in the view. **The magnitude of change is likely to be no change resulting in neutral effects**

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
	treeline on both sides of the motorway.	skyline. Overall the view would become more open due to the loss of screening vegetation and an increased awareness of the M42 and other infrastructure in the area. **The magnitude of change is likely to be minor resulting in slight adverse effects .**	**in the design year.**

Table 3: VIEWPOINT C – East Way Overbridge see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of East Way Value: Low Susceptibility; Low Sensitivity : Low	Elevated viewpoint on East Way allows open direct views to the south of the M42 corridor and slip roads associated with Junction 6. The existing view is complex, featuring direct views of the M42 carriageways and heavy traffic movement merging and diverging, static motorway signage, electronic gantry signage and lighting. The view is contained with only woodland visible in far distant views.	From this viewpoint the Proposed Scheme would bring significant additions to the M42 corridor within this view. The introduction of the new free flow lanes on the north and south bound carriageways and connections to the local road network would significantly increase the width of the existing corridor and reduce the extent of the soft estate. Vegetation removal to accommodate the northbound free flow lane would open views across the carriageway into the expanse of the NEC car parks and alter the composition of the view towards a more urban nature. While there would be noticeable additions to the existing view, dominated by the M42, the nature of the view would not change significantly. **The magnitude of change is likely to be minor resulting in slight adverse effects.**	Outline mitigation planting would include reinstatement of planting along new verges on the M42 corridor. The open and direct views of the M42 corridor would remain but would appear more integrated within the setting. generally the view would be a similar outlook as the existing view. **Overall the existing outlook restored and the magnitude of change is likely to be negligible in the context of this view, resulting in slight adverse effects in the design year.**

Table 4: VIEWPOINT D – Coventry Road A45 westbound see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the A45/Coventry Road and visitors to the recycling centre and surrounding businesses. Value: Low Susceptibility; Low Sensitivity : Low	Open views to the west along the A45 corridor with limited awareness beyond due to the roadside vegetation and open skylines creating a sense of separation from the surrounding landscape. The A46, traffic movements, lighting columns and signage are the main features within the view.	From this viewpoint there would be little awareness of the Proposed Scheme. There would be no direct views of the works which would be below the line of sight from the elevated A45, with the exception of the tie ins of the free flow lanes with the A45. At these points a slight change in the highways layout, signage and local vegetation clearances would result in very minor changes to the existing view. Wider vegetation clearances may result in a reduction of vegetation visible against the skyline but otherwise there would be no significant change in the existing outlook. **The magnitude of change is likely to be negligible resulting in neutral effects.**	Mitigation planting would include reinstatement of planting along new verges on the M42 corridor. Planting would restore any removed vegetation within the view. **The magnitude of change is likely to be no change resulting in neutral in the design year**.

Table 5: VIEWPOINT E – National Motorcycle Museum / National Conference Centre (NMM/NCC) see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the NMM/NCC Value: Low Susceptibility; Moderate Sensitivity : Low	The view from this location varies from Direct to oblique to the west from the entrance and car parking areas of the facility. Beyond the maintained vegetation at theentrance are direct views of the junction roundabout and traffic movements along it and the bridged section of the A45. Electricity pylons, road signage and lighting columns are visible.	From this viewpoint there would be a significant change in the view. The southbound free flow link with M42 would cut across the frontage of the NMM/NCC in deep cutting which would result in a loss and reconfiguration of the entrance, car parking areas and amenity planting, as well as some maturing trees screening the junction from the main building. The free flow link itself would be below the line of view and traffic movements should not be visible, but the open cutting would be an obvious new element across the line sight. The loss of the existing screening vegetation would further open up views of traffic on the A45 and on the junction itself, while the works on the opposite	Mitigation planting would include reinstatement of planting along new verges on the M42 corridor. Reconfiguration of the NMM/NCC entrance and car parking would be required. Planting would seek to reinstate screening of junction 6 and restore the amenity planting of the facility. There is likely to be an increased presence and awareness of the M42 and junction 6, however in the context of this view this would not constitute a significant change. **The magnitude of change is likely to be**

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
		side of the junction would remove or reduce screening towards the NEC and would likely open partial views of the NEC buildings and car parking areas. Overall there would be some noticeable alterations to the view but the general composition and context would not change significantly. **The magnitude of change is likely to be minor resulting in slight adverse effects.**	**minor resulting in Slight adverse effects in the design year.**

Table 6: VIEWPOINT F – Old Station Road see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Properties along Old Station Road and users of the rights of way. Value: High Susceptibility: Moderate Sensitivity:Moderate	Short range views to the west from Old Station Road across the rising open fields are terminated in the mid ground by the established field boundary hedgerows, and the screening vegetation along the M42 corridor beyond. Electricity pylons are visible above this vegetation running north/south alongside the motorway. The main carriageway and slip roads of the M42 are located within cutting and as a result are screened from view. Two storey properties may have greater awareness of lighting but traffic movements are below the line of sight (with the possible exception of the houses on the western side of Old Station Road).	From this viewpoint the tie in of the southbound free flow link with the M42 would be in cutting and remain below the line of sight. There would be no views of the M42 or associated traffic. The new section of road would require widening and some loss of existing vegetation within the motorway verge. However any reduction in vegetation in the view is unlikely to open views of the motorway and would be seen as reduced vegetation in filtered views beyond the intervening mature hedgerows which would remain intact. The new link road would not be visible from this location. **The magnitude of change of is likely to be negligible resulting in neutral effects.**	Mitigation planting would include reinstatement of planting along new verges on the M42 corridor and screen planting along the sections of embankment and hedge planting along the boundary fence line. Re-instatement of vegetation along the southbound verge of the M42 would return the view to the existing outlook. Overall views towards the proposed scheme would be restored to the existing view. **The magnitude of change is likely to be no change resulting in neutral effects in the design year.**

Table 7: VIEWPOINT G – Right of way on railway over bridge south see 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the public right of way between M42 and Bickenhill Value: High Susceptibility Moderate Sensitivity: Moderate	Broad open and elevated views to the south from the overbridge. The view takes in the mature trees and remnant field structure between the village of Bickenhill and the M42 corridor. The M42 and the lines of electricity pylons alongside it dominate the view. The motorway follows the line of sight as it heads south. Traffic movements are constantly visible in filtered views, while the gantries, lighting columns and pylons are visible against the skyline running southwards along the M42 corridor towards the horizon. These urbanising and intrusive elements contrast with the settled and more static rural setting of the village of Bickenhill to the west.	From this viewpoint there would be little awareness of the Proposed Scheme. The distance to the proposed scheme and the intervening landscape screens views to the proposed works. **The magnitude of change of is likely to be negligible resulting in neutral effects.**	Mitigation planting would include planting along the length of the Proposed scheme Planting would restore any removed vegetation within the view. **The magnitude of change is likely to be no change resulting in neutral in the design year**.

Table 8: VIEWPOINT H – Right of way on railway over bridge north see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the public right of way between M42 and Bickenhill Value: High Susceptibility: Moderate Sensitivity: Moderate	Open short range view to the north from the rail overbridge across unmanaged grassland towards Junction 6 of the M42. The view is dominated by the nearby and prominent lines of electricity pylons in the open mid-ground, with filtered views through screening vegetation to the M42 and A45 corridors. Gantries, lighting columns and traffic movements are visible in filtered to partial views. Overall the view is made up of a series of man-made elements which, with the exception	From this viewpoint there would be no change in view, beyond a slight reduction in vegetation on the skyline due to works on the opposite side of the junction. There would be no views of the M42 or A45 corridors opened up. **The magnitude of change is likely to be no change resulting in neutral effects.**	Outline mitigation planting would include reinstatement of planting along new verges on the M42 corridor. Any loss of vegetation in the background of the view would be reinstated. **The magnitude of change is likely to be no change resulting in neutral effects in the design year.**

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
	of the pylons, are generally bedded within the view by the established screening vegetation.		

Table 9: VIEWPOINT I – Bickenhill North see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the public right of way and properties in the north of Bickenhill. Value: High Susceptibility: Moderate Sensitivity: Moderate	View looking to the north across the undulating open arable fields towards the raised and vegetated A45 corridor in the background along which partial and filtered views of traffic movements are visible. Beyond the A45 corridor of the NEC and Birmingham International Airport area are not visible due to the dense vegetation however glimpses of the airport, communication towers and lighting columns begin to indicate the presence of major development. The contrast between the rural foreground and the development emphasises the limited separation between the village and the Development surrounding Junction 6.	From this viewpoint the Proposed Scheme would be visible emerging from cutting in the open fields in the west of the view as it approaches the Clock Interchange and divides to join the A45. One link would approach and join the existing alignment of Catherine de Barnes Lane and pass under the existing bridge to link with the roundabout. The other would turn to the north-west and rise to meet the slip road leading to the airport. Vegetation removal would initially open further views of traffic on the A45. In the context of this view the new link road would bring the existing views of traffic and highway infrastructure closer to the village edge. While not significantly altering the composition of the view, the sense of separation between the village and the A45 would be reduced. **The magnitude of change is likely to be moderate resulting in moderate adverse effects.**	Mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Hedge planting along the boundary fencing of the new link road to the Clock Interchange would integrate the road within the view and help screen traffic movements. Screen planting along sections joining the junction would reinstate screening of the A45 corridor. While the new link road would remain a nearby visual element the outlook would return to a similar outlook as the existing view. Overall views would remain but the views of traffic movements would be reduced and the sense of encroachment within the open views would be softened. **The magnitude of change is likely to be minor resulting in slight adverse effects in the design year.**

Table 10: VIEWPOINT J – St Peters Lane see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the local road network around Bickenhill Value: High Susceptibility: Moderate Sensitivity: Moderate	This is a contained view looking to the north-west along St Peters Lane towards Catherine de Barnes Lane. The lane is set in slight cutting and is lined by dense mature vegetation. Views along the lane are channelled towards the junction with Catherine de Barnes Lane (B4438) where they are terminated by roadside vegetation. Due to the contained nature of the lane there is very limited awareness of the wider surroundings from this viewpoint and the view is focused on the immediate area.	From this viewpoint the scheme would result in a new link road running across the view, in the foreground in deep and broad cutting. The new link road would remove existing vegetation that encloses the lane and open the view up to the west and north-west. Traffic movement along the link road would be partially visible, set low in the view. Catherine de Barnes and St Peters Lanes would be realigned and bridged across the cutting. This would significantly alter the nature of this quiet enclosed village lane, opening views of the wider area while introducing more frequent and new structures along with highway traffic to the view leading to a more urban context. **The magnitude of change is likely to be Large resulting in Large adverse effects.**	Outline mitigation planting would include hedge planting along the boundary fence line. Hedge planting along the boundary fence of the new link road would help screen views of traffic movements and help to restore the enclosed character of the view. However the bridged section would remain a prominent component of the view and the presence of the link road wold remain a major urbanising element of the view. **The magnitude of change is likely to be remain moderate resulting in moderate adverse effects in the design year.**

Table 11: VIEWPOINT K – Right of Way west of Bickenhill 1 see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of local footpath Value: High Susceptibility: Moderate Sensitivity: Moderate	Open views from the footpath to the east towards Bickenhill across rising rough grassland and arable fields west of Catherine de Barnes Lane (B4438). The view in this direction is static with very limited filtered views of traffic along Catherine de Barnes Lane which creates the sense of an isolated rural setting. However as the viewpoint is situated under the flight path of the nearby Birmingham International Airport, with	From this viewpoint the proposed scheme would not be visible directly as it runs across the line of view approx. 200m distant in cutting along the crest of the local rise in the landform. The alignment of the new road would be indicated in the alterations to the landform as the cutting modifies the form of the hill crest and some elements of vegetation would be removed. Traffic movements would be hidden from view in cutting, while the majority of rest of the works would be screened from view beyond the intervening landform. The exception would be	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Hedge planting along the boundary fence line would help restore the existing view and screen views of a more engineered profile of the hillcrest. **The magnitude of change is likely to be minor adverse resulting in slight**

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
	periodic aircraft coming in low to land. This together with the awareness of the nearby A45 prevents any perception of remoteness that may be indicated by the view.	potential lighting at the proposed new roundabout to the south-east near to the southern entrance of St Peters Lane onto Catherine de Barnes Lane. Overall there would be minor changes to the composition of this view. **The magnitude of change is likely to be moderate resulting in moderate adverse effects.**	**adverse effects in the design year.**

Table 12: VIEWPOINT L – Right of Way west of Bickenhill 2 see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of local footpath Value: High Susceptibility: Moderate Sensitivity: Moderate	View to the east from the footpath located on a footpath through open arable fields. The view takes in a mid-distant view of the village of Bickenhill set within the surrounding vegetation with the church spire rising above. The major developments of the NEC and Birmingham International Airport are visible in the background to the north of the village. Traffic movements along Catherine de Barnes Lane (B4438) and partially along the A45 introduce regular movement within the view, along with the periodic low flying aircraft coming in to land.	From this viewpoint views of the proposed scheme would be possible as the new link road runs in cutting from this high point towards the village of Bickenhill to the north-east. The modifications to the landform would be visible with views of traffic movements becoming more visible as the alignment approaches Catherine de Barnes Lane and Bickenhill in the distance. A new roundabout and associated lighting near to the southern entrance of St Peters Lane onto existing Catherine de Barnes Lane would be just visible to the south of the view with lighting introduced above the crest of the hill. The realignment and works to Catherine de Barnes Lane would remove some or all the existing hedge alongside and expose traffic to view. As the new link road passes to the left of Bickenhill in the distance the road corridor would create a large opening in the dense vegetation surrounding and forming the setting to the village. In general the view would be significantly transformed by the proximity of the proposed works and the extensive **The magnitude of change is likely to be major**	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Hedge planting along the boundary fence line would help restore the existing view but is not likely to screen views of the new link road entirely which would remain a significant component within this rural outlook. **The magnitude of change is likely to be moderate resulting in moderate adverse effects in the design year**. .

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
		resulting in large/moderate adverse effects.	

Table 13: VIEWPOINT M – Right of Way near Castle Hills Farm see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of local footpath and the farm holdings at Castle Hills Value: High Susceptibility: Moderate Sensitivity: Moderate	This is a long range view to the east from the right of way approaching Castle Hills Farm. The view provides a contextual outlook over grazing land, and the low lying SSSI in the mid-ground, towards the village of Bickenhill, which is indicated in the landscape by the recognisable church spire of St Peter's. There is a distinct rural view from this location. Awareness of the major development to the north is limited and largely screened from view by the mature hedgerow, restricting views in summer and allowing filtered views in winter. However this is interrupted by the periodic aircraft approaching the airport and crossing the view.	From this distant viewpoint the main indicators of the proposed scheme would be the modifications to the landform forming the background of the view. The alignment of the new link road would run in cutting through the local hillcrest, altering the profile of the hill form. Traffic movements are not likely to be directly visible, but a brief transition at grade between two sections of cutting in the south of the view would allow fleeting filtered views of traffic emerging and retreating between the earthworks. Within the vicinity of this area a new roundabout on the realigned Catherine de Barnes Lane would introduce distant views of lighting columns within the rural aspect. In general the new link road would be relatively discreet in the view, the proposed roundabout would be the most conspicuous element introducing lighting along the local road network. **The magnitude of change is likely to be minor resulting in slight adverse effects.**	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Hedge planting along the boundary fence line would help restore the existing view and screen views of a more engineered profile of the hillcrest. **The magnitude of change is likely to be negligible resulting in slight adverse effects in the design year.**

Table 14: VIEWPOINT N – Right of Way at Hazel Farm see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the right of way along St Peter's Lane, Hazel Farm and properties on the south-east of Bickenhill. Value: High Susceptibility: Moderate Sensitivity: Moderate	Long range views to the north-east from the edge of Bickenhill. The view looks over the M42 corridor set low in the undulating landscape towards the distant hills forming the horizon. Despite the low lying position of the M42 it remains a conspicuous element cutting across the field of view, with open views of traffic, gantries and motorway signage prominent. The electricity pylons following the M42 corridor form significant detractors viewed against the skyline.	From this viewpoint there would be no change in view due to the proposed scheme **The magnitude of change is likely to be no change resulting in neutral effects.**	From this viewpoint there would be no change in view due to the proposed scheme **The magnitude of change is likely to be no change resulting in neutral effects in the design year.**

Table 15: VIEWPOINT O – Right of Way West of M42 Crossing see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the public footpath / Isolated cottage at Heath Farm Value: High Susceptibility: Moderate Sensitivity: Moderate	Mid-range views to the north from the point the public footpath meets the M42. The view is comprised of a pleasant rural scene with undulating farmland leading up to the village of Bickenhill on the local highpoint in the north-west. However, the dominant electricity pylons tracing across the view form a focal point and lead the eye away from the village towards the intersection of the pylons and the stream of moving traffic on the M42 to the east. Glimpses of the NEC development are just visible above the tree line as well, all of which indicates the presence of larger development beyond the horizon. Overall	From this viewpoint there would be no change in view due to the proposed scheme **The magnitude of change is likely to be no change resulting in neutral effects.**	From this viewpoint there would be no change in view due to the proposed scheme **The magnitude of change is likely to be no change resulting in neutral effects in the design year.**

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
	the major transport and electricity corridors overwhelm and distract from the otherwise settled rural aspect.		

Table 16: VIEWPOINT P – Right of Way East of M42 Crossing see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the public footpath Value: High Susceptibility: Moderate Sensitivity: Moderate	The view looking to the north from the public footpath to the east of the M42 corridor is dominated by the views of the motorway crossing the view and the dual lines of electricity pylons running to the north. The pylons and lighting columns are prominent vertical elements, while the near constant stream of traffic along the motorway and periodic trains along the rail corridor, which intersects with the motorway, introduces constant movement through the otherwise rural aspect. Heavily filtered views of Bickenhill are possible through the vegetation along the M42 corridor.	From this viewpoint there would be no change in view due to the proposed scheme **The magnitude of change is likely to be no change resulting in neutral effects.**	From this viewpoint there would be no change in view due to the proposed scheme **The magnitude of change is likely to be no change resulting in neutral effects in the design year.**

Table 17: VIEWPOINT Q – Gaelic Football Grounds see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the Gaelic football club and public footpath. Value: High Susceptibility: Moderate Sensitivity: Moderate	This is a view looking to the west from the public footpath at the entrance to the Gaelic football grounds and along Catherine de Barnes Lane (B4438). The open expanse of the playing fields is framed by the surrounding mature field boundary vegetation .The wooded areas of Barber's Coppice, Bunts Wood and Hampton Coppice screen the urban areas of Solihull and form the background of the view. Traffic movements along Catherine de Barnes Lane (B4438) introduce regular movement within the view, along with the periodic low flying aircraft coming in to land. Overall the view and focused on the playing fields within a distinct rural setting offering few indicators of the development in the wider area.	From this viewpoint the proposed scheme would introduce the new link road in the foreground of the view. The alignment would run north to south through the playing fields in deep and broad cutting across the view. The new road corridor would dominate the view with partial views of traffic movements and the loss of the playing fields changing the nature of the view entirely. **The magnitude of change is likely to be major resulting in moderate/large adverse effects.**	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Hedge or screen planting along the boundary fence line would reduce or prevent views of traffic along new link road. However the broad cutting in close proximity to the viewpoint would permanently change and dominate the view. **The magnitude of change is likely to be major resulting in moderate/large adverse effects in the design year**.

Table 18: VIEWPOINT R – B4438 Catherine de Barnes Lane see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the B4438 Value: Moderate Susceptibility: lLow Sensitivity: Moderate	View to the south along the B4438 opposite the junction with Shadowbrook Lane. The view along the lane features local traffic and the isolated residential properties that occasionally occupy the local road network between Catherine de Barnes and Bickenhill. Mature road side trees and hedges are common along these local roads, and restrict awareness of the surrounding landscape where present. Where broader views are available, such as over the trimmed hedges at this viewpoint, the view extends towards the wooded horizon in the south-west. The prominent posts and netting associated with the adjacent Gaelic Football grounds are a distinctive element in the view.	The scheme would run under the alignment of the existing Catherine de Barnes Lane in deep cutting at this point. The alignment of the new link road would result in the clearance of the residential property in the view and mature trees along the lane, opening views of the wider area, as well as creating views directly along the new link road and the traffic along it. Catherine de Barnes Lane itself would be realigned to the east at this point and would be bridged over the broad cutting. Further south the link road would head to the south-east and the new alignment of the lane would head southwards bearing to the east of the existing lane where a new roundabout and associated lighting would be visible in the view. **The magnitude of change is likely to be major resulting in moderate/large adverse effects.**	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. The new link road in broad cutting and the reconfiguration of the local roads would remain a major feature in the view. Planting along the new alignments would help to integrate them within the view but the large scale changes to this view would remain. **The magnitude of change is likely to be major resulting in large adverse effects in the design year.**

Table 19: VIEWPOINT S – Shadowbrook Lane see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of Shadowbrook Lane Value: Moderate Susceptibility: Moderate Sensitivity: Moderate	View to the south through the managed hedges lining Shadowbrook across the arable farmland towards Aspbury's Copse and Barber's Coppice in the background. The view is comprised mostly of the simple mature treed arable farmland and the wooded horizons. However the prominent electricity pylons running overhead are a significant visual	The proposed scheme would introduce a new raised dumbbell junction over the M42 directly in front of Aspbury's Copse in the background of the view. The new lit junction would introduce a raised bridged section and new raised on slip road which would approach the viewpoint alongside the M42 corridor, opening views to the main carriageway as a result of vegetation clearance. The junction would also result in the partial loss of the wooded background and in	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Views of the section of the new link road and traffic in cutting would be reduced by hedge planting and help it to integrate within the rural setting. Screen planting on sections of embankment along the slip

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
	detractor, contrasting with the rural view, drawing the eye along the line of pylons. The nearby M42 corridor also influences the view, but set in shallow cutting and entirely screened by vegetation it isn't perceptible at this particular viewpoint location.	additional lighting and views of traffic movements outside of the existing M42 corridor. The new link road would bear north-west from the new roundabout immediately entering cutting and bearing away from the M42. The link road would result in the loss of existing mature trees within the farmland but would quickly retreat out of sight from this viewpoint, however lighting on the approach to the junction would be conspicuous within the view. Overall the scheme would introduce prominent new highway elements within the view in which the existing M42 is relatively well screened. **The magnitude of change is likely to be moderate resulting in moderate adverse effects.**	road and roundabout would screen the majority of views of traffic movement and integrate the new infrastructure within the wooded setting. Increased lighting associated with the scheme would remain a visible element in the context of existing views of the lit M42 corridor. Overall views would be reduced and integrated within the existing view but minor elements would remain visible. **The magnitude of change is likely to be minor resulting in slight adverse effects in the design year.**

Table 20: VIEWPOINT T – Rights of Way south of Shadowbrook Lane see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of the rights of way Value; High Susceptibility; Moderate Sensitivity: Moderate	View to the south-east near the junction of several rights of way within the arable fields south of Shadowbrook Lane. The view consists of the mature treed arable farmland and the wooded horizons of Aspbury's Copse and the wooded grounds of Hampton Manor in the distance to the east. The M42 corridor and lines of electricity pylons create a stark contrast to this undulating rural landscape. Traffic movements, while hidden low in the view, introduce movement, whereas gantries and lighting columns rising above the carriageway are visible lit elements. The electricity pylons following the M42 are a	The scheme would introduce a new raised dumbbell junction over the M42 in direct and open views. The new junction would be located in the open fields directly in front of Aspbury's Copse in the background. The new junction would introduce a raised bridged section and two new roundabouts and the associate traffic and lighting either side of the M42 in this view. New slip roads would also be visible and open up the existing M42 to greater view due to the loss of the existing screening vegetation. The junction would also result a reduction of Aspbury's Copse in the background. The new link road immediately enters cutting and would bear north-west from the new roundabout towards the viewpoint, passing to the south and	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Views of the section of the new link road and traffic in cutting would be reduced by hedge planting and help it to integrate within the rural setting but the proximity to the viewpoint would ensure it remains a prominent visual element. Screen planting on sections of embankment along the slip road and roundabout would screen the majority of views of traffic movement and integrate the new infrastructure within the wooded setting. Increased lighting associated with the scheme would remain

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
	significant visual detractor seen against the skyline across the field of view from this area.	west. Traffic movements along the new link would be visible across the field of view, despite being set in cutting, until the alignment passes to the right of the viewpoint behind the hedge line and out of sight. Overall the scheme would introduce major new highway elements within the view outside of the existing M42 corridor. **The magnitude of change is likely to be major resulting in moderate/large adverse effects.**	a visible element in the context of existing views of the lit M42 corridor. Overall views of the scheme would be reduced and integrated within the existing view but the new link road would remain a prominent visual component in the context of existing view of the M42. **The magnitude of change is likely to be moderate resulting in moderate adverse effects in the design year.**

Table 21: VIEWPOINT U – Friday Lane see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of Friday Lane Value: Moderate Susceptibility: Moderate Sensitivity: Moderate	This is a contained view looking along Friday Lane The lane is lined by dense mature vegetation. Views along the lane are channelled towards the higly vegetated roundabout at Catherine de Barnes, joining the B4438 and the B4012 Due to the contained nature of the lane there is very limited awareness of the wider surroundings from this viewpoint and the view is focused on the immediate area.	Tthe proposed scheme would have the potential to introduce heavily filtered partial views of the tops of lighting columns associated with the new junction at Solihull Road. Any views would be barely discernible within the wooded crest forming the background of the view and would not alter the existing view. **The magnitude of change is likely to be Slight adverse resulting in Slight adverse effects.**	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Any potential distance awareness of the new junction would be reduced further. **The magnitude of change is likely to be negligible resulting in neutral effects in the design year.**

Table 22: VIEWPOINT V – Solihull Road (B4102) see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of Solihull Road Value: High Susceptibility: Moderate Sensitivity: Moderate	The view along Solihull Road to the west allows for partial glimpsed views towards the M42 corridor over and through the roadside hedges and trees. The intervening mature stands of trees in the arable farmland further break the line of sight beyond Solihull Road. However the M42 and associated traffic can be seen running across the line of sight in the background through gaps in the hedge. Electricity pylons following the line of the motorway are a much more prominent feature above the intervening vegetation.	The proposed scheme would introduce a new raised dumbbell junction over the M42 introducing a new lit roundabout and the associated slip roads in filtered and partial in the background of the view from this viewpoint. Traffic movements would be visible in the gaps within (and potentially above) the road side vegetation along Solihull Road, where existing traffic movements already exist. The lighting would be the most obvious addition to the view, rising above the intervening vegetation, but again would be seen in the context of the existing lit M42 corridor. Overall the proposed scheme would introduce more prominent highways related elements within existing but partial views of the M42. **The magnitude of change is likely to be minor resulting in slight adverse effects.**	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Views of the new junction and associated slip roads would be greatly reduced by screen planting in these distant and partial views. Scheme lighting would remain partially visible but in the context of the existing lit M42 corridor. Overall views of the scheme would be reduced and integrated within the existing view. **The magnitude of change is likely to be negligible resulting in neutral effects in the design year.**

Table 23: VIEWPOINT W – Eastcote Lane see Figure 7.1

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
Users of Eastcote Lane and Public Right of Way Value: Moderate Susceptibility: Moderate Sensitivity: Moderate	Long distant open views from a break in the roadside vegetation looking to the north-west. The simple open fields leading up to Solihull Road just beyond the brow of a low rise give way to the more wooded views of the landscape forming the background. Aspbury's Copse is visible to the left of the view, while numerous small blocks of woodlands and stands of trees combine to form the wooded horizon. Prominent	The proposed scheme would introduce distant partial views of a new raised dumbbell junction over the M42 introducing a new lit roundabout and the associated slip roads in the background of the view near to Aspbury's Copse. Traffic movements and lighting would be much more apparent in the view as a result, but would only affect a small portion of the view and would not constitute a significant change in the composition of this distant and contextual view. **The magnitude of change is likely to be**	Outline mitigation planting would include screen planting along the sections of embankment and hedge planting along the boundary fence line. Views of the new junction and associated slip roads would be greatly reduced by screen planting in these distant and partial views. Scheme lighting would remain partially visible but in the context of the existing lit M42 corridor.

Receptors	Existing Outlook	Winter Year of Opening View	Summer of Design Year
	electricity pylons broadly follow the M42 corridor which is set in cutting and generally screened from view by the intervening topography. However occasional glimpses of traffic movements are possible around Aspbury's Copse.	**negligible resulting in neutral/slight adverse effects**.	Overall views of the scheme would be reduced and integrated within the existing view. **The magnitude of change is likely to remain negligible resulting in slight adverse effects in the design year.**

M42 Junction 6 Improvements

Extended Phase 1 Habitat Survey Report

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Contents

1 Introduction

1.1 Background

Mouchel was commissioned by Highways England to undertake an Extended Phase 1 Habitat survey for the proposed improvement works at Junction 6 of the M42 to the east of Birmingham, West Midlands. The M42 is a fundamental part of the Strategic Road Network (SRN) and forms the southern and eastern arms of the Birmingham Box area, which encompasses various smart motorway schemes.

There are currently three options for the improvement works: Option 1 (Option 2R West), Option 2 (Option 2R East) and Option 3 (Option 2P). The Phase 1 Habitat survey area, shown in Appendix 1: Figure 1 covers land which may be affected by all of the three route options

1.2 Site location

The proposed options are predominantly located to the south west of Junction 6, although all route options also include improvements to the junction itself.

To the east of Birmingham, the land is predominantly used for agriculture and pasture grazing, with the residential villages of Bickenhill and Hampton in Arden within the survey area on either side of the M42. The scheme is close to the National Exhibition Centre (NEC), Birmingham International Railway Station, and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 Study rationale and objectives

The aim of the study was to appraise the ecological value of the survey area. To achieve this, the following objectives were set:

- Consult records covering locations of statutory and non-statutory protected sites, habitats and species that are ecologically important within the survey area;
- Map the habitats within the scheme and adjacent to it;
- Identify habitats that are ecologically important and/ or have legal protection;
- Assess the potential of each habitat to support and, where possible, also undertake preliminary field surveys for ecologically important and/ or legally protected species;
- Identify ecological risks and appropriate actions to be taken to ensure compliance with wildlife legislation and conservation policy; and
- Identify invasive species present in the area of the works and provide recommendations as to how to best manage any such relevant issues.

2 Methods

2.1 Desk study

Online sources were consulted to establish the location of statutory and non-statutory designated sites within the survey area. This was achieved using the online, open source database MAGIC (www.magic.defra.gov.uk). This resource was also used to investigate whether any European Protected Species (EPS) licences have been issued within the past 10 years within the survey area.

Warwickshire Biological Records Centre and ENVIS Species Records (records kept by Highways England) were consulted for biological records within the survey area, from within the past 10 years[1]. Records of statutory protected sites, non-statutory protected sites, priority habitats/species, and other animals and plants of note were requested.

2.2 Site visit

2.2.1 Extended Phase 1 Habitat Survey

An extended Phase 1 Habitat survey was undertaken from 14th to 16th February 2017. Habitats were identified using the standard Phase 1 Habitat survey methodology[2]. In addition to mapping habitat types and dominant flora, the ability of habitats to support legally protected, valuable or controlled species, including Priority Species and invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) was assessed. Incidental field signs or sightings of such species were recorded during the site visit.

2.2.2 Habitat Suitability Index (HSI) Assessment

A review of OS mapping undertaken prior to the site visit which identified 41 ponds within 500m of the three route options. During the site visit, a Habitat Suitability Index (HSI)[3] assessment was undertaken. The HSI is a numerical score between 0 and 1 (0 indicating unsuitable habitat, 1 representing optimal habitat) which is derived from ten suitability indices, all of which are factors thought to affect the likelihood of a pond supporting breeding great crested newts. The HSI score provides an indicator of the suitability of a water body to support great crested newts and ranges from poor (an HSI score of less than 0.5) to excellent (an HSI score of greater than 0.8).

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[1] Older records have been ignored as they will not accurately reflect current ecological conditions.

[2] JNCC. 2007. *Handbook for Phase 1 Habitat Survey - a Technique for Environmental Audit*. England Field Unit, Joint Nature Conservancy Council, Peterborough.

[3] 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 10:143-155.

2.3 Limitations

Access was not permitted into large areas of privately owned land, with some landowners refusing permission or not being contactable. Where possible these areas were observed from adjacent accessible or public access land. Where this was not possible, habitats were mapped using aerial imagery.

The majority of land beneath the footprint of the four route options is contained within the south-western quadrant formed by the intersection of the M42 and the A45. This area was predominantly fully accessible at the time of the survey and, as such, access limitations are not a significant limitation to achieving the objects of the survey.

3 Results

3.1 Desk Study

3.1.1 Statutory sites

Information obtained from MAGIC confirmed that there are two statutory designated sites within the survey area. The River Blythe Site of Special Scientific Interest (SSSI) and Bickenhill Meadows SSSI.

The River Blythe SSSI is an excellent example of a lowland river on clay substrate. The structure of the river is very variable and is important due to the rarity of such examples in lowland Britain. Botanically, the River Blythe is one of the richest rivers in lowland England with the most species-rich sections containing as many species as the very richest chalk streams. The habitats along the river are also important for invertebrate communities.

Bickenhill Meadows SSSI consists of two groups of fields comprising species-rich grassland situated to the south and west of the village of Bickenhill on predominantly neutral soils. The unit to the west of Catherine de Barnes Lane is 2.53ha whilst the unit to the east of Catherine de Barnes Lane is 3.15ha. The unit to the east of Catherine de Barnes Lane also forms part of the Shadowbrook Meadows Warwickshire Wildlife Trust Nature Reserve which covers an area of 4.40ha.

The meadows as a whole comprise one of the richest grassland floras in the county with good examples of both meadow foxtail *Alopecurus pratensis* – great burnet *Sanguisorba officinalis* floodmeadow and common knapweed *Centaurea nigra* – crested dog's-tail *Cynosurus cristatus* meadow and pasture. Both grassland types have declined very severely nationally in the 20th century due to agricultural improvement. The West Midlands Region contains a major part of the national resource of the common knapweed – crested dog's-tail grassland type which is typically associated with level topography, loam or clay soils, moderately free drainage and the retention of traditional farming methods with small fields.

There is a complex pattern of vegetation resulting from local variations in topography and drainage, such as the ridge and furrow pattern, evident in some of the fields. This has led to the development of mosaics where the main vegetation types intermingle, as well as to areas where each type can be recognised. Characteristic species include common bent *Agrostis capillaris*, meadow foxtail, Yorkshire-fog *Holcus lanatus*, sweet vernal-grass *Anthoxanthum odoratum*, common sorrel *Rumex acetosa*, cat's-ear *Hypochoeris radicata*, ribwort plantain *Plantago lanceolata* and yellow rattle *Rhinanthus minor*. The sward is enriched by the presence of cowslip *Primula veris*, quaking-grass *Briza media*, lady's bedstraw *Galium verum*, devil's-bit scabious *Succisa pratensis*, heath-grass *Danthonia decumbens* and common spotted-orchid *Dactylorhiza fuchsii*. The fields also contain a number of uncommon species such as betony *Stachys officinalis*, pepper-saxifrage *Silaum silaus*, saw-wort *Serratula tinctoria*, as well as meadow thistle *Cirsium dissectum*, a county rarity.

Further interest is provided by wetter areas characterised by rushes *Juncus* spp., sedges *Carex* spp. and tall herbs such as meadowsweet *Filipendula ulmaria* and great burnet. Both groups of meadows have streams and there is a good range of tree and shrub species in the hedgerows around the fields.

The scheme is within the Impact Risk Zone (IRZ) for both these SSSIs. This means that for planning applications for any road proposals, the LPA should consult Natural England regarding any likely risks from the proposed scheme.

3.1.2 Non-statutory sites

These include Local Wildlife Sites (LWS), Ecosites, Nature Conservation Sites (NCS), Local Geological Sites (LGS) and ancient woodland within the survey area:

- Castle Hill Farm Meadows LWS;
- Marsh adjacent to River Blythe Ecosite;
- Barbers Coppice Ecosite;
- The Jungle LWS;
- Main Birmingham to London Railway Line Ecosite;
- Pendigo Lake and The Rough Ecosite/ancient woodland;
- Catherine De Barnes Ecosite;
- Greens Ward Piece LWS;
- Bickenhill Churchyard Ecosite
- Aspbury's Coppice ancient woodland/Ecosite;
- Clock Lane Meadows;
- Wayside Cottages Meadow LWS;
- Low Brook and Kinghurt Brook Ecosite;
- Road Side Hedge Ecosite;
- Shadow Brook Ecosite;
- Holywell Brook Ecosite;
- Disused Railway Ecosite;
- Hampton Grasslands LWS;
- Hampton Manor Grounds and Churchyard Ecosite;
- Denbigh Spinney LWS;
- Arden Brickworks LGS; and
- Marshy Fields Ecosite.

3.1.3 EPS licences

There have been four EPS licences issued in the past 10 years within the survey area:

- At SP 184 828, near the junction of Catherine de Barnes Lane (B4438) and the A45. EPSM2012-4998 issued for bats (common pipistrelle) to allow destruction of a resting place. Start 26/10/12. End 31/08/15.

- At SP 187 821, in Bickenhill village. 2015-9758-EPS-MIT issued for bats (brown long-eared, common pipistrelle, soprano pipistrelle) to impact on a breeding site, allow destruction of a breeding site and allow destruction of a resting place. Start 05/05/15. End 01/05/25.

- At SP 198 824, between Old Station Road and the M42/train track, just south of Junction 6 of M42. EPSM2012-5010 issued for bats (brown long-eared) to allow destruction of a resting place. Start 17/10/12. End 30/10/13.

- At SP 198 826, between Old Station Road and the M42/train track, just south of Junction 6 of M42. EPSM2012-5244 issued for bats (brown long-eared, common pipistrelle) to impact on a breeding site, allow destruction of a breeding site and allow destruction of a resting place. Start 02/12/12. End 01/09/16.

3.1.4 Species

ENVIS data, and data received from Warwickshire County Council Records Centre indicated that there are records of the following species from within the survey area from the past 10 years:

- Otter *Lutra lutra* signs (spraint only) where Holly Brook crosses under the A456 Chester Road;
- Great crested newt records from two ponds south east of Junction 6 near Hampton in Arden;
- Three records of Leisler's bat *Nyctalus leisleri* in flight in Little Packington and three roost records at Grange Farm, Bickenhill of brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*;
- [redacted] and six road casualties along Catherine de Barnes Lane; and
- Records of moth, butterfly and beetle species of principal importance.

3.2 Habitats

The survey area contained a mixture of common habitat types. Table 1 presents a summary description of each habitat type found, which should be read in conjunction with the Phase 1 Habitat Map (Appendix 1; Figure 1), the table of Target Notes (Appendix 2) and photographs in Appendix 3.

Table 1- Habitats identified within the survey area

Habitat	Description	Biodiversity Value
Broad-leaved semi-natural and mixed semi-natural woodland	This habitat comprises all stands which do not obviously originate from planting. Within the survey area there are two areas of ancient replanted woodland (TN19 and TN20) with other stands being of more recent origin. Two areas of woodland are mapped as mixed semi-natural woodland (TN20 and TN73) due to them having a high coniferous (Scots pine) component within the canopy. Despite the predominance of conifers the ground flora within woodland at TN20 still includes many species more characteristic of ancient broad-leaved woodland.	Broad-leaved semi-natural woodland can provide habitat for foraging and roosting bats if suitable holes/cracks or mature ivy is present on trees. Standing trees also provide habitat for breeding birds and cover for commuting and foraging mammals. These habitats usually are botanically rich and may include important or rare lichen and fungi species which are associated with mature trees.
Plantation woodland	Plantation woodland includes woodland of any age which is obviously planted. Most of the plantation woodland within the survey area is composed of broad-leaved trees but there is a single narrow belt of Norway spruce *Picea abies* along the eastern embankment of the M42, around TN9.	Plantation woodland can also provide suitable foraging and roosting habitat for bats although plantation woodland normally contains fewer bat roosting features than semi-natural woodland due to the generally smaller size of trees within plantations. Plantation woodland also provides breeding and foraging habitat for birds and mammals.
Scattered and dense /continuous scrub	Scrub occurs frequently throughout the survey area and is dominated by locally native shrubs usually less than 5m high and any stands of mature hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa* or grey willow *Salix cinerea*, even if over 5m high. The majority of woody vegetation along the embankments of the M42 is comprised of scrub.	Scrub provides valuable habitat for nesting birds, with many species such as hawthorn or blackthorn also providing a winter food-source for birds. Scrub is also a valuable habitat for sheltering reptiles where if forms an interface with more open grassland or tall herbaceous habitat, particularly on south-facing slopes. Patches of scrub also provide cover over mammal resting or breeding places including badger setts.

Habitat	Description	Biodiversity Value
Hedgerow	Hedgerows throughout the survey area are mapped as all being species-poor. This is due to the fact that the survey was undertaken in February, with most hedgerows being leafless. Identification of component species was further hindered due to the majority of hedgerows having been recently flailed, with the majority of the previous season's growth being removed. Previous walkover surveys of the area, however, describe hedgerows as mostly being overgrown and species-rich in places, particularly along Catherine de Barnes Lane.	Hedgerows (including those not classified as 'important' under the Hedgerow Regulations 1997) are typically significant corridors for wildlife, particularly in intensively farmed landscapes, and link habitats such as woods, ponds, grasslands and wetlands. They also provide nesting and foraging areas for birds.
Bare ground	Bare ground mapped within the survey area consists mostly of tarmac car parks, located around the airport and hotels and conference/arena buildings.	This habitat has very little biodiversity value, except possibly for foraging or breeding birds within ornamental shrub planting immediately adjacent to the car parks.
Arable /improved grassland	This is the dominant habitat in the landscape, both to the east and west of the M42. Interspersed are wooded areas, ponds, scrub and unimproved and semi-improved grasslands and species-rich hedgerows in places.	Common farmland birds such as skylark *Alauda arvensis* may use fields such as these to nest during the breeding season (March to July). Badgers and other mammals such as hedgehog also use these areas to forage.
Amenity grassland	This habitat is present along parts of the roadside verge within the survey area and is intensively managed with a short sward due to regular mowing. Species present include perennial rye grass *Lolium perenne*, daisy *Bellis perennis,* dandelion *Taraxacum officinale* agg. and white clover *Trifolium repens.* Large areas of amenity grassland also occur within private gardens and surrounding conference centres and hotels. The largest single area of amenity grassland comprises playing fields at the Gaelic Athletic Association sports grounds to the east of Catherine de Barnes Lane.	This habitat is generally of low value as a result of its management regime. Where this habitat is adjacent to scrub, however, it may be valuable for basking reptiles and foraging mammals.

Habitat	Description	Biodiversity Value
Unimproved and semi-improved neutral grassland	Unimproved and semi-improved neutral grasslands have either not been modified by the addition of fertilisers/herbicides, intensive grazing and drainage or have only been treated with low levels of farmyard manure. Unimproved grassland at TNs 42 and 50 constitutes the Bickenhill Meadows SSSI. There are also numerous LWS and ecosites within the survey area designated for the diverse range of plant species associated with species-rich grasslands. Other smaller areas are undesignated.	Grasslands such as these are important for the invertebrate assemblages they support as well as for their intrinsic value. This habitat also provides rich foraging habitat for mammals, birds, reptiles and amphibians.
Marshy grassland	Marshy grassland covers certain grasslands with a high proportion of rushes, sedges and herbaceous species such as meadowsweet *Filipendula ulmaria*, marsh-marigold *Caltha palustris* or valerian *Valeriana* species. It differs from swamp habitat in that the latter has a water table distinctly above the substratum for much of the year and is dominated by reed grasses or large sedges. There is a large area of marshy grassland towards the south of the survey area, just north of the sewage works, to the east of the M42. There are also smaller patches of marshy grassland which are too small to map, including within the eastern unit of the Bickenhill Meadows SSSI/ Shadowbrook Meadows Warwickshire Wildlife Trust Nature Reserve.	Marshy grassland is intrinsically important as it includes many scarce National Vegetation Classification (NVC) communities, with associated rare and scarce invertebrate species. Marsh grassland also provides valuable feeding habitat for bird species, particularly waterfowl and waders, with several species also nesting within marshy grassland habitat.
Open water	There are numerous ponds within 500m of the Options footprint.	These have value to waterfowl and farmland birds as well as amphibians such as great crested newt. The results of the great crested newt HSI assessments are covered separately within the great crested newt HSI survey report. Bats may also use these open water bodies for feeding and foraging.
Running water	There are several streams/wet ditches within the survey area including those at TNs 14, 41 and 52.	These watercourses may have value to riparian mammal and amphibian species and can act as corridors for dispersal for these animals.

3.3 Species

3.3.1 *Birds*

The hedgerows, woodland, scrub and arable fields adjacent to and within the survey area provide suitable nesting habitat for birds between March and July, and provide foraging habitat for the resident local garden and farmland bird communities throughout the year.

3.3.2 *Bats*

There is suitable foraging and roosting habitat for bats within the survey area. Mature trees and built structures with potential roost features were identified during the Phase 1 Habitat survey. See locations listed in the table of Target Notes (Appendix 2) for further details. Hedgerows and vegetated embankments adjacent to the M42 may also be used by commuting and foraging bats.

3.3.3 *Badger*

The woodland, scrub, grasslands and arable fields within the survey area and the surrounding landscape are suitable habitat for this species. Badger signs were found at the following locations during the Phase 1 Habitat survey:

- [redacted]
- [redacted]
- [redacted];
- [redacted]
- [redacted]

[redacted]

Table 2- Badger sett hole locations [redacted]

[redacted]		
Hole	**OS Grid Ref**	**Description**
1	[redacted]	[redacted]
2	[redacted]	[redacted]
3	[redacted]	[redacted]
4	[redacted]	[redacted]
5	NA	[redacted]
6	[redacted]	[redacted]

Table 3- Badger sett hole locations [redacted]

Sett at TN72		
Hole	**OS Grid Ref**	**Description**
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

3.3.4 *Reptiles*

The habitat within the survey area is suitable to support reptiles. Arable fields, grasslands, woodland and scrub provide sites that can be used for basking, foraging or shelter for these animals. An example of suitable habitat can be found along the south-facing road embankment at TN45 (Photograph 11). The presence of reptiles within the survey area, however, was not confirmed by any desk-study records.

3.3.5 *Great crested newt*

Ponds suitable for breeding amphibians and habitats such as hedgerow, dense scrub, woodland and grassland, which are suitable for foraging and sheltering amphibians, are present within the survey area.

41 waterbodies were identified from OS mapping within 500m of the route options and an additional 5 waterbodies were recorded during the Phase 1 habitat survey. HSI surveys were undertaken to assess the suitability of these waterbodies to support breeding newts. The full results of the HSI surveys are provided in Appendix 2.

3.3.6 *Water vole*

Arable ditches and streams throughout the survey area can provide suitable habitat for water voles, although the watercourses observed during the survey were mostly heavily shaded (Photograph 12), with water that appeared contaminated. No evidence of water vole was found during the site visit, however their presence cannot be ruled out without further, more detailed investigation.

3.3.7 *Dormouse*

Suitable habitat for this species exists throughout the survey area with patches of woodland, linked by an extensive network of hedgerows. The presence of dormouse within the survey area, however, was not confirmed by any desk-study records.

3.3.8 Otter

Rivers and their component watercourses can provide habitat for otters, which typically have large home ranges. No evidence of otters was found during the Phase 1 Habitat survey, however, it is likely that these animals use the River Blythe, which is located just outside the survey area, to the east of the A452.

3.3.9 White-clawed crayfish

Suitable habitat for this species was identified during the Phase 1 Habitat survey, with some stony sections within the watercourse at TN52. The presence of white-clawed crayfish within the survey area, however, was not confirmed by any desk-study records.

3.3.10 Invertebrates

Data collected from the desk study and the field survey indicate that parts of the survey area, in particular land west of the M42 where unimproved grassland, woodland and marshy grasslands occur, are likely to support locally important invertebrate assemblages.

3.3.11 Hedgehogs

Habitat suitable for use by foraging hedgehogs, such as scrub, grasslands and woodland is present within the survey area. However, the habitat on the highways verges and embankments is of poorer quality and close to traffic and therefore less likely to be used by this species.

3.3.12 Schedule 9 plant species

Several stands of Japanese knotweed *Fallopia japonica* were found during the Phase 1 Habitat survey at TNs 51 (Photograph 13), 54 (Photograph 14), 55 (Photograph 15) and 63. The Schedule 9 species water fern *Azolla filiculoides* was found to be covering the entire surface of Pond 36 (Photograph 16).

4 Legislative and policy context

4.1 Summary of relevant legislation and policy

This section summarises the legislation and policy which is relevant, in ecological terms, to this assessment; i.e., legislation relevant to species present or likely to be present within the survey area, and has guided the scope of work undertaken in order to identify likely ecological constraints.

4.2 Conservation of Habitats and Species Regulations 2010

All bat species in England and Wales are fully protected through inclusion within Schedule II of the Conservation of Habitats and Species Regulations 2010. Under this legislation they are given the status of a European protected species (EPS). This legislation makes it an offence to deliberately capture, kill, injure or disturb bat species. For the purposes of this legislation disturbance has been defined as that likely:

- Impair their ability to:

  (i) Survive, breed or reproduce, or to rear or nurture their young; or

  (ii) Hibernate or migrate.

- Affect significantly the local distribution or abundance of that species to which they belong.

It is also an offence to damage or destroy a breeding site or resting place of these species. It may be possible to apply for a licence from Natural England to allow activities that would otherwise be an offence under these Regulations.

All bats are also partially protected in England and Wales through their inclusion in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Under this legislation, it is an offence to intentionally or recklessly disturb a bat whilst it is using a place of rest or shelter and/ or from being obstructed from entering such a place. This applies to individuals but is subject to a number of defences, including if the disturbance was the '*incidental result of a lawful operation that could not reasonably have been avoided*'. No licences are available for the purposes of development for offences under the Wildlife and Countryside Act 1981 (as amended).

4.3 Wildlife and Countryside Act 1981 (as amended)

This is the main piece of legislation which protects animals, plants, and in some cases their habitats, in England. Through its inclusion under Schedule 5 of The Act water voles, their breeding sites and resting places are protected by law. Under Part 1 of The Act, all wild birds receive protection from being intentionally killed, injured or taken damage. It is also an offence to destroy a wild bird nest (whilst being built or in use) or its eggs. Species listed on Schedule 1 of The Act (such as barn owl *Tyto alba*) receive further protection which makes it an offence to intentionally or

recklessly disturb these species while building a nest, or in, on or near a nest containing eggs or young; or to disturb dependent young of such a bird.

Under Section 14 of the Wildlife and Countryside Act 1981 (as amended) it is an offence to release (or in the case of plants, cause to grow) any species of animal or plant listed on Schedule 9 of the Act.

Priority Species (such as the European hedgehog *Erinacus europaeus* and the common toad *Bufo bufo*) are those that are identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (now superseded by the UK Post-2010 Biodiversity Framework). Whilst inclusion on this list does not confer any direct protection upon the species concerned, government agencies and local authorities are legally obliged to have regard to those features of principal conservation importance and in exercising its functions. Conservation of Priority Species is considered a material consideration for national and local planning policy (including the granting of planning permission) after the introduction of the Countryside and Rights of Way (CROW) Act 2000 and Natural Environment and Rural Communities (NERC) Act 2006 (both as amended). Government agencies and local authorities are also obliged under Section 74 (3) of the CROW Act 2000 to undertake steps to further the conservation interest of such species, and under Section 41 of the NERC Act, 2006, to restore or enhance a population or habitat of such species.

5 Recommendations

5.1 Habitats

There are two statutory designated sites, twenty two non-statutory designated sites and two ancient woodlands within the survey area. All three route options may result in both direct and indirect adverse impacts on these sites. Narrow strips of ancient woodland (TNs 19 & 20) located directly adjacent to the M42 would be also be lost to Options 1 and 2.

It is recommended that, once route selection has been made and land-take requirements confirmed, a more detailed habitat assessment is undertaken in order to assess likely impacts. This may include detailed NVC surveys which should be undertaken during the appropriate season. It is recommended that Options which results in the direct loss of designated sites and ancient woodland be avoided. Options which impact these sites may also incur major impacts on the timescale and cost of the project.

As the survey area lies within several SSSI IRZs, further consultation with Natural England is recommended.

5.2 Birds

Vegetation throughout the survey area provides nesting and foraging habitat for garden and farmland birds. If trees, woodland, hedgerows or other woody vegetation are to be removed, there is risk of negative effects on breeding birds and/ or their young and nests. Work should be planned to control this risk, and removal of vegetation that is likely to support breeding birds should be undertaken outside the breeding season (March to July).

If clearance during the breeding season is unavoidable then vegetation should be checked for the nests by an experienced ecologist prior to removal. If active nests are present, then work around the nest should cease until the young have fledged.

5.3 Bats

Mature trees and buildings beneath one or more of the route options within the survey area, have features suitable to support roosting bats. Further assessment of trees and buildings should be undertaken to determine bat roost suitability.

All bat species receive statutory protection covering both killing or injuring individual bats, and disturbance which may impair their ability to survive, breed, hibernate or rear young. The scheme could impact bats by effects on roosting sites, disruption of commuting routes, changing or removing foraging areas and commuting lines, artificial lighting and vibration and noise associated with construction and road infrastructure.

A bat roost suitability assessment can be undertaken during any month of the year. If given access, an internal and external inspection (including an endoscope survey of

accessible crevices) for features suitable to support roosting bats, should be undertaken in conjunction with the bat roost suitability assessment. Depending on the outcome of the survey, structures and trees may require emergence/ re-entry surveys to inform more accurately the presence, species, number of bats present and type of roost. This level of survey should be undertaken during May-September when bats are active.

Linear features, such as hedgerows and watercourses, and areas of grassland and woodland may provide suitable habitat for foraging and commuting bats. It is recommended that an assessment of the likely value of these habitats for bats is undertaken. Further surveys, including walked-transects and the deployment of static bat detectors may be required and these surveys should be undertaken between March and October.

5.4 Badger

Active badger setts have been found at [redacted] The sett at [redacted] is not currently beneath any of the route options but the sett within woodland at [redacted] If this option is adopted, works within the vicinity of the sett will have to be undertaken under Natural England licensing and appropriate mitigation provided.

5.5 Reptiles

Suitable habitat for reptiles occurs at locations throughout the survey area. It is recommended that presence / absence surveys are undertaken within suitable areas of habitat which are currently beneath the footprint of any of the route options, such as the south-facing road embankment at TN45. Surveys would require the placement and regular checking of artificial refugia within suitable areas of habitat and should be undertaken between March to October.

5.6 Great crested newt

Both aquatic and terrestrial habitats suitable for great crested newts are present within the survey area. It is recommended that further survey work, comprising presence/absence surveys, is undertaken to determine if this species is present. Surveys should be undertaken between mid-March and mid-June, with at least half of the surveys taking place between mid-April and mid-May. Should great crested newts be found during these surveys, an additional two surveys may be required to allow an assessment of the population size.

5.7 Water voles

Habitat suitable for water voles is present within the survey area. It is recommended that a water vole survey is undertaken on all watercourse sections within the survey area, which are beneath any of the route options, to determine the presence or absence of this species. The survey should be undertaken during the water vole active period, April to September.

5.8 Dormouse

The presence of dormouse within the survey area is uncertain. It is recommended that consultation with local mammal groups is undertaken to gain a greater insight into the current distribution of this species within the region. This information will enable a decision to be made as to whether to undertake presence / absence surveys within the survey area. Should these surveys be required, these should be undertaken between April and November.

5.9 Otter

Watercourses within the survey area are generally small streams or field drains, with the most suitable otter habitat (the River Blythe) being located just outside the survey area to the east of the A452. Otter field signs can be searched for at the same time as water vole surveys are undertaken on all watercourse sections within the survey area, which are beneath any of the route options.

5.10 White-clawed crayfish

The presence of white-clawed crayfish within the survey area is uncertain. Further assessments of habitat suitability should be undertaken on all watercourse sections within the survey area which are crossed by any of the route options. A habitat suitability assessment is not seasonally constrained, however should any additional surveys for white-clawed crayfish be required, these should be undertaken during June to September.

5.11 Invertebrates

It is recommended that further habitat suitability assessment is undertaken within areas of unimproved grassland, woodland and marshy grassland to determine whether this habitat is suitable to support important invertebrate assemblages.

5.12 Hedgehogs

If scrub, woodland and hedgerow habitat is to be removed, this should be first checked by a suitably qualified ecologist for resting animals, which can then be moved to a suitable location outside the works area.

If a substantial area of semi-improved grassland or scrub is to be lost due to the scheme, it is recommended this is either reinstated or compensated for with like-for-like habitat in order to further the conservation interest of this species as a Local Species of Principle Importance.

5.13 Schedule 9 plant species

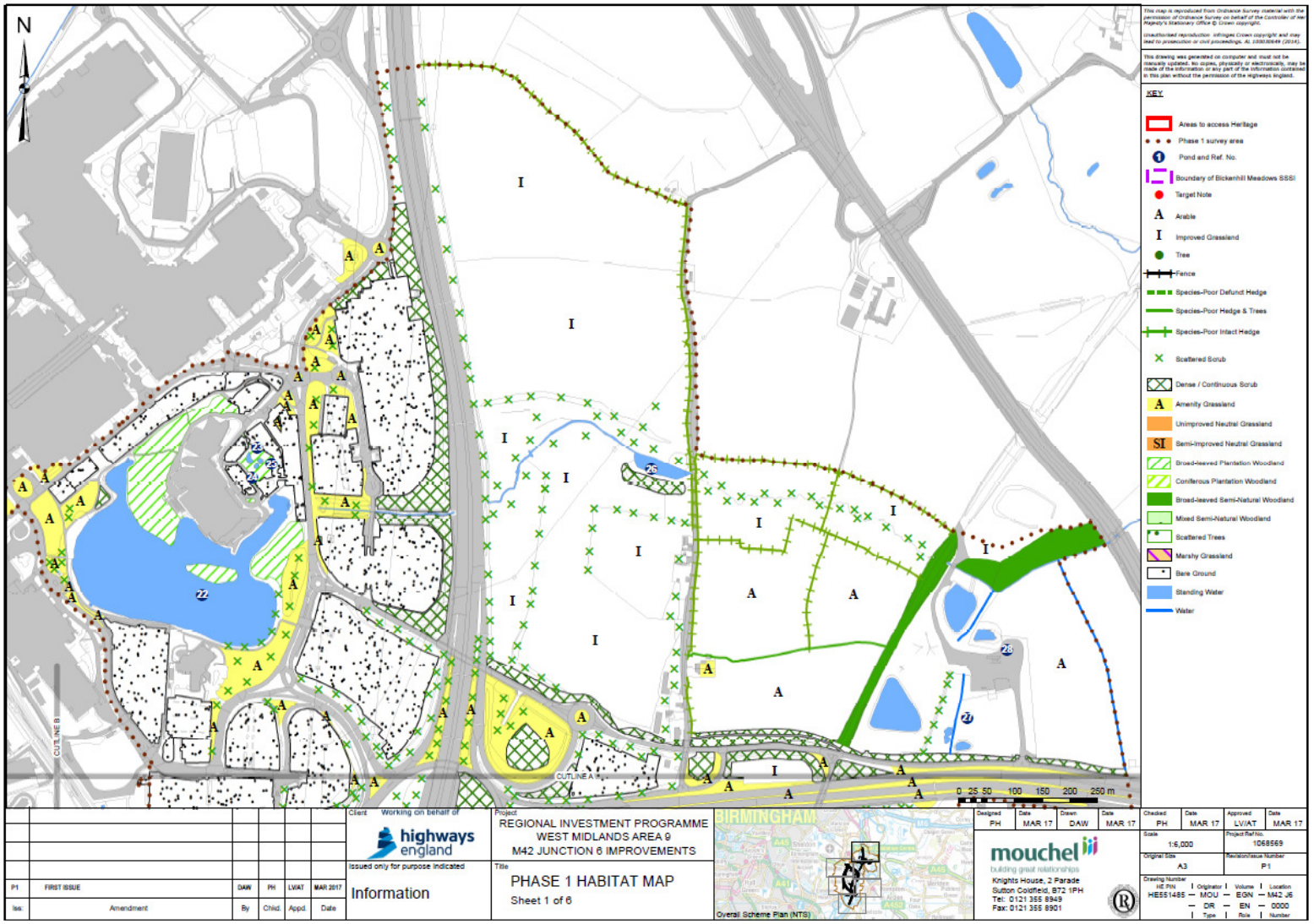
Japanese knotweed at TNs 51, 54, 55 and 63 is currently beneath the footprint of Option 1. If this route option is chosen, the stands of knotweed will have to be chemically treated and removed by a licenced contractor, prior to any digging or vegetation removal to avoid committing an offence under the Wildlife & Countryside Act 1981 (as amended), by potentially spreading this species to the wider environment.

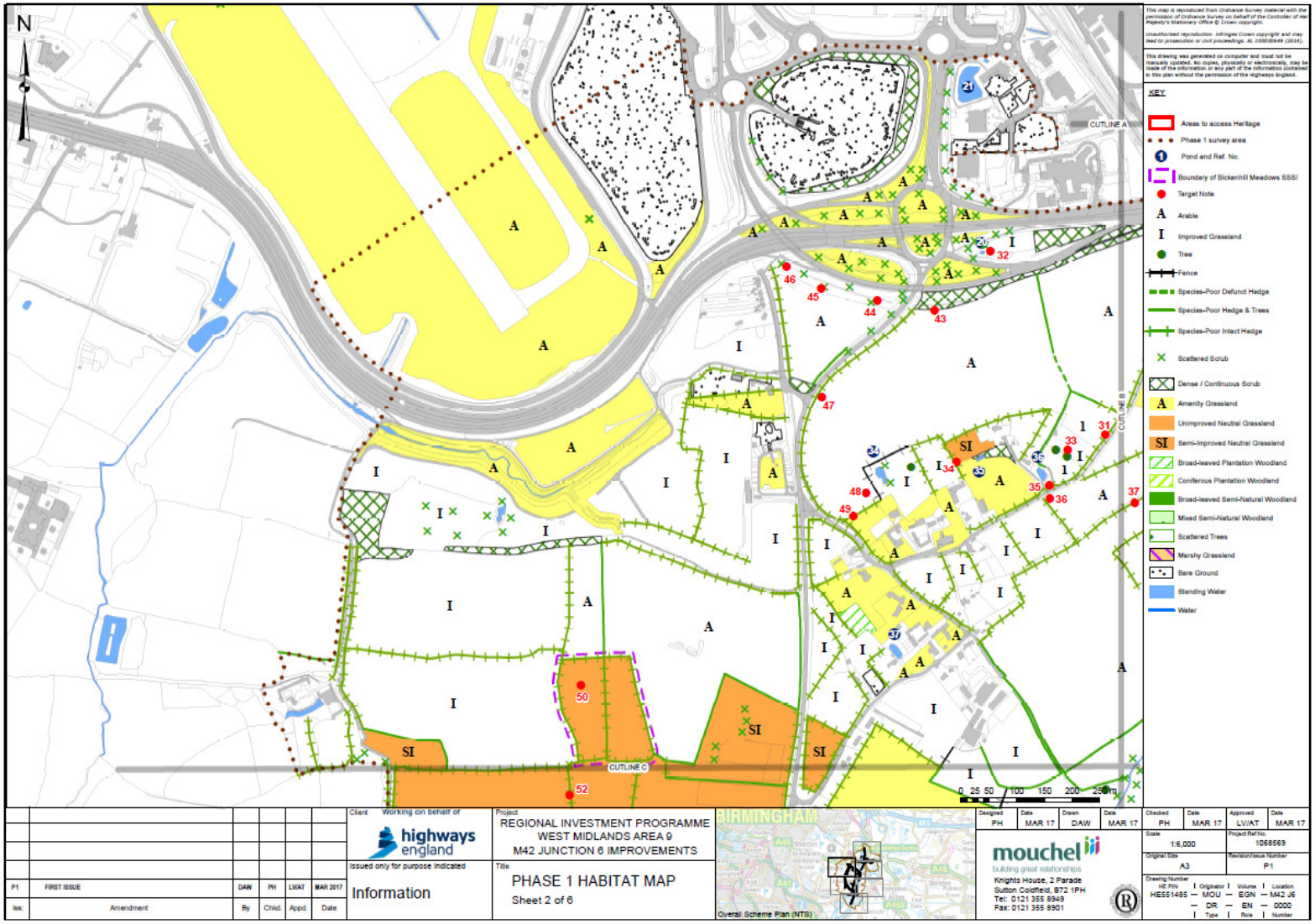
Pond 36 which contains water fern is not beneath the footprint of any of the route options. If the pond is to be bottle trapped as part of great crested newt surveys, however, care will need to be taken to avoid spreading this species to any other survey ponds. This could most easily be achieved by using a single set of bottle traps and canes solely on this pond to avoid carrying fragments of the plant which may get trapped within the traps or on canes.

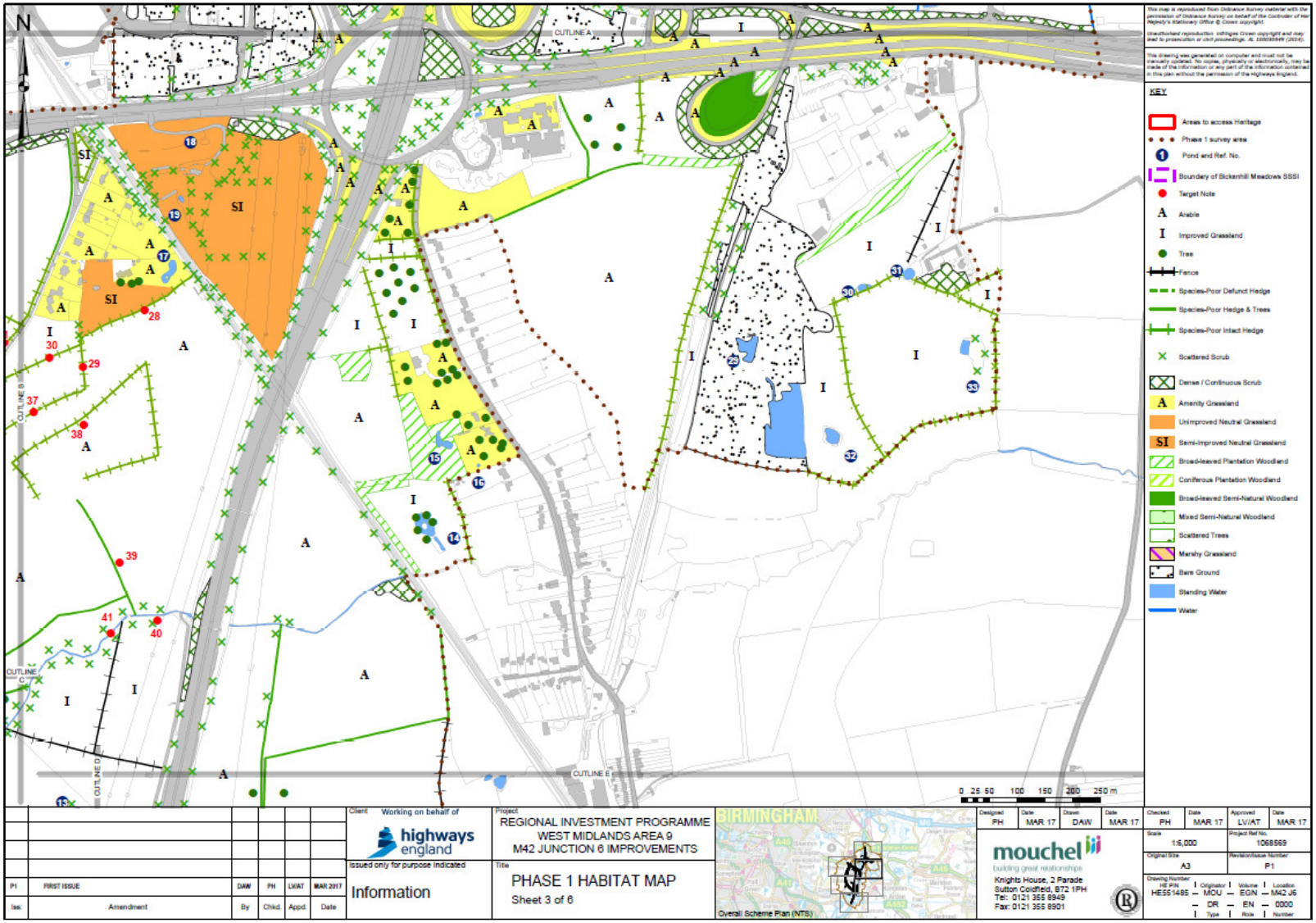
5.14 Survey programme

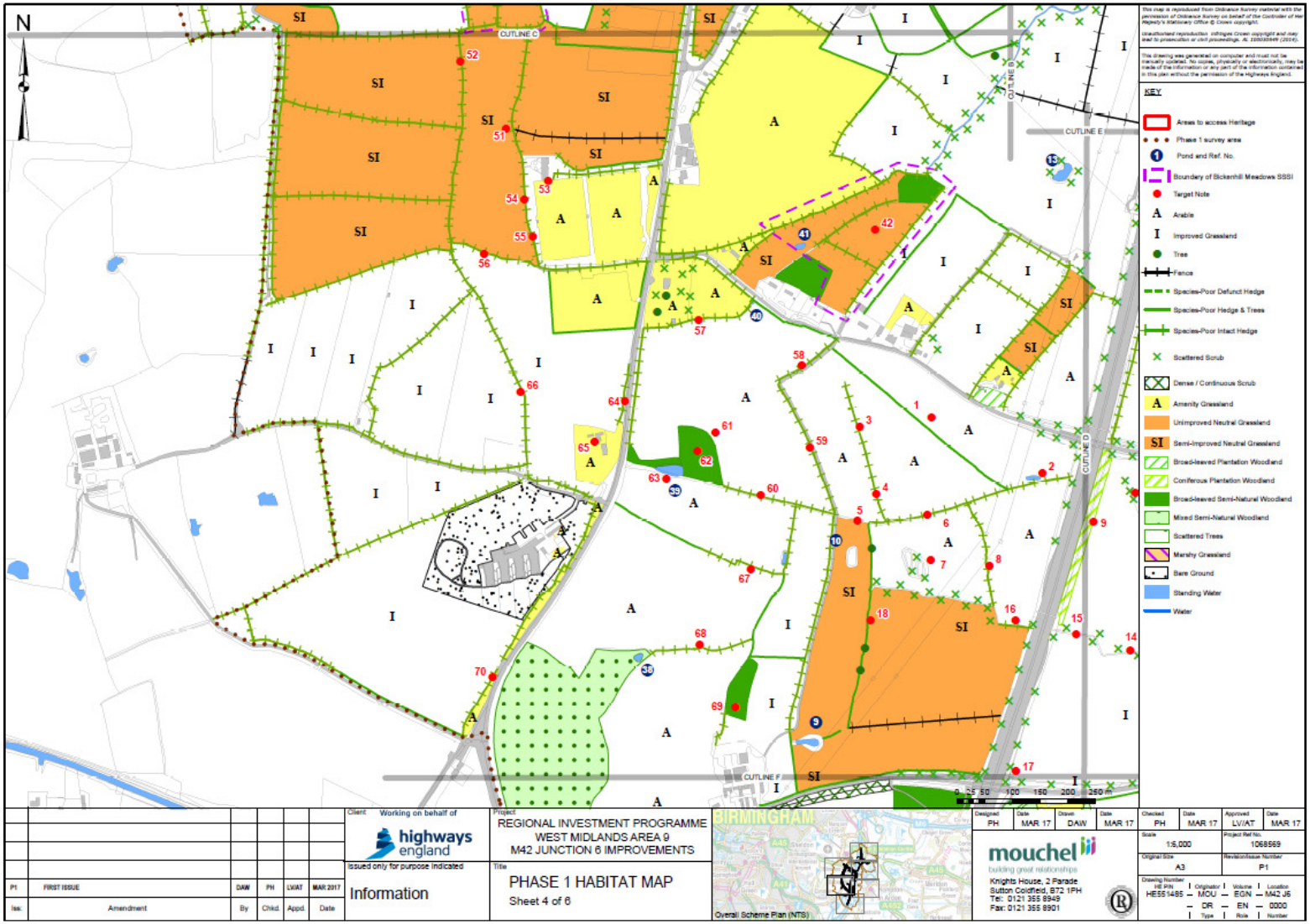
An indicative survey programme is provided in Appendix 6 outlining mobilisation periods and when surveys need to be undertaken for different species.

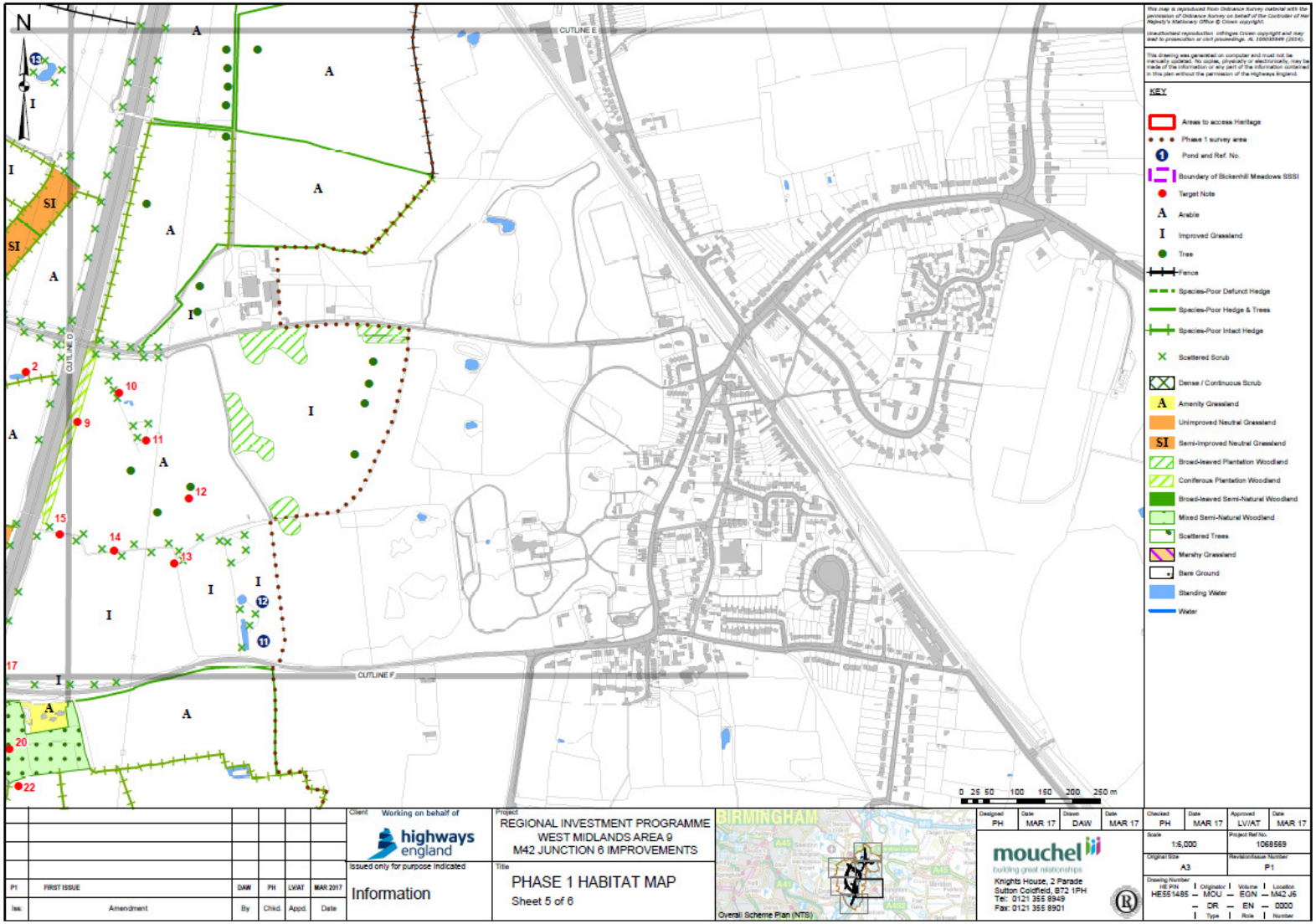
Appendix 1: Phase 1 habitat survey map

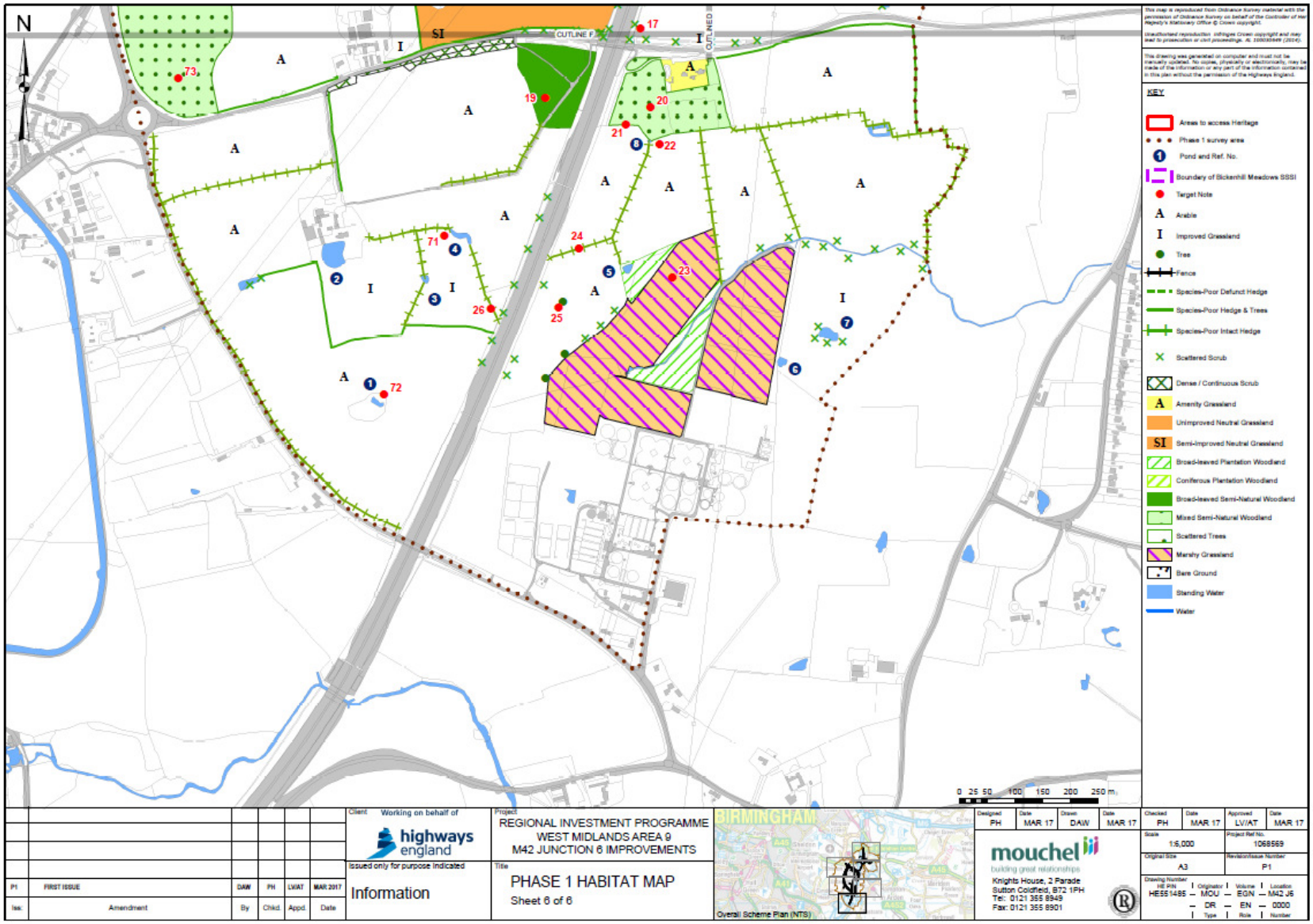












Appendix 2: Phase 1 target notes table

TN	Description
1	Location of new pond, discovered during survey (Pond C).
2	Line of trees with bat roost potential.
3	Tree with bat roost potential.
4	Tree with bat roost potential.
5	Tree with bat roost potential.
6	Line of trees with bat roost potential.
7	Group of trees with bat roost potential.
8	Line of trees with bat roost potential.
9	Single tree with bat roost potential within a belt of conifers (predominantly Norway spruce *Picea abies*) along eastern embankment of M42.
10	Line of trees with bat roost potential.
11	Group of trees with bat roost potential.
12	Tree with bat roost potential.
13	Tree with bat roost potential.
14	Watercourse heavily shaded by bramble *Rubus fruticosus* agg. for full length. Silty substrate with discoloured water (grey).
15	Tree with bat roost potential.
16	Line of trees with bat roost potential.
17	Tree with bat roost potential.
18	Line of trees with bat roost potential.
19	Badger latrine within woodland. Woodland is ancient replanted woodland with canopy of pedunculate oak *Quercus robur*, ash *Fraxinus excelsior* and poplar *Populus* sp. Currently not much understorey-heavily shaded but including holly *Ilex aquifolium*, elder *Sambucus nigra*, hazel *Corylus avellana* and honeysuckle *Lonicera periclymenum*. Ground layer includes common dog-violet *Viola riviniana*, wood avens *Geum urbanum*, pendulous sedge *Carex pendula* and lesser celandine *Ficaria verna*.
20	Ancient replanted woodland with canopy of predominantly Scots pine *Pinus sylvestris* with deciduous species including pedunculate oak, ash and poplar. Understorey including holly, elder, hazel, ivy *Hedera helix*, bramble, hawthorn *Crataegus monogyna* and honeysuckle. Ground layer includes broad buckler-fern *Dryopteris dilatata*, common nettle *Urtica dioica*, lesser celandine, herb-robert *Geranium robertianum*, male fern *Dryopteris filix-mas*, garlic mustard *Alliaria petiolata*, cow parsley *Anthriscus sylvestris*, greater stitchwort *Stellaria holostea*, pendulous sedge, bluebell *Hyacinthoides non-scripta*, wood avens, cleavers *Galium aparine* and dog's-mercury *Mercurialis perennis*.
21	Mammal pathways leading into woodland.
22	Pond 8 indicated on map is not present. Just a patch of wet grassland.
23	Fox holes dug within depression in ground within marshy grassland and tall herbaceous vegetation.
24	Line of trees with bat roost potential.
25	Tree with bat roost potential.
26	Group of trees with bat roost potential.
27	Mammal push-through beneath fencing at bottom of motorway embankment.
28	Line of trees with bat roost potential.
29	Line of four trees with bat roost potential.
30	Line of trees with bat roost potential.
31	Line of trees with bat roost potential.
32	Frequent rabbit holes around Pond 20.
33	Two mature trees with bat roost potential. Multiple features including dead wood and holes. Category 1 bat potential.
34	Location of new pond, discovered during survey (Pond A).
35	Oak tree with Category 2 bat potential. Some dead wood present.
36	Oak tree with Category 1 bat potential. Large rot hole on branch on north side and

	smaller knot hole.
37	Line of seven mature trees and one dead tree with bat roost potential.
38	Multiple trees with bat roost potential along tree and hedge lines in middle of arable field.
39	Clear badger footprint found in mud in arable field.
40	Tree with bat roost potential.
41	Watercourse. Moderate flow, silted, shallow with some deeper sections. Heavily shaded but with some great willowherb *Epilobium hisutum* growing in channel. Banks muddy and lacking vegetation coverage.
42	Part of Bickenhill Meadows SSSI. Bickenhill Meadows consists of two separate groups of fields comprising species-rich grassland situated to the south and west of the village of Bickenhill on predominantly neutral soils. Other group of fields comprising the SSSI is at TN50. This unit of the SSSI is also designated as Shadowbrook Meadows Warwickshire Wildlife Trust Nature Reserve.
43	Location of dry ditch running along bottom of road embankment. Although the ditch was dry at the time of the survey it did contain frequent bulrush *Typha latifolia*. There was also a mammal push-through beneath fencing at bottom of embankment at this point.
44	Mammal push-through beneath fencing at bottom of embankment.
45	Road embankment covered in frequent scrub and tall herbaceous vegetation.
46	Location of new pond, discovered during survey (Pond B).
47	Fox observed at this point during survey.
48	Signs of badger foraging.
49	Frequent rabbit digging.
50	Part of Bickenhill Meadows SSSI. Other group of fields comprising the SSSI is at TN42.
51	Large stand of Japanese knotweed *Fallopia japonica* at OS grid reference SP 18242 81809. The dead stems appear to have been recently cut down (Photograph 13).
52	Watercourse running along field boundary, not marked on map. Approximately 2m wide with sediment and stone/gravel substrate. Water appeared discoloured (grey).
53	Clubhouse building at Gaelic Athletic Association sports grounds with bat roost potential.
54	Japanese knotweed stand at SP 18254 81725 (Photograph 14).
55	Japanese knotweed stand at SP 18258 81692 (Photograph 15).
56	Multiple trees with bat roost potential along tree and hedge line running east to Catherine de Barnes Lane.
57	Line of trees with bat roost potential.
58	Line of three trees with bat roost potential.
59	Line of trees with bat roost potential.
60	Line of trees with bat roost potential.
61	[redacted]
62	Woodland with mature predominantly deciduous trees including pedunculate oak and ash with some Scots pine. Multiple trees with bat roost potential. Understorey includes bramble, holly, honeysuckle and wild privet *Ligustrum vulgare.* Signs of rabbit digging and mammal foraging. [redacted]
63	Large (10m x 5m) stand of Japanese knotweed at edge of woodland / arable field.
64	Trees with bat roost potential along boundary.
65	Several buildings beneath road footprint. Main house with bat roost potential and possibly bat roost potential in smaller structures.
66	Line of three trees with bat roost potential.
67	Old disused holes along tree / hedge line. One is badger shaped but very small. Possibly old and partially filled-in. Another hole appears to be used by rabbits. Several trees with bat roost potential along this tree / hedge line. Location of new pond, just to south-east of TN67, discovered during survey (Pond D).
68	Line of trees with bat roost potential.

69	Group of mature trees, all with bat roost potential.
70	Line of trees with bat roost potential.
71	Evidence of mammal digging near [redacted]
72	[redacted]
73	Large woodland (Barber's Coppice) dominated by Scots pine with pedunculate oak around the edges. Holly, bramble and honeysuckle amongst understorey.

Appendix 3: Site photographs

Photograph 1.

Photograph 2.

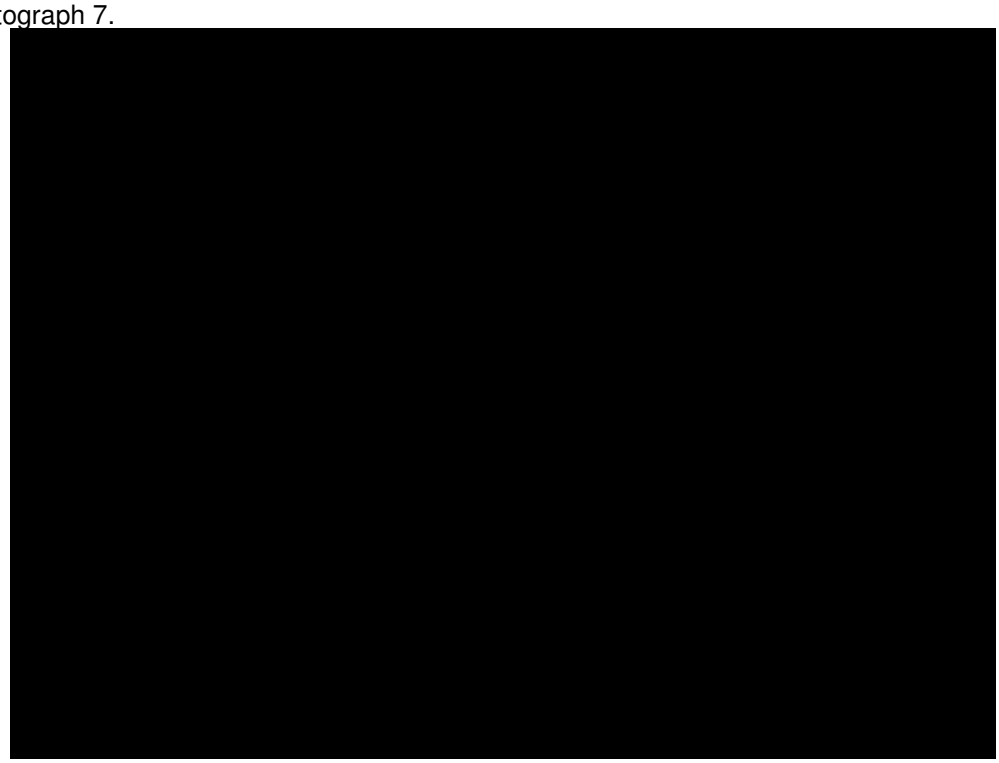
Photograph 3.

Photograph 4.

Photograph 5.

Photograph 6.

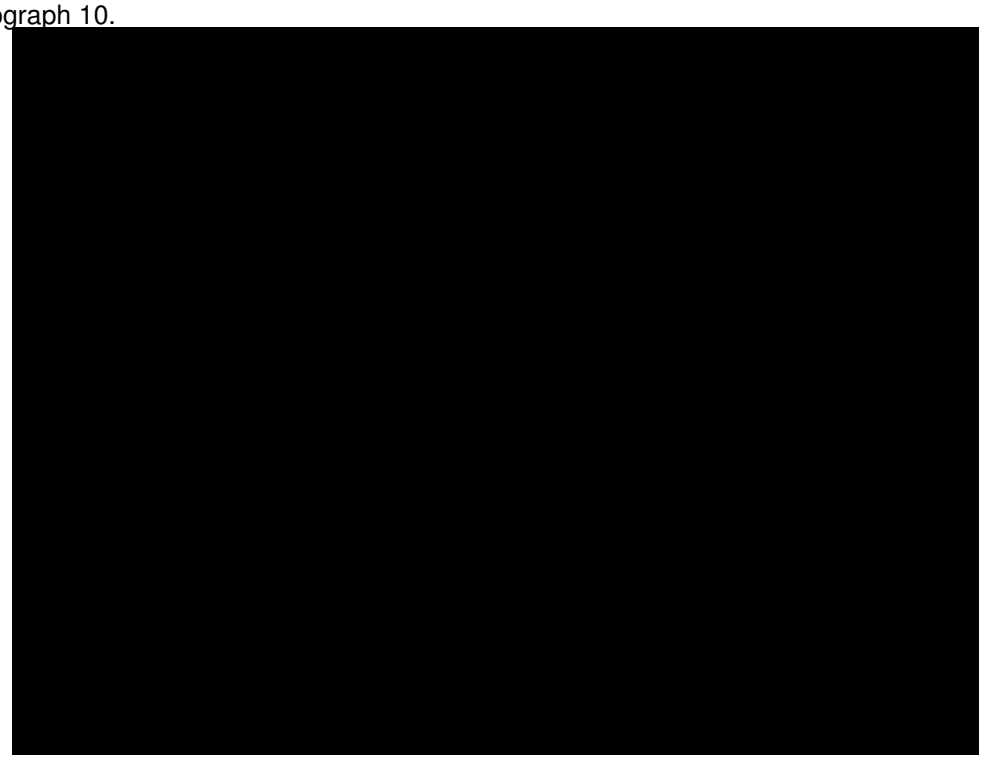
Photograph 7.



Photograph 8.

Photograph 9.

Photograph 10.



Photograph 11.

Suitable reptile habitat along south-facing road embankment at TN45

Photograph 12.

Heavily shaded watercourse at TN41

Photograph 13.

Japanese knotweed at TN51

Photograph 14.

Japanese knotweed at TN54

Photograph 15.

Japanese knotweed at TN55

Photograph 16.

Water fern completely covering surface of Pond 36

Appendix 5: HSI Survey Results

Pond Number	Date of Survey Visit	SI1 Geographic Location	SI2 Pond Area	SI3 Pond Drying	SI4 Water Quality	SI5 Shade	SI6 Fowl	SI7 Fish	SI8 Ponds	SI9 Terrestrial Habitat	SI10 Macrophytes	Sum	HSI Score	HSI Category
1	16/02/2017	1	0.2	0.1	0.33	0.6	1	1	0.83	1	0.3	0.00	0.50	Below Average
2	15/02/2017	1	0.88	1	0.67	1	0.67	0.67	0.88	1	0.3	0.07	0.77	Good
3	15/02/2017	1	0.3	0.1	0.64	0.2	1	1	0.88	1	1	0.00	0.57	Below Average
4	15/02/2017	1	0.3	0.1	0.67	0.2	1	1	0.92	0.67	0.3	0.00	0.49	Poor
5	16/02/2017	1	0.2	0.5	0.67	0.4	1	1	1	1	0.3	0.01	0.62	Average
6	16/02/2017	1	0.3	0.5	0.67	0.2	1	1	1	0.67	0.3	0.00	0.58	Below Average
7	16/02/2017	1	1	1	1	0.8	1	1	1	0.67	0.35	0.19	0.85	Excellent
8	16/02/2017	No pond present												
9	15/02/2017	1	0.8	1	0.67	0.8	0.67	0.67	0.95	0.67	0.5	0.06	0.76	Good
10	15/02/2017	No pond present												
11	16/02/2017	1	0.9	0.5	0.67	1	1	1	1	0.67	0.8	0.16	0.83	Excellent
12	16/02/2017	1	0.1	0.5	0.67	1	1	1	1	0.67	0.4	0.01	0.62	Average
13	No Access													
14	No Access													
15	No Access													
16	No Access													
17	14/02/2017	1	0.9	1	0.67	1	1	0.67	0.83	1	0.35	0.12	0.81	Excellent
18	No Access													
19	No Access													
20	14/02/2017	1	0.05	0.1	0.67	0.7	1	1	0.83	0.67	0.4	0.00	0.47	Poor
21	14/02/2017	1	0.8	0.9	0.67	1	0.67	0.67	0.92	0.67	0.35	0.05	0.74	Good
22	14/02/2017	1	0.8	0.9	0.67	0.9	0.67	0.67	0.38	0.67	0.3	0.01	0.66	Average
23	14/02/2017	Pond Dry												
24	14/02/2017	Pond Dry												

25	14/02/2017	Pond Dry												
26	No Access													
27	No Access													
28	No Access													
29	No Access													
30	No Access													
31	No Access													
32	No Access													
33	No Access													
34	14/02/2017	1	0.6	1	0.67	1	1	1	1	0.67	0.4	0.11	0.80	Excellent
35	14/02/2017	1	0.05	0.1	0.67	0.4	1	1	1	1	0.3	0.00	0.46	Poor
36	14/02/2017	1	0.4	1	0.67	1	1	0.67	1	1	0.8	0.14	0.82	Excellent
37	16/02/2017	Not accessible at time of survey												
38	15/02/2017	Pond Dry												
39	15/02/2017	Pond Dry												
40	14/02/2017	1	0.05	0.1	0.67	0.2	1	1	0.95	1	0.3	0.00	0.42	Poor
41	14/02/2017	1	0.3	0.5	1	1	1	1	0.95	1	1	0.14	0.82	Excellent
A	14/02/2017	1	0.05	0.1	0.67	0.2	1	1	1	1	0.5	0.00	0.45	Poor
B	14/02/2017	1	0.05	0.5	0.01	0.2	1	1	0.98	0.67	0.35	0.00	0.32	Poor
C	15/02/2017	1	0.4	0.5	0.67	0.2	1	1	0.92	1	0.35	0.01	0.62	Average
D	15/02/2017	1	0.05	0.1	0.67	0.2	1	1	1	1	0.3	0.00	0.43	Poor
E	16/02/2017	1	0.05	0.1	0.33	1	1	1	1	0.01	0.3	0.00	0.29	Poor

Appendix 6: Indicative Survey Programme

M42 Junction 6 Indicative Survey Programme

Ecology Surveys

Survey Type	Survey Window	Proposed Survey Dates	Mobilisation Time	Additional surveys
Grassland NVC	June - August	20.07.17	1 week	
Woodland NVC	March - April	06.04.17	1 week	
Bats - Roost Assessment	No seasonal constraint	10.04.17 - 13.04.17	1 week	Following the roost assessment surveys, there may be the requirement to undertake further survey work to establish if bats are present. These would be subject to seasonal constraints and additional fees.
Reptiles	March - October	Set up - 15-16.05.16	1 week	
		1. 26.05.17		
		2. 05.06.17		
		3. 12.06.17		
		4. 23.06.17		
		5. 26.06.17		
		6. 05.07.17		
		7. 21.07.17		
Great crested newt	4 surveys to be undertaken between mid-March to mid-June. At least 2 two surveys to be undertaken between mid-Apil and mid-May. If great crested newts found during these surveys, an additional 2 surveys should be undertaken, with at least 3 of the 6 surveys being undertaken between mid-April and mid-May (these surveys have been included within the costings and based on the assumptions that	1. 03.04.17 - 07.04.17	2 weeks	
		2. 10.04.17 - 13.04.17		
		3. 02.05.17 - 05.05.17		
		4. 15.05.17 - 19.05.17		
		5. 30.05.17 - 02.06.17		
		6. 05.06.17 - 09.06.17		
Water vole	Mid-April - late-September	02.05.17	1 week	
White-clawed crayfish - Scoping	No seasonal constraint	02.05.17	1 week	Following the habitat assessment surveys there may be the requirement to underake further survey work to esatblish if white-clawed crayfish are present. These would be subject to seasonal contraints and additional fees.
Dormice	Surveys to be undertaken between April and November	Set-up - 03.04.17 - 07.04.17	2 weeks	
		1. 17-19.05.17		
		2. 19-20.06.17		
		3. 26-27.07.17		
		4. 17-18.08.17		
		5. 18-19.09.17		

HIGHWAYS ENGLAND

M42 JUNCTION 6 IMPROVEMENT

PRELIMINARY BAT ASSESSMENT

MAY 08, 2017

CONFIDENTIAL

M42 JUNCTION 6 IMPROVEMENT

PRELIMINARY BAT ASSESSMENT

FINAL
CONFIDENTIAL

PROJECT NO.: 62241010
DATE: MAY 2017

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QUALITY MANAGEMENT

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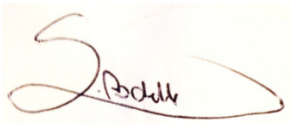
SIGNATURES

PREPARED BY



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TABLES

1 INTRODUCTION

1.1 BACKGROUND

WSP (formally Mouchel) was commissioned by Highways England to undertake a preliminary assessment of land within and adjacent to the proposed M42 Junction 6 Improvement Scheme to determine if the habitats present are likely to be used by bats.

This report presents the results of the preliminary assessment undertaken in April 2017 and makes recommendations for further survey work as appropriate.

1.2 SCHEME LOCATION

At the time of writing, three possible route options (Options 1, 2 and 3) are being considered. All three options are predominantly located to the south west of Junction 6 close to the village of Bickenhill, although all route options also include improvements to the junction itself. The land within the proposed scheme is predominantly used for agriculture and pasture grazing, although the scheme is also close to the National Exhibition Centre (NEC), Birmingham International Railway Station and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 STUDY AREA

A study area extending up to 1km from the proposed route was defined, with field surveys focussing on the proposed routes and immediately adjacent habitats. Given the large number of trees within the study area, only those which are likely to be directly affected as a result of the proposed scheme were surveyed for their suitability for roosting bats at this stage.

1.4 STUDY AIMS AND OBJECTIVES

The study sought to determine whether features suitable for roosting and/or foraging and commuting bats are present within or adjacent to the proposed scheme. To achieve this, field surveys were undertaken across the study area to identify possible roosting, foraging and commuting features.

The results of the surveys will be used to inform the need for any future surveys which may be required in order to fully assess the impact of the scheme on bats.

2 METHODOLOGY

2.1 PRELIMINARY ASSESSMENT

2.1.1 ROOSTS

An assessment of the suitability of structures and trees within the study area to support roosting bats was carried out in April 2017. Given the large number of trees within the study area, only those likely to be directly affected as a result of either of the three route options were assessed at this stage.

The methodology for the assessment of structures and trees for their suitability to support bat roosts follows the Bat Conservation Trust's (BCT) Good Practice Guidelines. Surveyors assessed each structure and tree from the ground, using binoculars as required. The location of the structure or tree, along with any potential roosting features (PRFs) were recorded and the structure or tree was described as being of either negligible, low, moderate or high suitability for roosting bats. A summary of each of these categories is provided in Table 1.

Table 2.1 Categories of suitability of structures and trees for bat roosts, summarised from Table 4.1 of the BCT's Good Practice Guidelines.

SUITABILITY	DESCRIPTION
Negligible	Negligible features likely to be used by roosting bats.
Low	A structure or tree with limited roosting potential that could be used by individual bats opportunistically; or a tree of a size and age where PRFs may be present, but have not been observed from the ground. Unlikely to be used regularly or by large numbers of bats
Moderate	A structure or tree with one or more PRFs which may be used regularly by bats, but are unlikely to support roosts of high conservation status.
High	A structure or tree with multiple PRFs suitable for large numbers of bats on a regular basis for longer periods of time.

2.1.2 COMMUTING AND FORAGING HABITATS

An assessment of the suitability of habitats located within the study area for foraging and commuting bats was also carried out in April 2017. Again, the methodology for the assessment of habitats followed BCT's Good Practice Guidelines. Any likely foraging and/or commuting habitats were recorded and described as being of either negligible, low, moderate or high suitability for foraging and commuting bats. A summary of each of these categories is provided in Table 2.

Table 2.2 Categories of suitability of habitats for foraging and commuting bats, summarised from Table 4.1 of the BCT's Good Practice Guidelines.

SUITABILITY	DESCRIPTION
Negligible	Negligible features likely to be used by commuting or foraging bats.

Low	Habitats which may be used by small numbers of foraging and commuting bats, but poorly connected within the wider landscape.
Moderate	Continuous habitat connected to the wider landscape that could be used by foraging and commuting bats.
High	Continuous, high quality habitat that is well connected and likely to be used regularly by foraging and commuting bats. Close to and connected to known roosts.

2.2 LIMITATIONS

At the time of survey, access was not available to all land within the study area. An assessment of the habitats present was undertaken from adjacent land where possible to determine the likelihood of suitable habitat for bats being present, although a detailed assessment could not be undertaken at this stage. Surveys of areas unable to be accessed will be undertaken at a later date once access becomes available to ensure that an assessment of the whole study area has been undertaken.

3 RESULTS

3.1 ROOSTS

3.1.1 TREES

Trees in proximity to each of the proposed route options were assessed for their suitability to support roosting bats. Only trees likely to be directly affected as a result of each route option were surveyed at this stage. 92 trees/small groups of trees and 3 areas of woodland were found to have features suitable for roosting bats. These are described in Appendix A and shown in Figure 1. 16 of these are of high suitability, 41 of these are of moderate suitability and 32 are of low suitability for roosting bats. 3 trees could not be directly assessed due to access restrictions.

3.1.2 STRUCTURES

In addition to the trees listed above, both residential and commercial buildings are present within the study area, some of which are located adjacent to the proposed routes. In addition, two variants of Option 1 will likely result in the loss of two residential properties on Catherine De Barnes Lane. Both properties are of a construction type which appear to offer opportunities for roosting bats.

3.2 COMMUTING AND FORAGING HABITATS

A summary of the habitats present within the study area and an assessment of their suitability for foraging and commuting bats is provided below:

3.2.1 LAND SOUTH OF M42 JUNCTION 6

The land to the west of Catherine De Barnes Lane comprises arable and grassland fields which are connected to the wider area by a network of treelines and hedgerows. These features provide a continuous corridor of vegetation which may be used by commuting bats, with grassland and woodland habitats offering opportunities for foraging. Accordingly, this area is of moderate suitability for foraging and commuting bats.

The land to the east of Catherine De Barnes Lane and to the west of the M42 also comprises arable and grassland habitats. An area of ancient woodland is present at the junction of Catherine De Barnes Lane and Solihull Road and this is connected to smaller parcels of woodland by hedgerows and treelines. Two watercourses are also present. The mosaic of habitats within Bickenhill Meadows Site of Special Scientific Interest (SSSI) including neutral and marshy grassland, woodland and a pond is also likely to be used by foraging bats. This area is of moderate suitability for foraging and commuting bats.

The land to the east of the M42 is similar to the wider area, comprising improved grassland and arable habitats with hedgerows, treelines and waterbodies. Accordingly, these habitats are of moderate suitability for foraging and commuting bats.

3.2.2 LAND NORTH OF M42 JUNCTION 6

Habitats located to the north-east of Junction 6 include improved grassland, arable fields and waterbodies which provide opportunities for foraging bats. These habitats are connected by hedgerows and treelines providing suitable commuting routes for bats. These habitats are of moderate suitability for foraging and commuting bats.

Habitats to the north-west of Junction 6 are dominated by buildings and hard-standing associated with the NEC and Birmingham International railway station. These habitats are of negligible suitability for foraging and commuting bats.

4 RECOMMENDATIONS

4.1 BAT ROOSTING OPPORTUNITIES

Trees, woodlands and structures with features suitable for roosting bats have been recorded within the study area. In order to determine if these features are being used by bats, it is recommended that further survey work is undertaken. Table 3 shows the recommended timings and minimum number of survey visits for presence/absence surveys to give confidence in a negative result when surveying structures. The same is also recommended when surveying trees, however this survey effort is unlikely to give confidence in a negative result. This is due to a number of limitations when undertaking emergence/re-entry surveys of trees, including quiet echolocation calls of some tree-dwelling species and difficulty in observing features which may be high off the ground or obscured by foliage. It is therefore also recommended that where possible, climbed inspection surveys are undertaken in conjunction with emergence/re-entry surveys.

Table 4.1 Recommended minimum number of survey visits for emergence/re-entry surveys to give confidence in a negative result – taken from Tables 7.1 and 7.3 of the BCT's Good Practice Guidelines.

SUITABILITY	SURVEY TIMINGS	SURVEY EFFORT
Low	Structures: May to August Trees: No further surveys required*	Structures: One dusk emergence or one dawn re-entry survey Trees: No further surveys required*
Moderate	May to September with at least one of the surveys between May and August.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey.
High	May to September with at least two of the surveys between May and August.	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be dusk or dawn.

(as confidence in a negative result is not possible for trees due to limitations outlined above)*

This assessment has focussed on roosting features which are likely to be directly lost as a result of the proposed route options. It is recommended that consideration is also given to the possible presence of roosts within adjacent habitats. It is recommended that walked transect surveys are undertaken (see below) to determine how bats are using the landscape. If suitable, these surveys can be combined with back-tracking surveys, the aim of which is to locate likely roost locations by observing the time and direction of flight of commuting bats at sunset and sunrise. Should these surveys record roosting bats within the close vicinity of either proposed route option, an assessment of the likely impacts of the scheme on these bats and their roosts can be made.

4.2 BAT FORAGING AND WIDER CONTEXT

Suitable foraging and commuting habitat is present across the study area. It is recommended that further survey work, including walked transects and/or static detector surveys are undertaken to record levels of bat activity and determine how bats are using the habitats within the study area so that the effects of the proposals on foraging and commuting bats can be assessed. Table 4 shows the recommended timings and number of surveys to achieve a reasonable survey effort.

Table 4.2 Recommended number of activity surveys to achieve a reasonable survey effort in relation to habitat suitability – taken from Table 8.3 of the BCT's Good Practice Guidelines.

SUITABILITY	SURVEY EFFORT	
	TRANSECT SURVEYS	STATIC DETECTOR SURVEYS
Low	One survey visit per season** in appropriate weather conditions. Further surveys may be required if these survey visits reveal higher levels of bat activity than predicted by habitat alone.	One location per transect, data to be collected on five consecutive nights per season** in appropriate weather conditions for bats.
Moderate	One survey visit per month (April to October) in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk-dawn) within one 24-hour period.	Two locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.
High	Up to two survey visits per month (April to October) in appropriate weather conditions for bats. At least one of the surveys should comprise dusk ad pre-dawn (or dusk-dawn) within one 24-hour period.	Three locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.

(** *spring* – April/May, summer – June/July/August, autumn – September/October)

BIBLIOGRAPHY

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5 FIGURES

5.1 FIGURE 1: PRELIMINARY BAT ASSESSMENT RESULTS

APPENDIX

A TREES WITH POTENTIAL ROOSTING FEATURES

TREE NUMBER	SPECIES	LOCATION		POTENTIAL ROOST FEATURES (PRFS)	BAT ROOST POTENTIAL
		N	E		
1	Oak	419143	280692	Knot holes, missing bark, cracks, broken branches	High
2	Oak	419260	280932	Broken branches, missing bark, knot holes in dead branches	Moderate
3	Oak	419320	280887	Knot holes in both living and dead branches	Moderate
4	Ash	419369	280882	Knot hole	Low
5	Oak	419334	280827	Missing bark, small knot holes, cracks	Moderate
6	Oak	419039	280827	Missing branch	Moderate
7	Ash	418939	280480	Knot holes and missing limb	Moderate
8	Ash	418961	280467	Knot hole and missing limbs	High
9	Oak	418901	280209	Missing bark	Moderate
10	Oak	418901	280209	Split in stem, missing bark	Moderate
11	Oak	418882	280863	Knot holes, peeling and lifted bark, split in stem	Moderate
12	Oak	418787	280763	Rotten branch	Low
13	Oak	419762	280889	Knot hole	Moderate

APPENDIX

TREE NUMBER	SPECIES	LOCATION		POTENTIAL ROOST FEATURES (PRFS)	BAT ROOST POTENTIAL
		N	E		
14	Oak	418775	280892	Split in stem	Moderate
15	Oak	418779	280942	Split in bark	Low
16	Oak	418790	280966	Missing limbs	Moderate
17	Oak	418811	281023	Missing branch	Low
18	Oak	418814	281067	Missing branches	Low
19	Oak	418817	281080	Missing branches	Low
20	Oak	418779	281153	Knot hole	Low
21	Ash	418743	281097	Dead branch with hole	Moderate
22	Oak	418743	281097	Hole	Moderate
23	Oak	418745	281074	Knots in limbs	Low
24	2 Poplar and 2 Ash	418749	281042	Stem splits	Moderate, High
25	7 Oak	418749	282044	Multiple	Moderate
26	Oak	418690	280947	Three knot holes and missing branch	Moderate
27	Oak	418672	280932	Small holes and crack	Low
28	Oak	418689	280900	Hole and dead branch	Low
29	Oak	419015	282567	Cavities, splits and dead wood	High
30	Oak	419069	282540	Splits, cavities, missing limbs	Moderate
31	2 Ash	419001	282537	Knot hole, split	Moderate

TREE NUMBER	SPECIES	LOCATION		POTENTIAL ROOST FEATURES (PRFS)	BAT ROOST POTENTIAL
		N	E		
32	Oak	419028	282513	Knot hole	Low
33	Oak	419914	282502	Knot holes	High
34	Horse Chestnut	419099	282546	Cavity	High
35	Ash	419106	282567	Woodpecker holes, cavities	High
36	Ash	419117	282559	Knot holes and large cavities	High
37	Oak	419252	282634	Split in branch	Low
38	Ash	419192	282579	Woodpecker holes	Moderate
39	Oak	419146	282575	Splits	Moderate
40	Oak	419131	282556	Cavity	High
41	2 Ash	419122	282561	Knot holes and cavities	Moderate, High
42	Oak	418156	282287	Split	Low
43	Oak	418156	282300	Five tear outs, dead wood	High
44	Oak	418172	282332	Woodpecker hole	Low
45	Ash	419226	281200	Knot hole	Low
46	Oak	419207	281198	Missing bark, missing limbs, splits in limbs	Moderate
47	Ash	419190	281203	Stem split and missing limb	High
48	Oak	419107	281216	Splits in limb	Moderate
49	Ash	419053	281249	Cavity in stem	Moderate
50	Oak	418915	281296	Knot holes, lifted bark,	Moderate, High

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TREE NUMBER	SPECIES	LOCATION		POTENTIAL ROOST FEATURES (PRFS)	BAT ROOST POTENTIAL
		N	E		
51	2 Ash, 1 Oak	418844	281411	Knot holes, missing limbs, lifted bark	Low, Moderate
52	Oak	418817	281441	Broken limbs	Low
53	2 Oak	418801	281426	Limbs, split limb, knot hole	Moderate
54	Oak	418756	281396	Knot holes, split limbs	High
55	Oak	418736	281376	Knot hole, split branch, lifting bark, missing limb	Moderate
56	2 Oak	418733	281367	Dead branch	Low
57	Oak	418738	281344	Knot holes, lifted bark	Low
58	Oak	418709	281254	Split in limb	Moderate
59	Oak	418805	281218	Knot hole	Low
60	Ash	418202	280837	Knot hole	Low
61	Oak	419036	281167	Knot holes, cavities	High
62	Oak	419024	281150	Tear out	Low
63	Oak	409013	281150	Split bark, knot hole	Moderate
64	Oak	418947	281150	Woodpecker hole on western tree - eastern tree dead branches with overlap	Low, Moderate

TREE NUMBER	SPECIES	LOCATION		POTENTIAL ROOST FEATURES (PRFS)	BAT ROOST POTENTIAL
		N	E		
65	Oak	418846	281131	Branches grown into each other	Low
66	Oak	418744	281162	Knot hole	Low
67	Oak	418728	281270	Dead wood and gaps	Moderate
69	Ash	418699	281273	Cavity	Moderate
69	Oak	418685	281172	Dead wood	Low
70	Oak	418519	281118	Four woodpecker holes	Moderate
71	Ash	418571	281092	Knot holes and cavities	Moderate
72	Oak	418565	281082	Knot holes and cavities	Moderate
73	Ash	418655	281059	Missing limb	Moderate
74	Poplar	418661	281061	Missing limbs and branches	Moderate
75	Oak	418683	281048	Dead wood and missing branches	Low
76	Oak	419175	280944	Dead wood	Low
77	Oak	419149	280940	Dead wood	Low
78	Oak and Ash	419124	280961	Dead wood	Low
79	Ash	419079	281133	Cavities knot holes	Moderate
80	Ash	419094	280978	Knot holes and broken branches	Moderate
81	3 Oak	418894	281053	Knot holes deadwood missing branches	Low
82	Oak	418290	482180	Woodpecker hole, dead branch and lifted bark	Moderate

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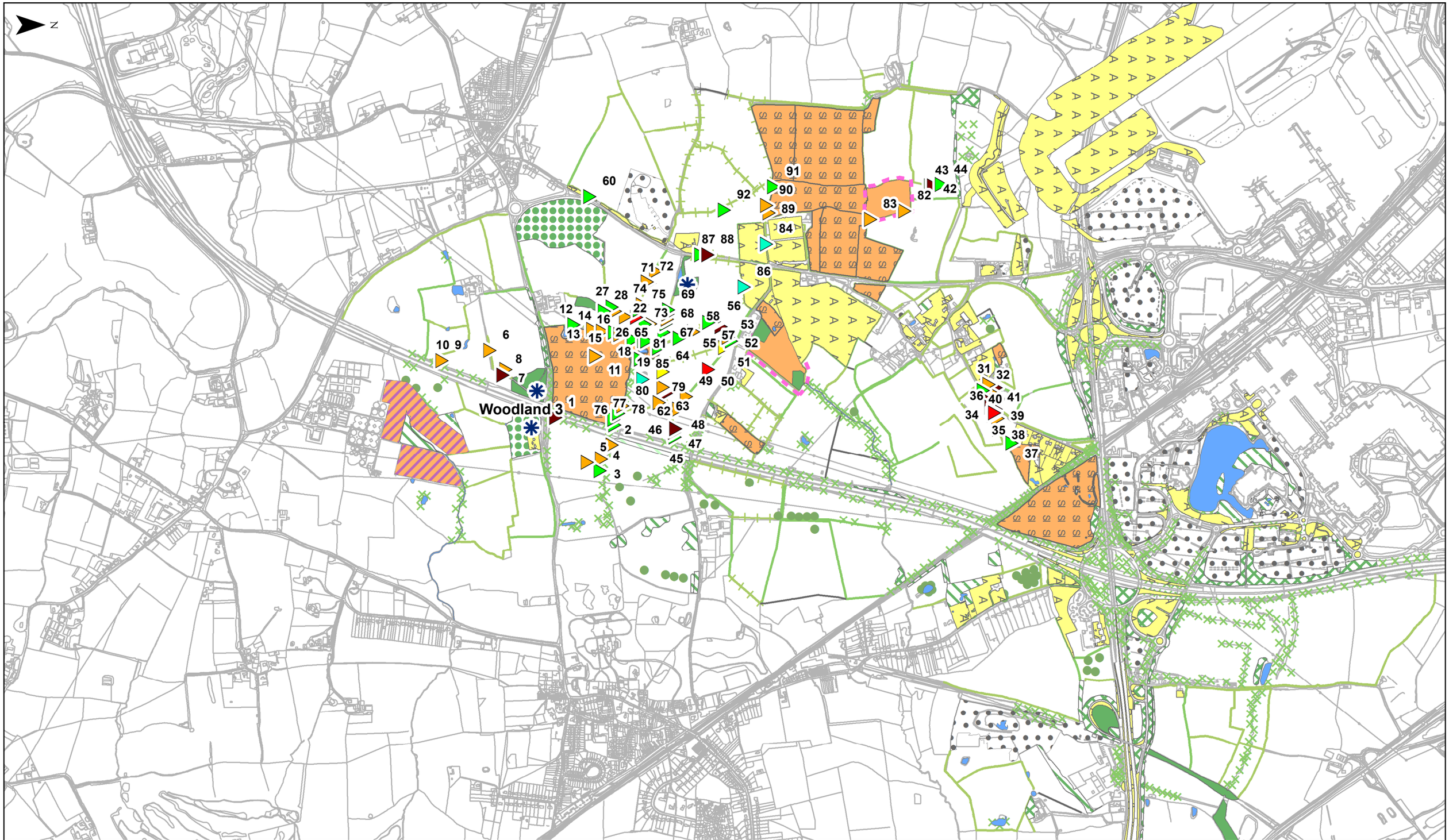
TREE NUMBER	SPECIES	LOCATION		POTENTIAL ROOST FEATURES (PRFS)	BAT ROOST POTENTIAL
		N	E		
83	Oak	418330	482040	Woodpecker holes, splits in bark and cavity	Moderate
84	Oak	418404	281589	Unknown	Unknown
85	Unknown	418980	281063	Unknown	Unknown
86	Unknown	418587	281495	Unknown	Unknown
87	Oak	418450	281310	Knothole and deadwood	Low
88	Oak	418450	281340	Split trunk	High
89	Ash	418270	281600	Woodpecker hole	Moderate
90	Ash	418240	281590	Woodpecker hole	Moderate
91	Oak	418160	281620	Ivy, possibly obscuring features	Low
92	Oak and Alder	418260	281410	Multiple	Low



Key

Trees with Bat Roosting Potential (BCT catergories)

- High
- Low
- Low, Moderate
- Moderate
- Moderate, High
- Unknown
- Woodlands with potential bat roosting features

Habitat Type

- (A)rable/(I)mproved
- Amenity
- Bare Ground
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- Site of Special Scientific Interest
- Coniferous Plantation Woodland
- Dense Scrub
- Marshy Grassland
- Mixed Semi-natural Woodland
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Client: Highways England

Project: M42 J6 Ecology Surveys

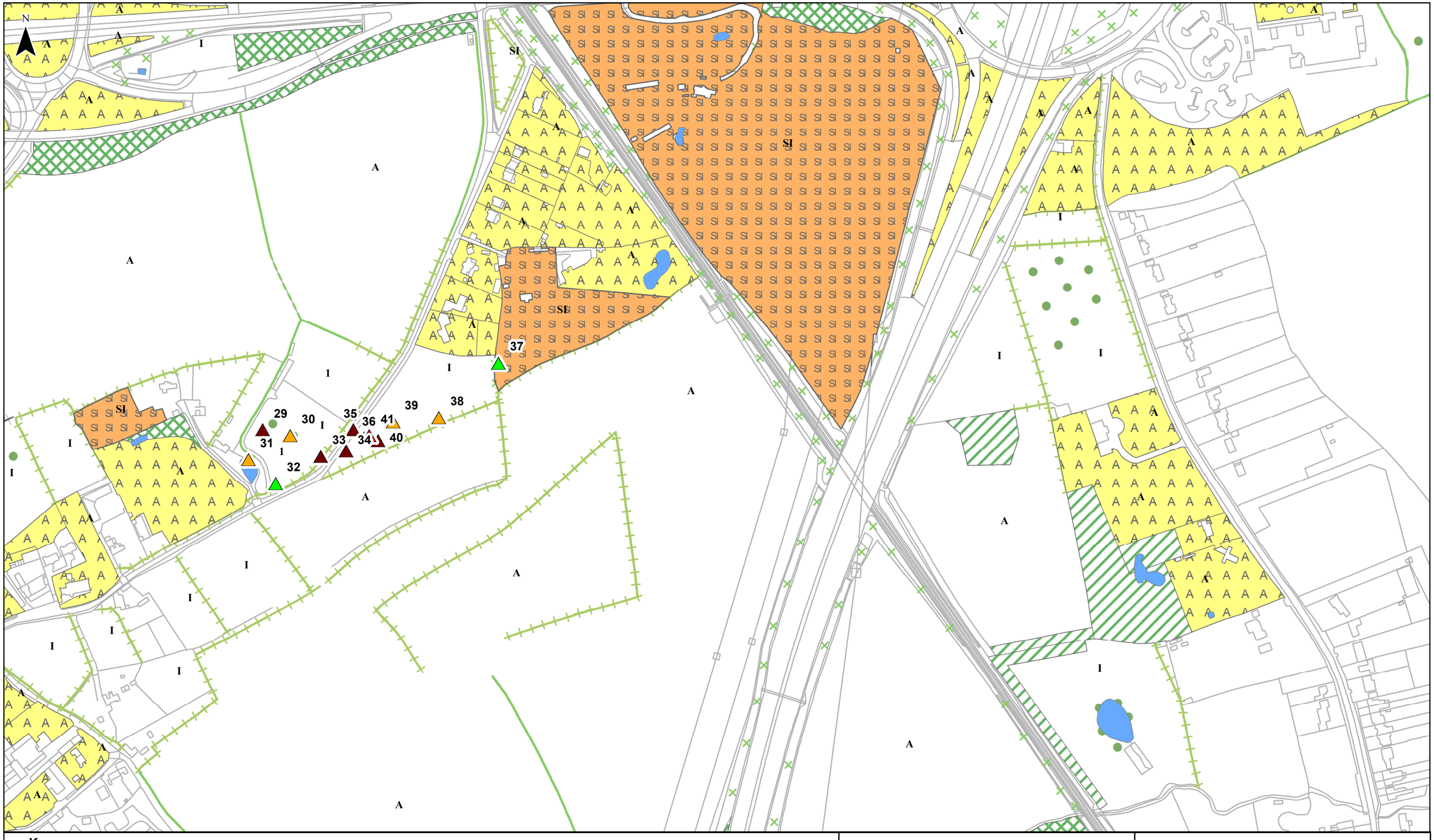
Drawing Title: Bat Scoping Map

Scale (at A3 size): 1:15,000

Purpose of Issue: Information

Office: Blackfriars
Tel: 020 7822 2497

Drawing Number: Page 1 of 8



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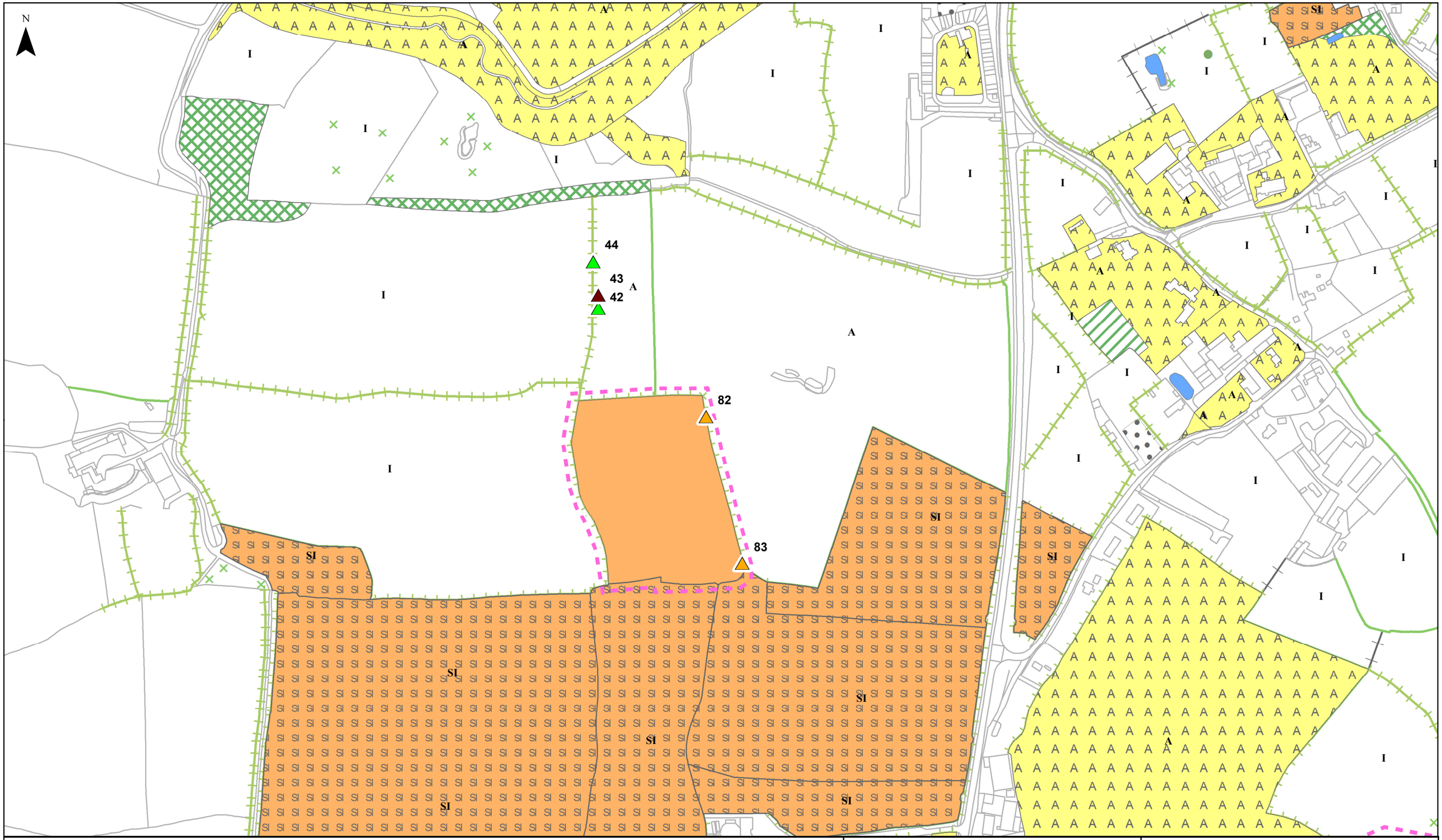

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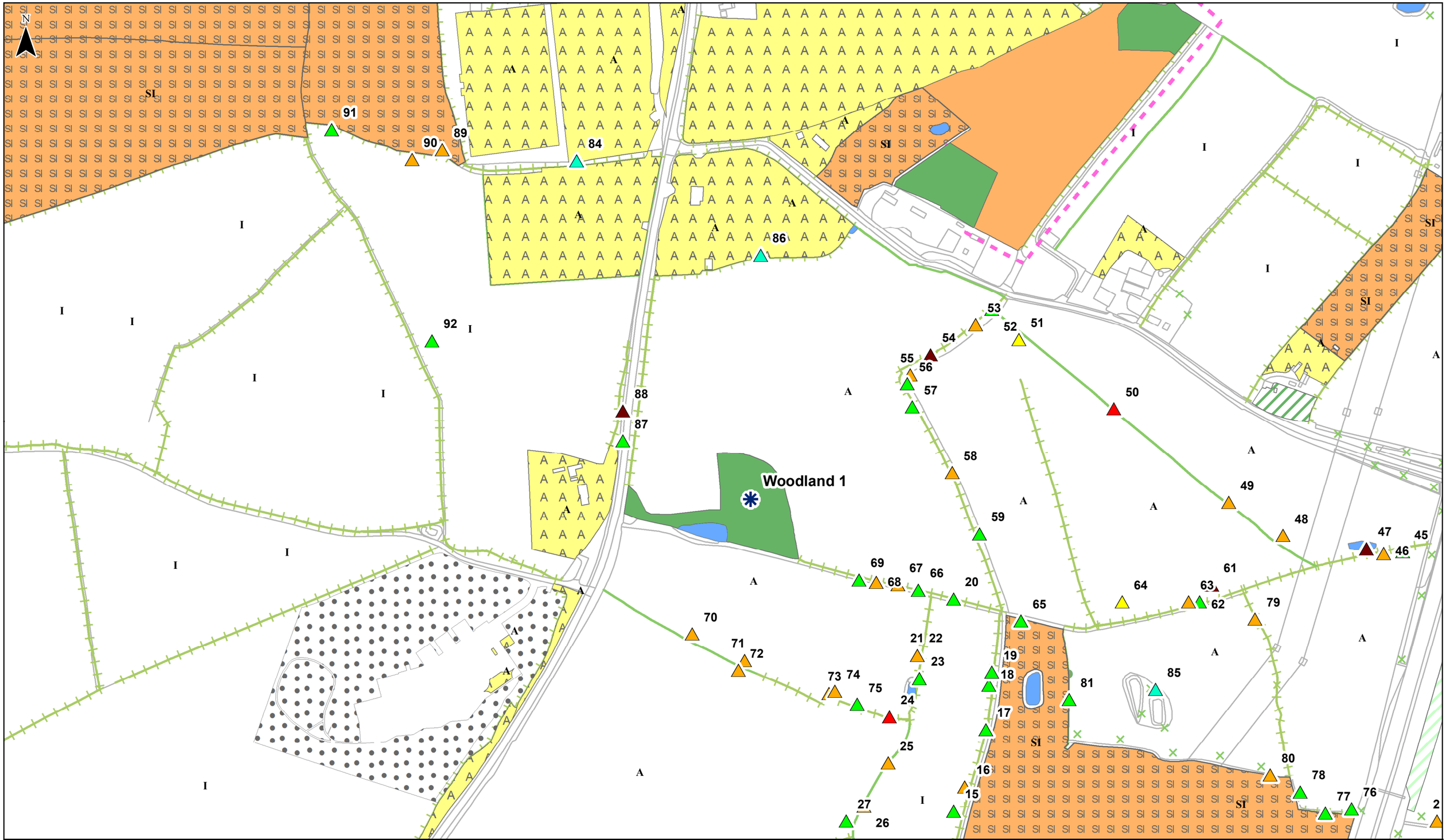

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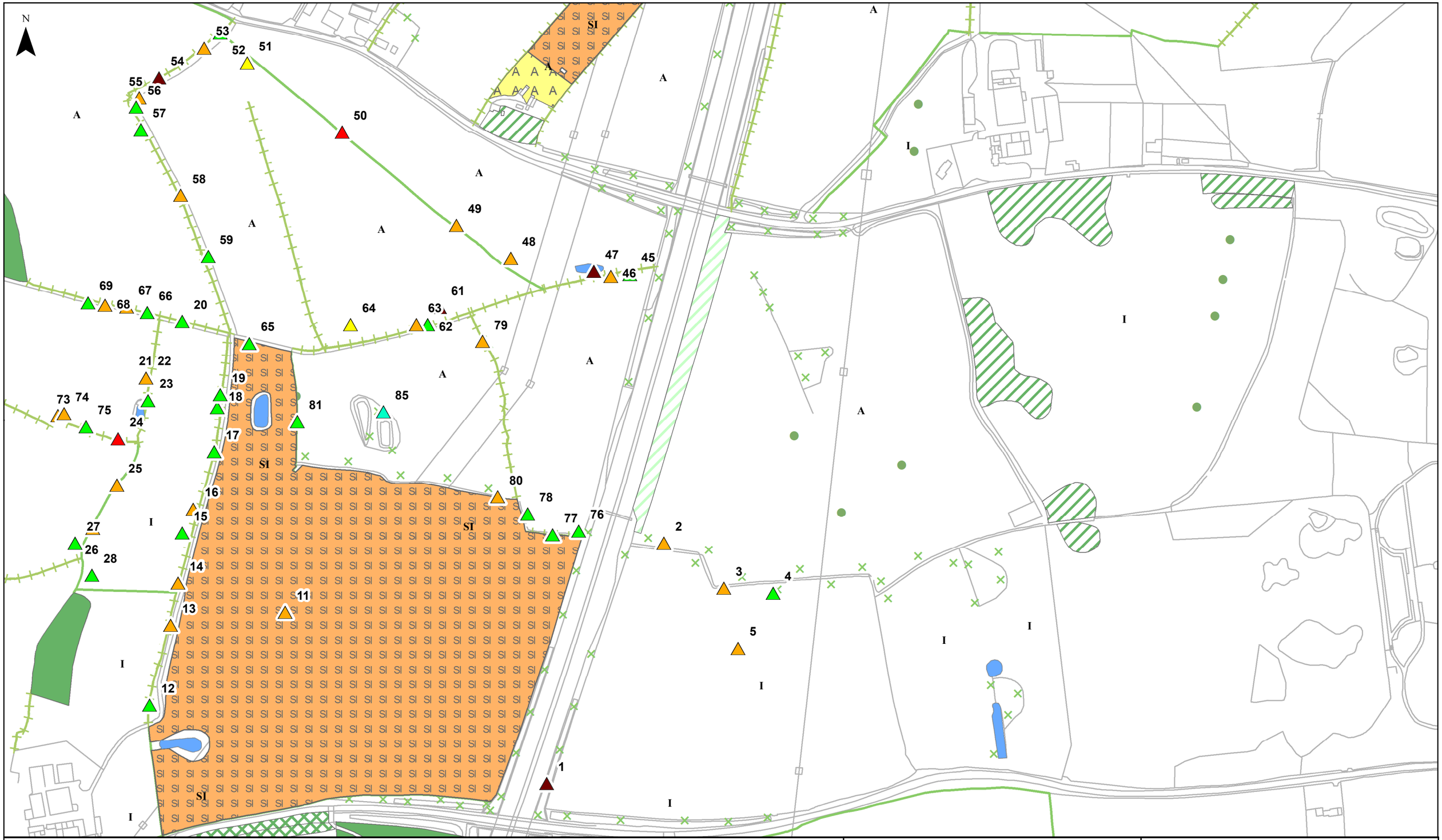

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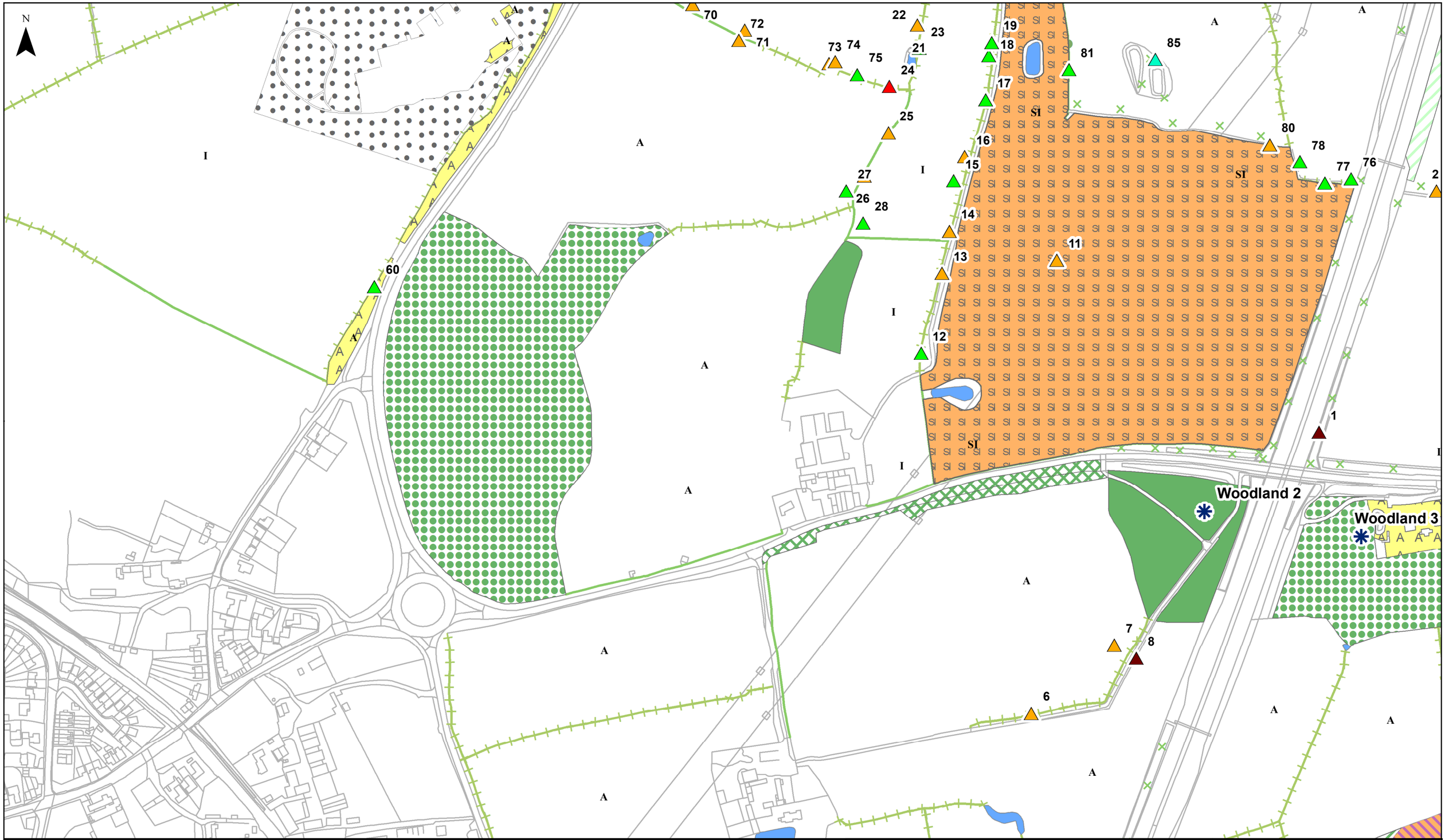

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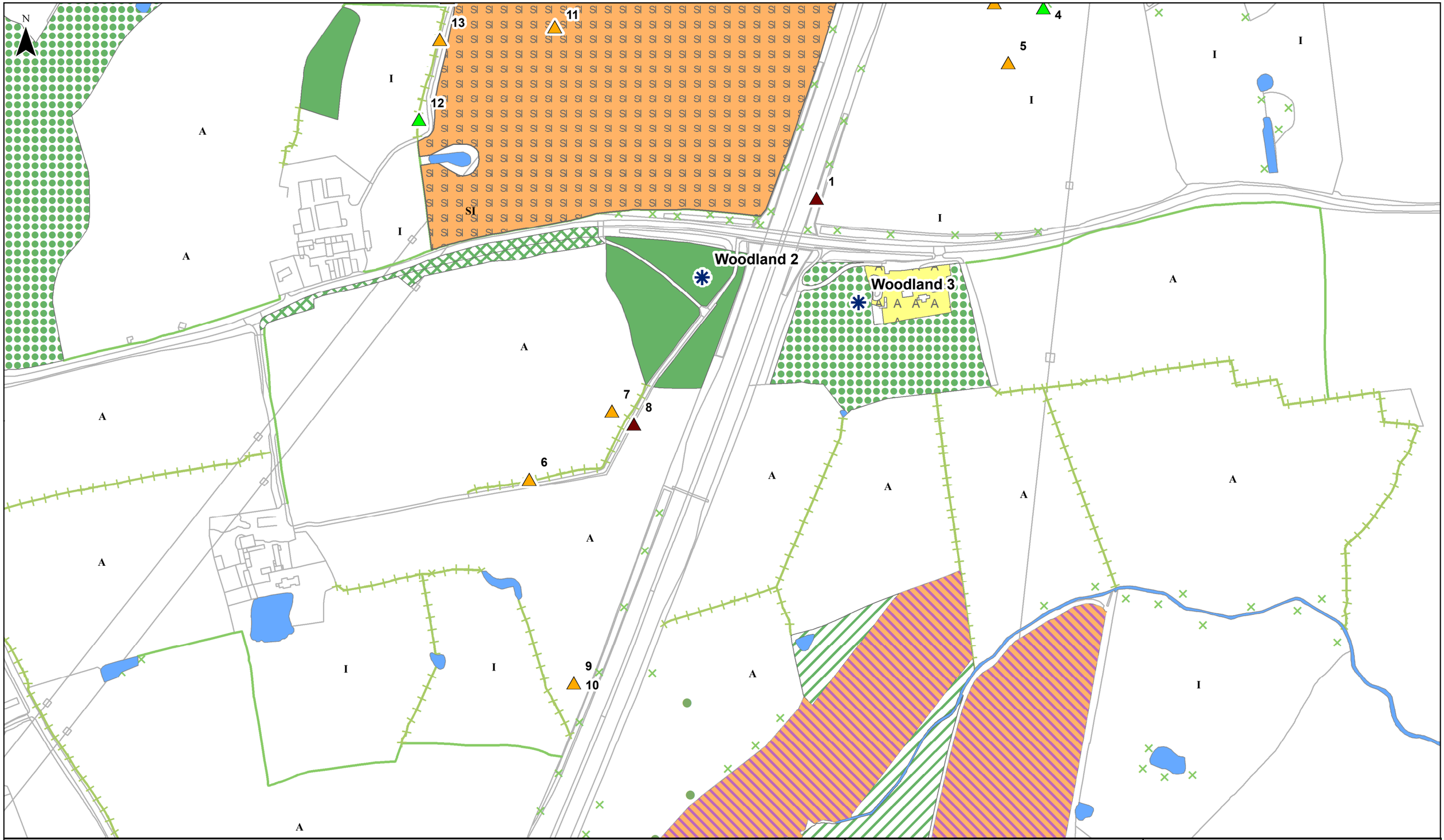

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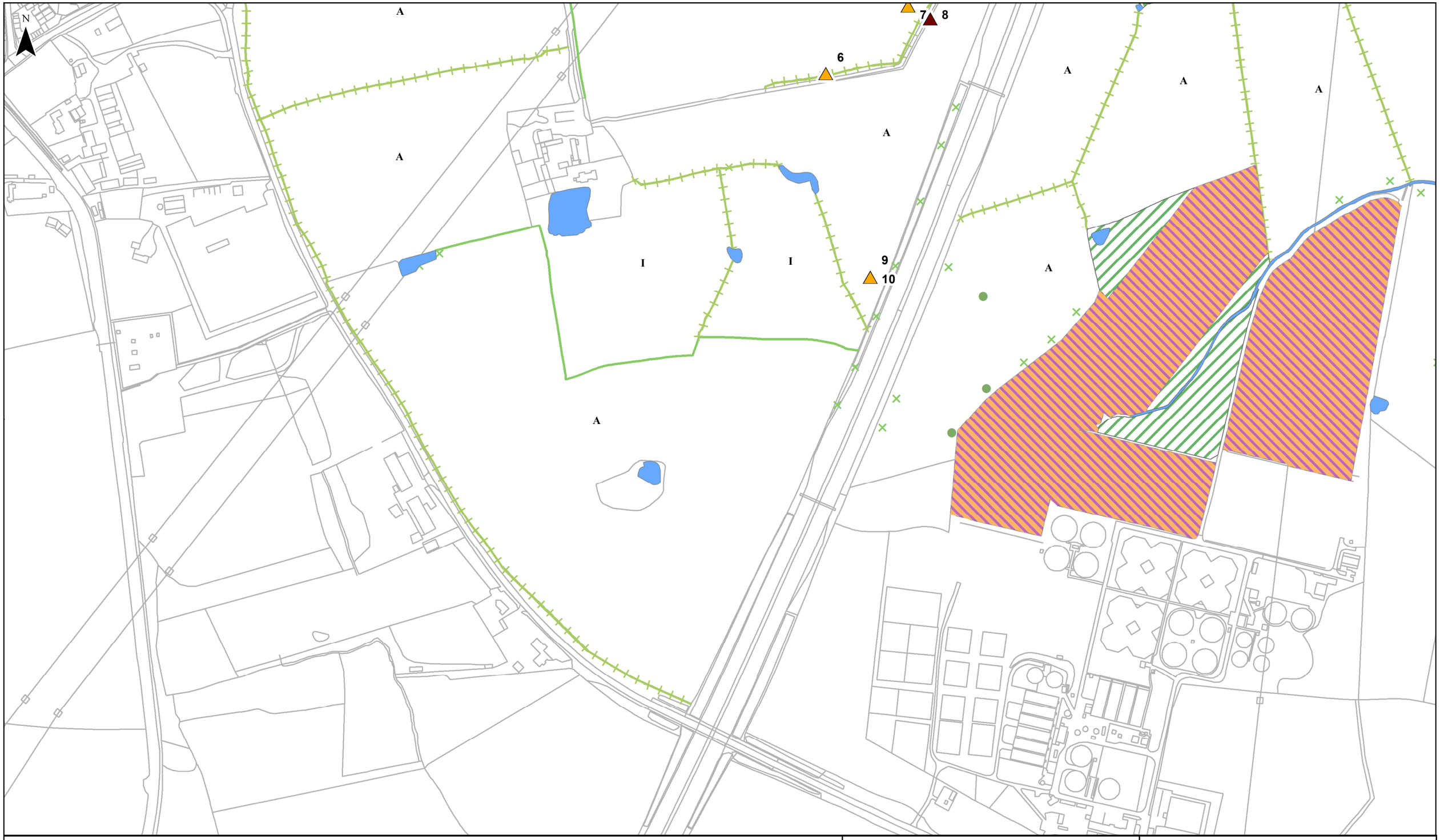

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HIGHWAYS ENGLAND

M42 JUNCTION 6 IMPROVEMENT

WATER VOLE SURVEY REPORT

MAY 05, 2017

CONFIDENTIAL

M42 JUNCTION 6 IMPROVEMENT

WATER VOLE

SURVEY REPORT

FINAL
CONFIDENTIAL

PROJECT NO.: 62241010
DATE: MAY 2017

WSP
THREE WHITE ROSE OFFICE PARK
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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
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Prepared by	David Lovett			
Signature				
Checked by	Lucy Elliott			
Signature				
Authorised by	Andy Bascombe			
Signature				
Project number	62241010			
Report number				
File reference				

SIGNATURES

PREPARED BY

David Lovett, MBiolSci GradCIEEM
Consultant Ecologist

REVIEWED BY

Lucy Elliott, BSc (Hons) MSc MCIEEM
Senior Ecologist

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

WSP (formerly Mouchel) was commissioned by Highways England to undertake ecological surveys to inform the proposed M42 Junction 6 Improvement Scheme. An extended Phase 1 habitat survey was undertaken by Mouchel in February 2017. During this survey, habitats within and adjacent to the proposed scheme were assessed for their suitability to support protected species. Three watercourses were identified as being suitable for water vole *Arvicola amphibius*.

Water vole surveys were undertaken in May 2017, the aim of which was to confirm the presence or likely absence of water vole and assess likely impacts of the proposed scheme on this species, if present. This report presents the results of the survey work undertaken.

1.2 SCHEME LOCATION

At the time of writing, three possible route options (Options 1, 2 and 3) are being considered. All three options are predominantly located to the south west of Junction 6 close to the village of Bickenhill, although all route options also include improvements to the junction itself. The land within the proposed scheme is predominantly used for agriculture and pasture grazing, although the scheme is also close to the National Exhibition Centre (NEC), Birmingham International Railway Station and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 STUDY AREA

A study area extending up to 1km from the proposed route was defined, with field surveys focussing on three watercourses present within the footprint of the scheme (see Figure 1): Hollywell Brook, which passes beneath the M42 at OS grid reference SP198836, Shadow Brook, which passes beneath the M42 at SP192809 and an unnamed watercourse, which passes beneath the motorway at SP194821.

1.4 STUDY AIMS AND OBJECTIVES

The study sought to determine whether water vole are present within suitable habitats within the study area and if so, to determine likely impacts of the proposed scheme on this species. To achieve this, a review of records of protected species obtained from environmental bodies was undertaken, along with field surveys to search for evidence of water vole within suitable habitats within the study area.

2 METHODOLOGY

2.1 DESK STUDY

Warwickshire Biological Records Centre, the local biological records centre, and the ENVIS database kept by Highways England was consulted to collate historical ecological records from within the study area.

2.2 FIELD SURVEY

A survey was undertaken in May 2017 to search for evidence of water vole. Surveys were undertaken in line with guidance set out in the Water Vole Mitigation Guidelines[1]. The extent of the watercourses surveyed is shown in Figure 1. Where accessible, the banks of the watercourses were surveyed from within the channel. Surveyors systematically searched along each bank and any evidence of water vole, including burrows, latrines, droppings, feeding remains and runs within the vegetation was recorded when found. Where surveyors were unable to access the watercourse channel, evidence was searched for from the top of the banks, using binoculars as required.

2.3 LIMITATIONS

There were no limitations to the survey work undertaken.

[1] Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

3 RESULTS

3.1 DESK STUDY

No records of water vole from within the study area were returned from the desk study.

3.2 FIELD SURVEY

No evidence of water vole was found during the field surveys undertaken in May 2017.

The habitats were generally found to be unsuitable for water vole. Both Shadow Brook and the unnamed watercourse were largely dry along their lengths and the section of Hollywell Brook to the west of the M42 is set within a concrete channel. To the east of the M42, Hollywell Brook is set within steep earth banks, although heavy shading means that vegetation on the banks is limited. Several areas were also poached by livestock. Therefore, a second survey visit was not undertaken on the basis that the habitats are of low suitability for water vole.

4 EVALUATION AND RECOMMENDATIONS

4.1 WATER VOLE

No evidence of water vole was found within the survey area and the habitats are considered to be of low suitability for water vole. As such, no further surveys or mitigation in respect of water vole are recommended.

5 FIGURES

5.1 FIGURE 1: WATERCOURSE MAP

N

Legend

Surveyed Watercourse

Habitats

- Amenity Grassland
- (A)rable/(I)mproved Grassland
- Bare Ground
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- SSSI
- Coniferious Plantation Woodland
- Dense Scrub
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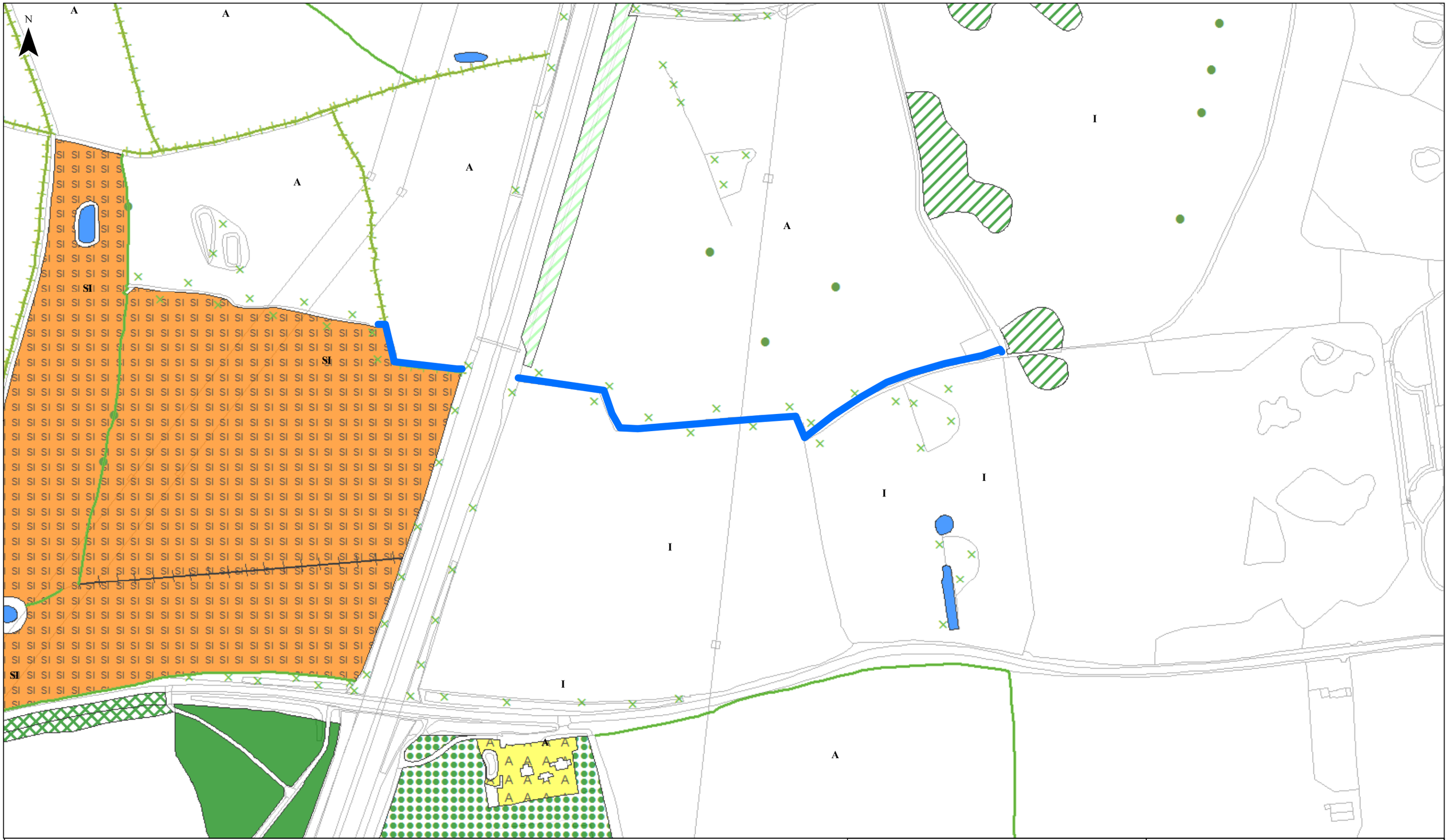
Drawing Number: Page 1 of 4



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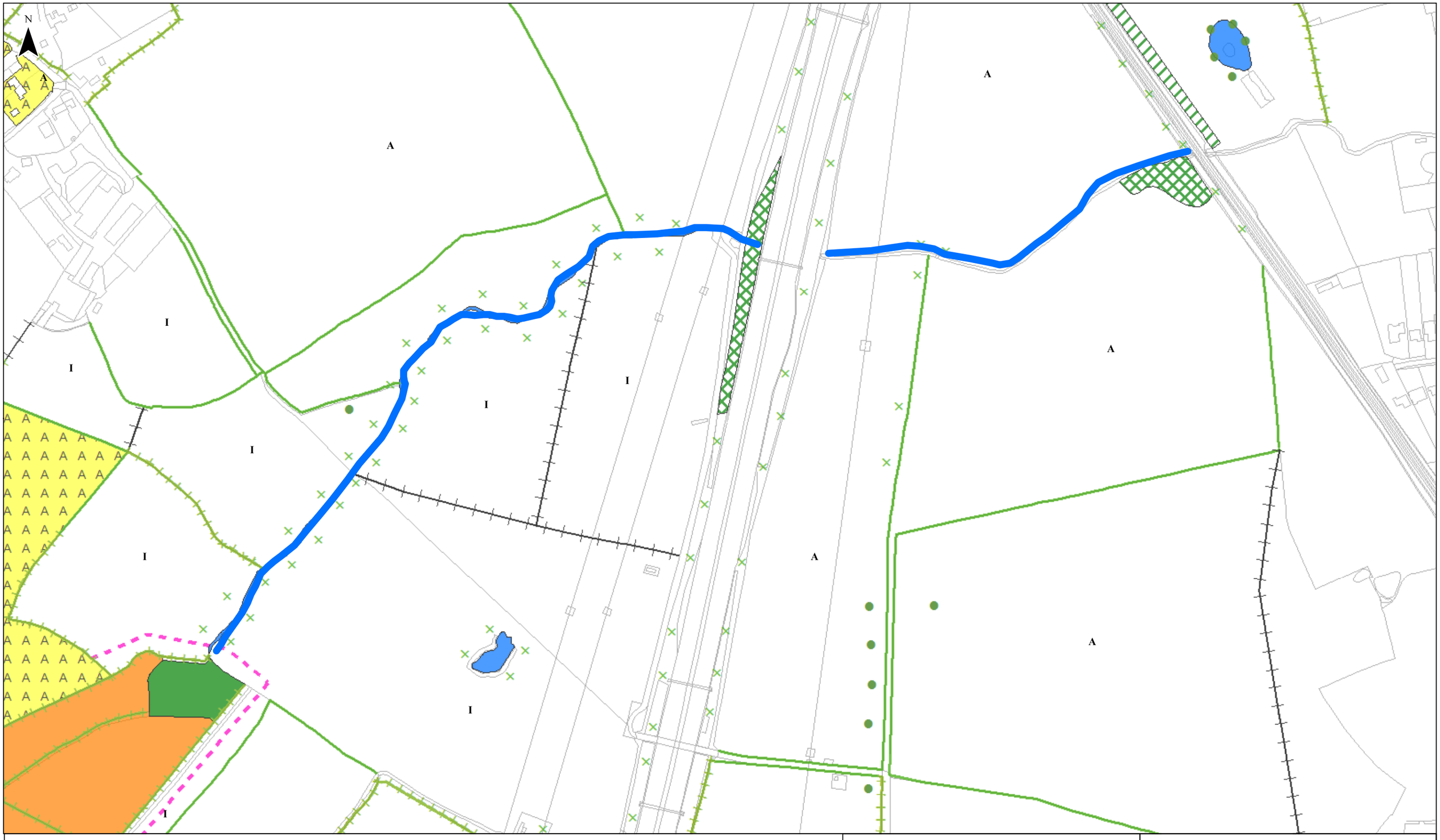
Tel: 020 7822 2497

Drawing Number: Page 2 of 4



Legend

Surveyed Watercourse

Habitats

- Amenity Grassland
- (A)rable/(I)mproved Grassland
- Bare Ground
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- SSSI
- Coniferious Plantation Woodland
- Dense Scrub
- Marshy Grassland
- Mixed Semi-natural Woodland
- Semi-improved Grassland
- Standing Water
- Unimproved Neutral Grassland
- Fenc e
- Species Poor Defunct Hedge
- Species Poor Hedge and Trees
- Species Poor Intact Hedge
- Watercourse
- Scrub
- Tree

Version	Amendment	Drawing Date	Review Date	Approved Date
A	First Issue	15/05/17 JR	29/05/17 LE	12/05/17 AB

Client: Highways England

Project: M42 J6 Improvement Scheme

Drawing Title: Watercourse Map

wsp

Scale (at A3 size): 1:3,000

Purpose of Issue: Information

Office: Blackfriars

Tel: 020 7822 2497

Drawing Number: Page 3 of 4

Legend

Surveyed Watercourse

Habitats

- A A Amenity Grassland
- (A)rable/(I)mproved Grassland
- Bare Ground
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
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- Coniferious Plantation Woodland
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Drawing Number: Page 4 of 4

HIGHWAYS ENGLAND

M42 JUNCTION 6 IMPROVEMENT

GREAT CRESTED NEWT SURVEY REPORT

JULY 24, 2017

CONFIDENTIAL

wsp

M42 JUNCTION 6 IMPROVEMENT

GREAT CRESTED NEWT SURVEY REPORT

FINAL
CONFIDENTIAL

PROJECT NO.: 62241010
DATE: JULY 2017

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QUALITY MANAGEMENT

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Prepared by	Lucy Elliott			
Signature				
Checked by	Rebecca Bailey			
Signature				
Authorised by	Andy Bascombe			
Signature				
Project number	62241010			
Report number				
File reference				

SIGNATURES

PREPARED BY

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Rebecca Bailey, BSc (Hons) MCIEEM
Principal Ecologist

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TABLES

1 INTRODUCTION

1.1 BACKGROUND

WSP (formerly Mouchel) was commissioned by Highways England to undertake ecological surveys to inform the proposed M42 Junction 6 Improvement Scheme. Great crested newt surveys were undertaken between April and June 2017, the aim of which was to confirm the presence or likely absence of great crested newts from waterbodies within 500m of the proposed route options. This report presents the results of the survey work undertaken.

1.2 SCHEME LOCATION

At the time of writing, three possible route options (Options 1, 2 and 3) are being considered. All three options are predominantly located to the south-west of Junction 6 close to the village of Bickenhill, although all route options also include improvements to the junction itself. The land within the proposed scheme is predominantly used for agriculture and pasture grazing, although the scheme is also close to the National Exhibition Centre (NEC), Birmingham International Railway Station and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 STUDY AREA

A review of OS mapping identified 41 waterbodies within 500m of the proposed route options. Six additional waterbodies were recorded during field surveys. Given that great crested newts often disperse into terrestrial habitats up to 500m from their breeding ponds, these 47 waterbodies were subsequently assessed for their likelihood to support great crested newts. The location of these waterbodies are shown in Figure 1.

1.4 STUDY AIMS AND OBJECTIVES

The study sought to determine whether great crested newts are present within the study area. To achieve this aim, the following tasks were undertaken:

- Habitat Suitability Index (HSI) assessments of ponds within 500m of the proposed route options to assess their suitability for breeding great crested newts;
- Field surveys, including presence/likely absence surveys and where appropriate, population size assessment surveys of ponds within 500m of the proposed works to gather on the distribution and size of great crested newt populations..

2 METHODOLOGY

2.1 FIELD SURVEY

2.1.1 HSI ASSESSMENT

Ponds within 500m from the proposed route options were assessed using the Habitat Suitability Index published by Oldham *et al.* (2000)[1]. The HSI method examines a range of criteria at each pond to produce an overall score between 0 (unsuitable) and 1 (optimal). The HSI score obtained provides an indicator of the suitability of a waterbody to support great crested newts. An HSI score of less than 0.5 indicates poor suitability, 0.5 – 0.59 below average suitability, 0.6 – 0.69 average suitability, 0.7 – 0.79 good suitability and greater than 0.8 excellent suitability.

HSI assessments were carried out between 14th and 16th February 2017. Ponds scoring 0.5 or higher were subject to presence/absence surveys, as detailed below. Ponds scoring less than 0.5, indicating poor suitability for great crested newts, were scoped out of any further survey work.

Pond 22 scored a value of 0.66, suggesting it is of average suitability for great crested newts. However it is considered that this score does not accurately reflect the on-site conditions; the waterbody is a large ornamental lake present within the centre of the National Exhibition Centre. Accordingly, this waterbody was scoped out of any further survey work.

2.1.2 PRESENCE/LIKELY ABSENCE AND POPULATION SIZE ASSESSMENT SURVEYS

Presence/likely absence of great crested newts can be determined with four survey visits carried out in suitable weather conditions. Surveys should be undertaken between mid-March and mid-June with at least two of these visits occurring from mid-April to mid-May.

If presence of great crested newts is confirmed, a population size assessment can be informed by undertaking a further two visits in suitable weather conditions within the same time period (a total of six visits, with at least three of these visits occurring during mid-April to mid-May).

Presence/likely absence and population size assessment surveys were undertaken using the following survey methods, in line with the Great Crested Newt Mitigation Guidelines[2]:

Bottle Trapping: This method requires setting bottle traps around the pond margin and leaving the traps set overnight. A density of one trap per two meters of shoreline was used. All bottle trapping was undertaken when night-time air temperatures were above 5°C, below which this method becomes unreliable.

Torching: This method specifies searching for great crested newts at night by shining a powerful torch (minimum one million candlepower) in the waterbody. All accessible areas of the waterbody margins were walked once, slowly checking for great crested newts. All torching was undertaken approximately 1 hour after sunset when fully dark.

Egg Searching: This method comprises searching both live and dead submerged vegetation for great crested newts. It is normally necessary to 'unwrap' the eggs to confirm identification, which can leave the egg vulnerable to

[1] 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

2 English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature.

predation and adverse effects from UV light. As this method conveys no information about population sizes, egg searching was terminated once the presence of great crested newt eggs had been confirmed.

Netting: This method involves using a long-handled hand net to sample the areas around the pond edge. Netting was undertaken at night, when adult newts are more likely to be in open water. At least 15 minutes of netting per 50m of shoreline was undertaken.

2.2 LIMITATIONS

2.2.1 ACCESS

Access was not permitted to the following ponds: 14, 15, 16, 18, 19, 26, 27, 28, 29, 30, 31, 32 and 33. Accordingly, HSI assessments and presence/absence surveys were not undertaken at these ponds.

Access to ponds 13 and 37 was not available during the HSI surveys, but was granted at a later date and HSI surveys were undertaken in conjunction with presence/absence surveys.

Access to pond 17 was rescinded following the HSI survey and as such, no further survey work was undertaken at this pond.

The implications of these access restrictions are discussed in Section 4 below.

2.2.2 POND 3

Pond 3 was found to be dry throughout the duration of the survey work. Accordingly, presence/likely absence surveys could not be undertaken at this pond.

2.2.3 POND 9

Access to pond 9 was not possible; the pond is fenced on all sides with barbed wire and surrounded by dense vegetation. Accordingly, surveys could not be undertaken at this pond. The implications of this are discussed in Section 4 of this report.

2.2.4 POND 21

During the second survey carried out at pond 21, a water shrew *Neomys fodiens* was captured in one of the bottle traps. To avoid harm to this species, no further bottle trapping was undertaken at this pond and alternative survey methods were used. Accordingly, the survey methods used did not pose a constraint in this instance.

2.2.5 POND 31

The banks of pond 31 are very steep and as such, it was deemed unsafe to carry out bottle trapping or egg searching at this pond. Torching and netting was undertaken from the top of the banks where safe to do so. However, the use of torching as a survey method was limited by the turbidity of the pond. The implications of these limitations are set out in Section 5 of this report.

2.2.6 POND 36

The surface of pond 36 is entirely overgrown with water fern *Azolla filiculoides*, an invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). As a result, torching and netting of this pond could not be undertaken. Bottle trapping was carried out and all surveyors followed a survey protocol which was established to prevent the spread of this invasive species to other ponds being surveyed as part of the scheme.

2.2.7 WEATHER CONDITIONS

During the first survey undertaken on 18/04/17, overnight temperatures were forecast to fall to 3°C. To avoid harm to any newts which may have been caught, and ensure the results obtained were reliable, bottle trapping was not undertaken during this survey. Alternative methods, comprising egg searching, netting and torching were undertaken, during which temperatures remained above 5°C. Accordingly, the weather conditions did not pose a constraint in this instance.

3 RESULTS

3.1 FIELD SURVEYS

3.1.1 HSI SURVEYS

47 waterbodies are present within 500m of the route options. HSI surveys were undertaken to assess the suitability of these waterbodies to support breeding great crested newts. A summary of the results of the HSI assessment are provided in Table 3.1, with the full results provided in Appendix 1.

Table 3.1 Summary of HSI assessment.

POND NUMBER	HSI SCORE	SUITABILITY	POND NUMBER	HSI SCORE	SUITABILITY	POND NUMBER	HSI SCORE	SUITABILITY
1	0.5	Below average	17	0.81	Excellent	33	No access	
2	0.77	Good	18	No access		34	0.8	Excellent
3	0.57	Below average	19	No access		35	0.46	Poor
4	0.49	Poor	20	0.47	Poor	36	0.82	Excellent
5	0.62	Average	21	0.74	Good	37	0.72	Good
6	0.58	Below average	22	0.66	Average	38	Pond dry	
7	0.85	Excellent	23	Pond dry		39	Pond dry	
8	No pond present		24	Pond dry		40	0.42	Poor
9	0.76	Good	25	Pond dry		41	0.82	Excellent
10	No pond present		26	No access		42	0.45	Poor
11	0.83	Excellent	27	No access		43	0.32	Poor
12	0.62	Average	28	No access		44	0.62	Average
13	0.65	Average	29	No access		45	0.43	Poor
14	No access		30	No access		46	0.29	Poor
15	No access		31	No access		47	0.6	Average
16	No access		32	No access				

3.1.2 PRESENCE/ABSENCE AND POPULATION SIZE SURVEYS

The dates and weather conditions of each of the surveys are shown in Table 3.2.

Table 3.2 Dates and weather conditions of presence/absence and population size surveys

DATE	SURVEY TYPE	PONDS SURVEYED	WEATHER CONDITIONS
18/04/2017	Presence/absence	1, 2, 11, 12, 47	3°C, BF0, 30% CC, dry, frost forecasted
19/04/2017	Presence/absence	5, 6, 7, 9, 41, 44	11°C, BF1, 80% CC, dry
20/04/2017	Presence/absence	13, 36, 37,	11°C, BF1, 60% CC, dry
02/05/2017	Presence/absence	26, 34,13, 36, 37, 41, 44	11°C, BF2, 80% CC, dry
03/05/2017	Presence/absence	21, 1, 2, 11, 12, 47,	11°C, BF2.5, 80% CC, dry
04/05/2017	Presence/absence	5, 6, 7	10°C, BF3, 80% CC, dry
15/05/2017	Presence/absence	21, 26, 5, 6, 7	15°C, BF3, 80% CC, light intermittent rain
16/05/2017	Presence/absence	34, 13, 36, 37, 41,	14°C, BF0, 80% CC, dry
17/05/2017	Presence/absence	1, 2, 11, 12, 47,	10°C, BF1, 80% CC, dry
18/05/2017	Presence/absence	26, 34, 44	11°C, BF1, 80% CC, dry
30/05/2017	Presence/absence	5, 6, 7, 26, 44	15°C, BF1, 60% CC, heavy rain before survey, dry
31/05/2017	Presence/absence	41, 36, 13, 34, 37	15°C, BF1, 60% CC, dry
01/06/2017	Presence/absence	1, 2, 11, 12, 31	17°C, BF0, 10% CC, dry
07/06/2017	Population size assessment	6, 7, 36	11.5°C, BF3, 0% CC, rained earlier, dry
06/06/2017	Population size assessment	11, 12, 13	11°C, BF2, 20% CC, light rain
12/06/2017	Population size assessment	6, 7, 11, 12, 13, 36	13°C, BF1, 80% CC, dry

The full results of the surveys undertaken are shown in Appendix 2. A summary of these results is shown in Table 3.3 below.

Table 3.3 Presence/absence and population survey results

POND	GCN PRESENT/ABSENT	PEAK COUNT	DATE RECORDED	SURVEY METHOD USED	POPULATION SIZE ASSESSMENT
1	Absent	N/A			
2	Absent	N/A			
5	Absent	N/A			
6	Present	1F	19/04/17	Trapping	Small

7	Present	3M, 2F Eggs present	19/04/17	Torching	Small
11	Present	5M, 3F	03/05/17	Torching	Small
12	Present	1F 1F	01/06/17 12/06/17	Trapping Torching	Small
13	Present	5M, 3F	02/05/17	Torching	Small
21	Absent	N/A			
26	Absent	N/A			
34	Absent	N/A			
36	Present	1M, 1F 2F	20/04/17 & 02/05/17 16/05/17 & 06/06/17	Trapping Trapping	Small
37	Absent	N/A			
41	Absent	N/A			
44	Absent	N/A			
47	Absent	N/A			

4 EVALUATION

4.1 INTERPRETATION AND EVALUATION

4.1.1 PRESENCE/ABSENCE

The survey work undertaken confirmed the presence of great crested newt within six of the ponds surveyed (Ponds 6, 7, 11, 12, 13 and 36). No great crested newts were recorded in the other ten ponds surveyed.

Great crested newt eggs were recorded in Pond 7 which confirms that this pond is used for breeding. Eggs were not recorded in any of the other ponds surveyed.

4.1.2 POPULATION SIZE ASSESSMENT

As set out within the Great Crested Newt Mitigation Guidelines, the maximum adult count per pond per night gained through either torching or bottle-trapping can be used to determine the size of the population present. Populations with up a maximum count of 10 are classed as small; between 11 and 100 are classed as medium; and counts of over 100 are classed as large.

Pond 6 had a peak count of one newt on 19/04/17 and pond 7 had a peak count of five newts on 19/04/17. Given the close proximity of these ponds to each other and the likely dispersal of individuals between ponds, ponds 6 and 7 are considered to form a metapopulation. Therefore, the peak count for this metapopulation is six newts on 19/04/17 which corresponds to a small population of great crested newts.

Pond 11 had a peak count of eight newts on 03/05/17 and pond 12 had a peak count of one newt on 01/06/17 and 12/06/17. Again, given the close proximity of these ponds to each other and the likely dispersal of individuals between ponds, ponds 11 and 12 are considered to form a metapopulation. Therefore, the peak count for this metapopulation is eight newts on 03/05/17, which corresponds to a small population of great crested newts.

Pond 13 had a peak count of eight newts on 02/05/17 which corresponds to a small population of great crested newts.

Pond 36 had a peak count of two great crested newts recorded on four of the six surveys, and this corresponds to a small population of great crested newts.

4.1.3 CONSTRAINTS

Due to access restrictions, HSI surveys were not undertaken at 13 of the ponds identified as being within 500m of the proposed route options. HSI surveys were carried out at ponds 3, 9 and 17, and all were found to be suitable for great crested newts, however further surveys of these ponds were not undertaken, as detailed in Section 2 above. Accordingly, there are 16 ponds within 500m of the proposed route options where the presence or likely absence of great crested newts could not be confirmed during the survey work undertaken.

Although presence/likely absence surveys were completed at P36 and P37, constraints identified during the surveys mean that the results should be interpreted with caution. Great crested newts were confirmed to be present within P36, however, due to the presence of water fern on the surface of the pond, torching and netting could not be undertaken. Accordingly, the peak count recorded may underrepresent the population size class present. In addition, eggs were not recorded during the surveys undertaken, however, newts may have made use of the water fern to lay their eggs and it was not possible to carry out a comprehensive search of this. As such, the absence of great crested newt eggs from this pond does not conclusively show that breeding is not occurring.

Finally, due to the steep banks present around P37, it was not possible to safely access the edge of the water and so trapping and egg searching was not undertaken. Torching and netting was undertaken however high turbidity levels on three of the four surveys meant that the results obtained from torching should not be relied upon. Accordingly, the survey work undertaken at P37 does not conclusively show that great crested newts are absent from this pond.

5 FIGURES

5.1 FIGURE 1: GREAT CRESTED NEWT SURVEY MAP

APPENDIX

A HSI SURVEY RESULTS

POND NUMBER	DATE OF SURVEY VISIT	SI1 GEOGRAPHIC LOCATION	SI2 POND AREA	SI3 POND DRYING	SI4 WATER QUALITY	SI 5 SHADE	SI6 FOWL	SI7 FISH	SI8 PONDS	SI9 TERRESTRIAL HABITAT	SI10 MACROPHYTES	SUM	HSI SCORE	HSI CATEGORY
1	16/02/2017	1	0.2	0.1	0.33	0.6	1	1	0.83	1	0.3	0.00	0.50	Below Average
2	15/02/2017	1	0.88	1	0.67	1	0.67	0.67	0.88	1	0.3	0.07	0.77	Good
3	15/02/2017	1	0.3	0.1	0.64	0.2	1	1	0.88	1	1	0.00	0.57	Below Average
4	15/02/2017	1	0.3	0.1	0.67	0.2	1	1	0.92	0.67	0.3	0.00	0.49	Poor
5	16/02/2017	1	0.2	0.5	0.67	0.4	1	1	1	1	0.3	0.01	0.62	Average
6	16/02/2017	1	0.3	0.5	0.67	0.2	1	1	1	0.67	0.3	0.00	0.58	Below Average
7	16/02/2017	1	1	1	1	0.8	1	1	1	0.67	0.35	0.19	0.85	Excellent
8	16/02/2017	No pond present												
9	15/02/2017	1	0.8	1	0.67	0.8	0.67	0.67	0.95	0.67	0.5	0.06	0.76	Good
10	15/02/2017	No pond present												
11	16/02/2017	1	0.9	0.5	0.67	1	1	1	1	0.67	0.8	0.16	0.83	Excellent
12	16/02/2017	1	0.1	0.5	0.67	1	1	1	1	0.67	0.4	0.01	0.62	Average
13	19/04/2017	1	1	1	0.67	0.2	0.67	0.67	0.89	0.67	0.35	0.05	0.74	Good
14	No Access													
15	No Access													
16	No Access													
17	14/02/2017	1	0.9	1	0.67	1	1	0.67	0.83	1	0.35	0.12	0.81	Excellent
18	No Access													
19	No Access													
20	14/02/2017	1	0.05	0.1	0.67	0.7	1	1	0.83	0.67	0.4	0.00	0.47	Poor
21	14/02/2017	1	0.8	0.9	0.67	1	0.67	0.67	0.92	0.67	0.35	0.05	0.74	Good
22	14/02/2017	1	0.8	0.9	0.67	0.9	0.67	0.67	0.38	0.67	0.3	0.01	0.66	Average
23	14/02/2017	Pond Dry												
24	14/02/2017	Pond Dry												
25	14/02/2017	Pond Dry												
26	No Access													
27	No Access													
28	No Access													

APPENDIX

POND NUMBER	DATE OF SURVEY VISIT	SI1 GEOGRAPHIC LOCATION	SI2 POND AREA	SI3 POND DRYING	SI4 WATER QUALITY	SI 5 SHADE	SI6 FOWL	SI7 FISH	SI8 PONDS	SI9 TERRESTRIAL HABITAT	SI10 MACROPHYTES	SUM	HSI SCORE	HSI CATEGORY
29	No Access													
30	No Access													
31	No Access													
32	No Access													
33	No Access													
34	14/02/2017	1	0.6	1	0.67	1	1	1	1	0.67	0.4	0.11	0.80	Excellent
35	14/02/2017	1	0.05	0.1	0.67	0.4	1	1	1	1	0.3	0.00	0.46	Poor
36	14/02/2017	1	0.4	1	0.67	1	1	0.67	1	1	0.8	0.14	0.82	Excellent
37	20/04/2017	1	0.6	1	0.67	1	0.67	0.67	0.89	0.67	0.35	0.04	0.72	Good
38	15/02/2017	Pond Dry												
39	15/02/2017	Pond Dry												
40	14/02/2017	1	0.05	0.1	0.67	0.2	1	1	0.95	1	0.3	0.00	0.42	Poor
41	14/02/2017	1	0.3	0.5	1	1	1	1	0.95	1	1	0.14	0.82	Excellent
42	14/02/2017	1	0.05	0.1	0.67	0.2	1	1	1	1	0.5	0.00	0.45	Poor
43	14/02/2017	1	0.05	0.5	0.01	0.2	1	1	0.98	0.67	0.35	0.00	0.32	Poor
44	15/02/2017	1	0.4	0.5	0.67	0.2	1	1	0.92	1	0.35	0.01	0.62	Average
45	15/02/2017	1	0.05	0.1	0.67	0.2	1	1	1	1	0.3	0.00	0.43	Poor
46	16/02/2017	1	0.05	0.1	0.33	1	1	1	1	0.01	0.3	0.00	0.29	Poor
47	19/04/2017	1	0.8	0.5	0.67	0.2	1	0.67	0.85	0.67	0.3	0.01	0.6	Average

N

Key

Ponds

- Great Crested Newts Present
- Great Crested Newts Absent
- Not Surveyed: Pond Scoped Out - Poor HSI
- Not Surveyed: Pond Dry
- Not Surveyed: Pond Not Accessible
- Not Surveyed: Access Denied

Habitats

- Amenity Grassland
- (A)rable/(I)mproved Grassland
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- Coniferious Plantation Woodland
- Dense Scrub
- Marshy Grassland
- Mixed Semi-natural Woodland
- Semi-improved Grassland
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- Site of Special Scientific Interest
- Fenc e
- Species Poor Defunct Hedge
- Species Poor Hedge and Trees
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Version	Amendment	Drawing Date	Review Date	Approved Date
A	First Issue	25/06/17 JR	29/05/17 LE	12/05/17 AB

Client: Highways England

Project: M42 J6 Improvement Scheme

Drawing Title: Great Crested Newt Survey Map

wsp

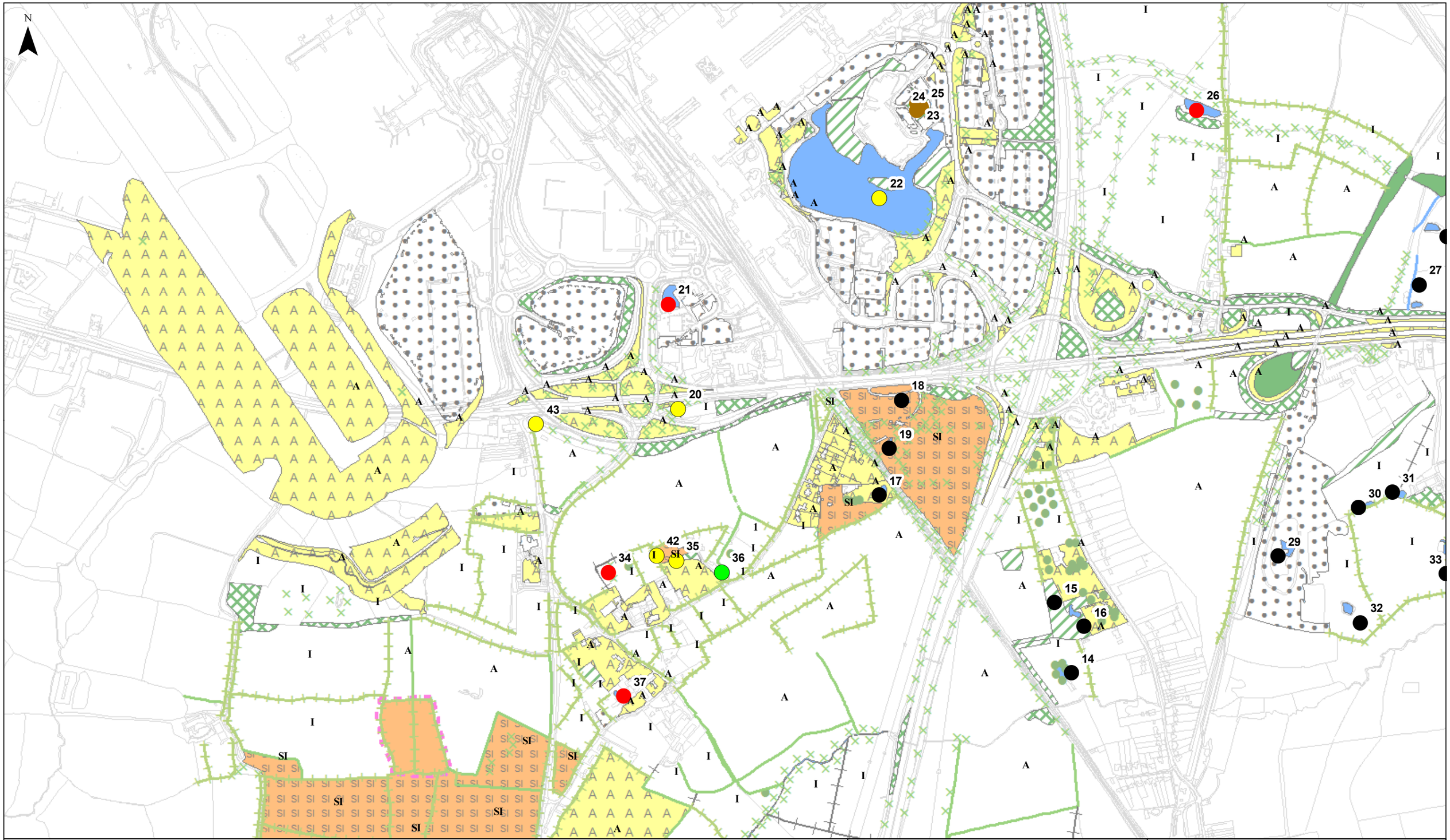
Office: Blackfriars

Tel: 020 7822 2497

Scale (at A3 size): 1:17,000

Purpose of Issue: Information

Drawing Number: Page 1 of 5



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- Unimproved Neutral Grassland
- Site of Special Scientific Interest
- Fenc e
- Species Poor Defunct Hedge
- Species Poor Hedge and Trees
- Species Poor Intact Hedge
- Watercourse
- Scrub
- Tree

Version	Amendment	Drawing Date	Review Date	Approved Date
A	First Issue	25/06/17 JR	29/05/17 LE	12/05/17 AB

Client: Highways England

Project: M42 J6 Improvement Scheme

Drawing Title: Great Crested Newt Survey Map

wsp

Office: Blackfriars

Tel: 020 7822 2497

Scale (at A3 size): 1:9,000

Purpose of Issue: Information

Drawing Number: Page 2 of 5

Key

Ponds

- Great Crested Newts Present
- Great Crested Newts Absent
- Not Surveyed: Pond Scoped Out - Poor HSI
- Not Surveyed: Pond Dry
- Not Surveyed: Pond Not Accessible
- Not Surveyed: Access Denied

Habitats

- Amenity Grassland
- (A)rable/(I)mproved Grassland
- Bare Ground
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- Coniferious Plantation Woodland
- Dense Scrub
- Marshy Grassland
- Mixed Semi-natural Woodland
- Semi-improved Grassland
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- Fenc e
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Scale (at A3 size): 1:9,000

Purpose of Issue: Information

Office: Blackfriars

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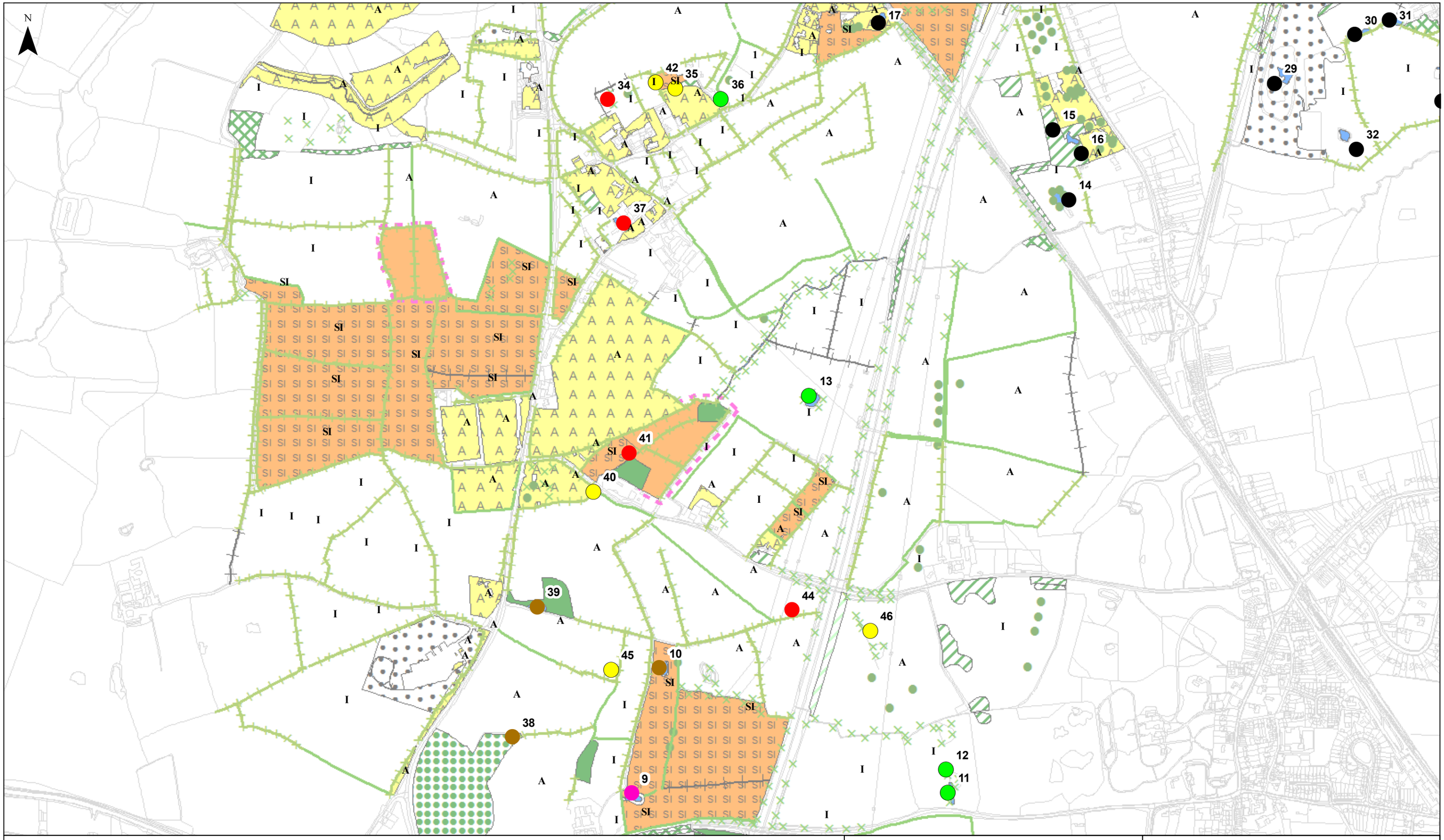
Drawing Number: Page 3 of 5



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Version	Amendment	Drawing Date	Review Date	Approved Date
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Drawing Title: Great Crested Newt Survey Map

wsp

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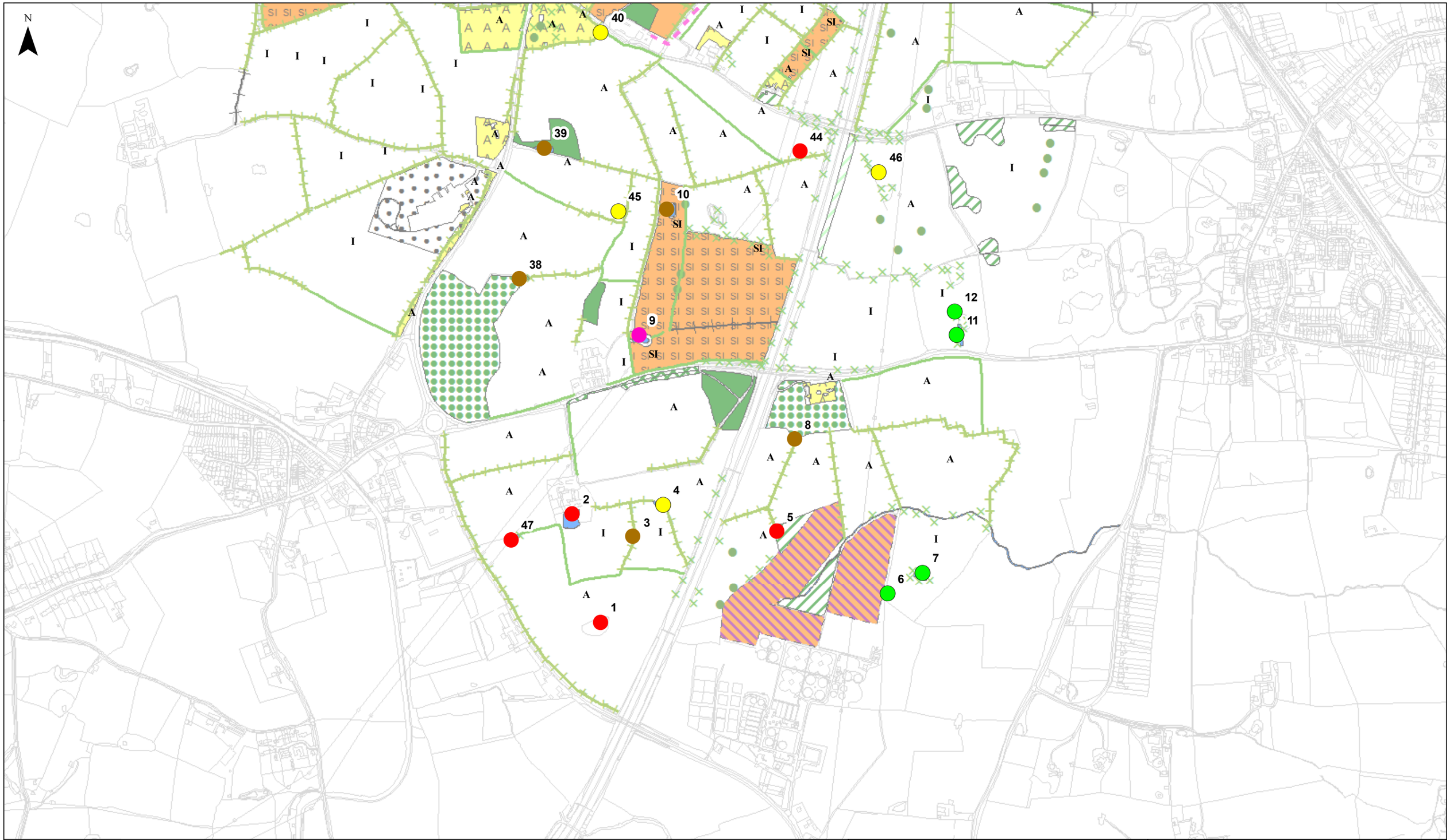
Scale (at A3 size): 1:9,000

Purpose of Issue: Information

Drawing Number: Page 4 of 5



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- Not Surveyed: Pond Scoped Out - Poor HSI
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Habitats

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Purpose of Issue: Information

Drawing Number: Page 5 of 5

HIGHWAYS ENGLAND

M42 JUNCTION 6 IMPROVEMENT

REPTILE SURVEY REPORT

JULY 27, 2017

CONFIDENTIAL

M42 JUNCTION 6 IMPROVEMENT

REPTILE SURVEY REPORT

FINAL
CONFIDENTIAL

PROJECT NO.: 62241010
DATE: JULY 2017

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Checked by	Becky Bailey			
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Authorised by	Andy Bascombe			
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Project number	62241010			
Report number				
File reference				

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TABLES

1 INTRODUCTION

1.1 BACKGROUND

WSP (formerly Mouchel) was commissioned by Highways England to undertake ecological surveys to inform the proposed M42 Junction 6 Improvement Scheme. An extended Phase 1 habitat survey was undertaken by Mouchel in February 2017. During this survey, habitats within and adjacent to the proposed scheme were assessed for their suitability to support protected species. Areas of grassland within and adjacent to the scheme were identified as being suitable to support reptiles.

Reptile surveys were undertaken across areas of suitable habitat between June and July 2017. This report presents the results of the survey work undertaken.

1.2 SCHEME LOCATION

At the time of writing, three possible route options (Options 1, 2 and 3) are being considered. All three options are predominantly located to the south west of Junction 6 close to the village of Bickenhill, although all route options also include improvements to the junction itself. The land within the proposed scheme is predominantly used for agriculture and pasture grazing, although the scheme is also close to the National Exhibition Centre (NEC), Birmingham International Railway Station and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 STUDY AREA

Three areas of suitable reptile habitat within and/or adjacent to the proposed route options were identified and subject to further survey. These include two fields to the west of Catherine de Barnes Lane (central grid references SP182818 and SP183813) and the southern embankment of the Clock Interchange and adjacent field margin (central grid reference: SP186828). No further areas of suitable reptile habitat were identified within or adjacent to the proposed route options.

1.4 STUDY AIMS AND OBJECTIVES

The study sought to determine whether reptiles are present within suitable habitats within the study area and if so, to assess likely impacts of the proposed scheme on these species. To achieve this, field surveys to search for evidence of reptiles within suitable habitats within the study area were undertaken.

2 METHODOLOGY

2.1 FIELD SURVEY

Surveys investigating the presence or likely absence of reptiles were undertaken in areas of suitable habitat present within or adjacent to the proposed route options.

Artificial refugia, comprising 500mm x 500mm sheets of bitumen felt, were placed at the site on 17th May 2017. Refugia were placed at 20m intervals along the edge of the fields. In accordance with best practice, the refugia and left to 'bed-in' for a period of two weeks prior to the first survey visit. In total, 140 refugia were deployed.

Seven survey visits were undertaken between 1st June 2017 and 25th July 2017 during suitable weather conditions. During each survey visit, refugia were inspected from a distance before being lifted and turned over searching for the presence of reptiles. In addition, any natural refugia such as debris, logs and large stones were searched for the presence of reptiles.

2.2 LIMITATIONS

Numbers of reptiles observed are likely to be affected by weather conditions, with reptiles being more evident during sunny weather with relatively low air temperatures and little wind. While reptiles are active throughout the summer, the months of April, May and September tend to be more effective for surveying, when temperatures typically fall in the range from 9°C to 18°C. Although surveys were undertaken during June and July, all surveys were undertaken within the optimal temperature range.

Typically, refugia would be placed across the entire area of suitable habitat however in this instance, refugia could only be placed around the margins of the areas surveyed to facilitate mowing by the landowner. Although this meant that a reduced number of refugia was used, it is considered that the margins offered optimal habitat for reptiles and the refugia in these locations were best placed for detecting the presence of reptiles. .

3 RESULTS

3.1 FIELD SURVEY

Table 3.1 below shows the results of the reptile surveys. No reptiles were recorded during the survey work undertaken.

Table 3.1 Reptile survey results.

SURVEY	DATE	WEATHER CONDITIONS	RESULTS
1	01.06.17	18°C, dry, cloud 0/8, BF1	No reptiles
2	07.06.17	14°C, dry, cloud 4/8, BF1	No reptiles
3	12.06.17	18°C, dry, cloud 6/8, BF1	No reptiles
4	29.06.17	16°C, dry, cloud 7/8, BF1	No reptiles
5	04.07.17	16°C, dry, cloud 8/8, BF2	No reptiles
6	18.07.17	17°C, dry, cloud 4/8, BF1	No reptiles
7	25.07.17	16°C, dry, cloud 3/8, BF1	No reptiles

4 EVALUATION AND RECOMMENDATIONS

4.1 OVERVIEW

No evidence of reptiles was found within the survey area and as such, no further surveys or specific mitigation in respect of reptiles is recommended.

Although no reptiles were recorded during the surveys, it is possible that individual reptiles may be discovered during the construction stage. As such, it is recommended that the overseeing organisation maintain a watching brief throughout the construction works. All staff working on the site should be briefed as to the possible presence of reptiles within the working area. If a reptile is observed, works in the immediate area should cease and the advice of an ecologist sought.

5 FIGURES

5.1 FIGURE 1: REPTILE SURVEY MAP

N

96-109

22-95

110-137

B

C

A

1-12

13-21

Key

Reptile Survey Area

Habitats

- Amenity Grassland
- (A)rable/(I)mproved Grassland
- Bare Ground
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- Coniferious Plantation Woodland
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Drawing Title: Reptile Survey Map

wsp

Office: Blackfriars

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Scale (at A3 size): 1:4,500

Purpose of Issue: Information

Drawing Number: Page 2 of 2

HIGHWAYS ENGLAND

M42 JUNCTION 6 IMPROVEMENT

WHITE-CLAWED CRAYFISH ASSESSMENT

MAY 05, 2017

CONFIDENTIAL

M42 JUNCTION 6 IMPROVEMENT

WHITE-CLAWED CRAYFISH ASSESSMENT

FINAL
CONFIDENTIAL

PROJECT NO.: 62241010
DATE: MAY 2017

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Checked by	Lucy Elliott			
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Authorised by	Andy Bascombe			
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Project number	62241010			
Report number				
File reference				

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TABLE OF CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

WSP (formerly Mouchel) was commissioned by Highways England to undertake a preliminary assessment of land within and adjacent to the proposed M42 Junction 6 Improvement Scheme to determine if the habitats present are likely to be used by white-clawed crayfish *Austropotamobius pallipes*. This report presents the results of the preliminary assessment undertaken in May 2017.

1.2 SCHEME LOCATION

At the time of writing, three possible route options (Options 1, 2 and 3) are being considered. All three options are predominantly located to the south west of Junction 6 close to the village of Bickenhill, although all route options also include improvements to the junction itself. The land within the proposed scheme is predominantly used for agriculture and pasture grazing, although the scheme is also close to the National Exhibition Centre (NEC), Birmingham International Railway Station and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 STUDY AREA

A study area extending up to 1km from the proposed route was defined, with field surveys focussing on three watercourses present within the footprint of the scheme (see Figure 1): Hollywell Brook, which passes beneath the M42 at OS grid reference SP198836, Shadow Brook, which passes beneath the M42 at SP192809 and an unnamed watercourse, which passes beneath the motorway at SP194821.

1.4 STUDY AIMS AND OBJECTIVES

The study sought to determine whether habitats suitable for white-clawed crayfish are present within or adjacent to the proposed scheme. To achieve this, a review of records of protected species obtained from environmental bodies was undertaken to determine whether this species are known within the study area, along with field surveys to assess the value of the habitats present for white-clawed crayfish.

2 METHODOLOGY

2.1 DESK STUDY

Warwickshire Biological Records Centre, the local biological records centre, and the ENVIS database kept by Highways England was consulted to collate historical ecological records from within the study area.

2.2 FIELD SURVEY

A survey was undertaken in May 2017 to assess the suitability of each watercourse for white-clawed crayfish. The physical characteristics of the water course, including channel width, depth, substrate, bank profile and flow types, were assessed, as well as the vegetation structure within and along the banks. Any feature offering suitable refuge habitat, such as undercut banks, submerged tree roots and cobbles, was recorded. Professional judgement was used to assess the quality of the habitat to support white-clawed crayfish.

2.3 LIMITATIONS

It was not always possible for surveyors to walk directly alongside sections of the watercourses due to the presence of dense vegetation. However, it is considered that surveyors were able to gather sufficient information on the characteristics of the watercourse from accessible sections to allow a thorough assessment of suitability for white-clawed crayfish to be undertaken.

3 RESULTS

3.1 DESK STUDY

No records of white-clawed crayfish from within the study area were returned from the desk study.

3.2 FIELD SURVEY

3.2.1 HOLLYWELL BROOK

Within the study area, there are three distinct sections to Hollywell Brook, the first of which is to the west of the M42. Here, the brook flows between car parks and is culverted with a concrete base and banks. Moving east downstream, the banks are gently sloping with soil and vegetation, including submerged tree roots. The brook then passes beneath the M42.

The second section is between the M42 and Middle Bickenhill Lane. Hollywell Brook has steep banks covered with a range of vegetation, although several areas had been poached by livestock. The substrate of the brook was thick mud and silt. The brook was well shaded by bankside vegetation and this, combined with the shallow depth of the water meant there was little to no aquatic vegetation present in this section of the brook.

The third section was east of Middle Bickenhill Lane. Here, Hollywell Brook is more open and aquatic vegetation was present. A range of grasses and rushes were present along the steep banks and in the water itself. More cobbles were present in the substrate, and occasional trees were present in the banks, offering submerged roots.

In the third section, a single claw was found and identified as being from a signal crayfish *Pacifastacus lenisculus*. This is a non-native species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). The signal crayfish both outcompetes white-clawed crayfish and carries crayfish plague *Aphanomyces astaci*, which is fatal to white-clawed crayfish. Given the likely presence of signal crayfish within Hollywell Brook, it is unlikely that white-clawed crayfish will be present within Hollywell Brook.

3.2.2 SHADOW BROOK

Shadow Brook is a shallow ditch that runs along the edge of field boundaries, both to the west and east of the M42 with a culvert beneath the motorway. The top of the bank of the brook was planted with a hawthorn dominated hedgerow. The brook itself was dry in places, with sections holding shallow areas of silted, standing water. The substrate of the brook was mud and silt. With no suitable refuge sites for crayfish identified and areas of the brook being found to be little more than a dry ditch, it is unlikely that white-clawed crayfish are present in Shadow Brook.

3.2.3 UNNAMED WATERCOURSE

Like Shadow Brook, the unnamed watercourse was a shallow ditch that is incorporated into field boundaries. The banks are hawthorn dominated, with brambles, nettles and ivy alongside. The banks are of soft earth and the substrate for the brook was again mud and silt. Like Shadow Brook, some sections of the brook were dry and what water was present was very shallow and with very slow flow, if any. With no suitable refuge sites for crayfish identified and areas of the brook being found to be little more than a dry ditch, it is unlikely that white-clawed crayfish are present in the unnamed watercourse.

4 EVALUATION AND RECOMMENDATIONS

4.1 WHITE-CLAWED CRAYFISH

No evidence of white-clawed crayfish was found within the study area during the survey work undertaken. The habitats within the study area were assessed for their potential to support this species. Two water courses, Shadow Brook and an unnamed water course were found not to offer suitable habitat for white-clawed crayfish. Hollywell Brook was found to support the invasive signal crayfish, a species which is known to outcompete white-clawed crayfish as well as carrying the crayfish plague, which is fatal to white-clawed crayfish. Therefore no further surveys or mitigation in respect of white-clawed crayfish is recommended.

4.2 SIGNAL CRAYFISH

Under the Wildlife and Countryside Act 1981 (as amended), it is unlawful to release non-native species, including signal crayfish, into the wild. Any non-native signal crayfish that are encountered during the works should not be returned to the channel of the watercourses, but should be removed and humanely destroyed. Natural England and the Environment Agency should also be informed as to the presence of a non-native species.

5 FIGURES

5.1 FIGURE 1: WATERCOURSE MAP

HIGHWAYS ENGLAND

M42 JUNCTION 6 IMPROVEMENT

WOODLAND NATIONAL VEGETATION CLASSIFICATION SURVEY

MAY 19, 2017

CONFIDENTIAL

M42 JUNCTION 6 IMPROVEMENT

WOODLAND NATIONAL VEGETATION CLASSIFICATION SURVEY REPORT

FINAL
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PROJECT NO.: 62241010
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TABLE OF CONTENTS

TABLES

1 INTRODUCTION

1.1 BACKGROUND

WSP (formerly Mouchel) was commissioned by Highways England to undertake a National Vegetation Classification (NVC) survey at Aspbury's Coppice. This area of ancient woodland, also designated as an Ecosite, is likely to be directly affected by Options 1 and 2 of the proposed M42 Junction 6 Improvement Scheme. Further botanical survey was therefore recommended to characterise the ecological baseline and to determine the likely effects of the scheme on the woodland.

This report presents the results of the NVC survey at Aspbury's Coppice undertaken in May 2017.

1.2 SCHEME LOCATION

At the time of writing, three possible route options (Options 1, 2 and 3) are being considered. All three options are predominantly located to the south-west of Junction 6 close to the village of Bickenhill, although all route options also include improvements to the junction itself. The land within the proposed scheme is predominantly used for agriculture and pasture grazing, although the scheme is also close to the National Exhibition Centre (NEC), Birmingham International Railway Station and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 STUDY AREA

Aspbury's Coppice is located south of Junction 6 of the M42, where the B4102 crosses the motorway (centred at Ordnance Survey (OS) Grid Reference SP190805). The site is bisected by the M42 which runs through its centre, and is surrounded arable farmland to the east, south, and west. It is bordered by the B4102 to the north (see Figure 1 in Appendix 1).

1.4 STUDY AIMS AND OBJECTIVES

The aim of the study was to assess the quality of Aspbury's Coppice with respect to its ancient woodland designation. To achieve this, the following objectives were set:

- Undertake an NVC survey to classify and map habitats within the site in accordance with the standard NVC method; and,
- To record the presence of ancient woodland indicator species where present within the site.

2 METHODOLOGY

2.1 OVERVIEW

The field survey was undertaken on the 4th May 2017 by two Mouchel surveyors.

The methodology employed for the NVC surveys followed the methods outlined in British Plant Communities (Rodwell et al. 1991a, 1991b, 1992, 1995 & 2000). The extent of areas of homogeneous vegetation was mapped and sample quadrats (relevés) were located within these areas to record the abundance and frequency of vascular plants within each compartment. The field data was then analysed and each compartment was assigned, where possible, to a particular plant community. The extent of these community types is represented within mapping of the survey area in Annex 1; Figure 1. Additional information in the form of Target Notes (TN) is provided in Annex 2 and photographs of the site are presented in Annex 3.

2.2 SAMPLING COMPARTMENTS

Prior to undertaking vegetation sampling, boundaries of all homogeneous plant communities were mapped, as accurately as possible, on large-scale field maps. An attempt was made to determine the most typical habitats for sampling.

For each homogenous stand identified, samples were taken using appropriate quadrat size (see 2.3 below). Within each stand selected for analysis an appropriate number of quadrats were positioned in areas supporting representative vegetation. This inevitably involved some surveyor bias, but avoided problems of the arrangement of random samples and incorporating obvious vegetation boundaries or unrepresentative floristic features.

2.3 QUADRAT SIZE

Throughout the NVC surveys, the size of the sampling quadrats reflected the scale of the vegetation being sampled. Thus the following quadrat dimensions were employed:

- 4 m x 4 m for taller or more open herb communities, and low woodland field layers;
- 10 m x 10 m for species-poor or very tall herbaceous vegetation or tall woodland field layers/low understorey and dense scrub;
- 50 m x 50 m for sparse scrub, woodland canopy and tall understorey.

Mosaics were treated as a single vegetation type where they were repeatedly encountered in the same form or where it is was impossible to sample their elements separately due to their small scale.

2.3.1 MEASURING SPECIES ABUNDANCE

Within each quadrat, a quantitative measure of the relative abundance of every vascular plant, bryophyte and lichen species was undertaken using the ten point Domin scale. Cover was assessed by eye as a vertical projection on to the ground of all live, above-ground parts of the plants within the quadrat. The Domin scale categories are presented below:

- Cover of 91-100% is recorded as Domin 10
- Cover of 76-90% is recorded as Domin 9

- Cover of 51-75% is recorded as Domin 8
- Cover of 34-50% is recorded as Domin 7
- Cover of 26-33% is recorded as Domin 6
- Cover of 11-25% is recorded as Domin 5
- Cover of 4-10% is recorded as Domin 4
- Cover of <4% with many individuals is recorded as Domin 3
- Cover of <4% with several individuals is recorded as Domin 2
- Cover of <4% with few individuals is recorded as Domin 1

2.4 LIMITATIONS

There were no limitations to the survey due to land access, allowing an appraisal of all the accessible habitat features present within the survey area.

The survey was undertaken at an appropriate time of year for identifying woodland ground-flora.

3 RESULTS AND DISCUSSION

3.1 OVERVIEW

Aspbury's Coppice ancient woodland can be split into two geographically distinct units: the area of woodland to the west of the M42 (Area 1) and the woodland to the east of the M42 (Area 2).

Area 1 supports three relatively distinct stands of vegetation:

1. An area of mature replanted woodland (TN1) which predominantly comprises semi-mature to mature pedunculate oak *Quercus robur* in the canopy, with localised areas dominated by hybrid black poplar *Populus X Canadensis* (TN2).
2. A stand of plantation woodland, dominated by field maple *Acer campestre* which is adjacent to the B4102 (TN3); and
3. The M42 verge habitats (TN4), which support scrub and grassland habitats comprising species such as hawthorn *Crataegus monogyna*, elder *Sambucus nigra*, bramble *Rubus fruticosus* agg., semi-mature pedunculate oak, and various grasses and herbs such as false oat grass *Arrhenatherum elatius*, cock's foot *Dactylis glomerata*, red campion *Silene dioica*, and curled leaf dock *Rumex crispus*.

Area 2 is similar in character to Area 1, although the composition of species in the canopy is more mixed in terms of the distribution of broad-leaved species, predominantly pedunculate oak and hybrid black poplar, and conifers, Scot's pine *Pinus sylvestris*. As with Area 1 above, three distinct vegetation stands were recorded:

1. The area of pedunculate oak/Scot's pine/hybrid black poplar woodland (TN5);
2. A stand of field maple dominated plantation woodland adjacent to the B4102 (TN6); and,
3. The M42 verge habitat (TN7).

The stands of mature woodland within Areas 1 and 2 (TNs 1 and 5) were subject to an NVC survey in line with the methods described in Section 2. The areas of field maple plantation woodland were not subject to NVC survey as these are planted, single species stands which do not equate to any of the NVC archetypes. The M42 verge habitats were also not subject to NVC survey as they are highly mosaic in nature and fall outside of the areas designated.

The results of the NVC survey within Areas 1 and 2 are presented below and on Figure 1 in Annex 1.

3.2 AREA 1 – WEST OF THE M42

Area 1 comprises approximately 1.4ha of replanted woodland dominated by pedunculate oak with localised areas dominated by hybrid black poplar. A single 50m x 50m quadrat of the canopy layer was recorded within the stand, given the size of the block. Within the understorey and field layers, five 4m x 4m quadrats were undertaken. Constants recorded within the understorey included hawthorn *Crataegus monogyna*, elder *Sambucus nigra*, with hazel *Corylus avellana* and honeysuckle *Lonicera periclymenum* occurring occasionally. Within the field layer, bluebell *Hyacinthoides non-scripta*, lesser celandine *Ficaria verna*, and wood anemone *Anemone nemorosa*, were recorded as constants, while lords and ladies *Arum maculatum*, and dog's mercury *Mercurialis perennis* occurred occasionally. Table 3.1 presents the quadrat data for Area 1.

Table 3.1 Quadrat data for Area 1.

COMMON NAME	LATIN NAME	1	2	3	4	5	FREQUENCY
Pedunculate oak	*Quercus robur*	10	10	10	10	10	V
Common hawthorn	*Crataegus monogyna*	6	6	4	6	5	V
Elder	*Sambucus nigra*	5	6	4	6	5	V
Bluebell	*Hyacinthoides non-scripta*	9	10	7	6	5	V
Lesser celandine	*Ficaria verna*	4	7	4		4	IV
Wood anemone	*Anemone nemorosa*		4	8	6	4	IV
Common nettle	*Urtica dioica*	1			1	2	III
Lords and ladies	*Arum maculatum*			1	5	2	III
Cleavers	*Galium aparine*	5			4		II
Honeysuckle	*Lonicera periclymenum*			1		1	II
Common hazel	*Corylus avellana*			1		5	II
Bramble	*Rubus fruticosus agg.*	4					I
Dog's mercury	*Mercurialis perennis*					9	I
Wood melick	*Melica uniflora*					1	I
Enchanter's-nightshade	*Circaea lutetiana*	1					I

The canopy layer is generally semi-mature to mature, and it is evident that the pedunculate oak have been planted relatively recently (the majority are approximately 25 – 50 years old). The ground flora within the stand is a good example of a well-developed broad-leaved woodland ground flora, with many ancient woodland indicator species present, including bluebell, lesser celandine, wood anemone, dog's mercury, and lords and ladies. Generally, the woodland nearest the M42 verge exhibits lower diversity and abundance of ancient woodland indicator species and a greater degree of scrub encroachment. However, these areas are still likely to contain a seed bank which supports species typical of ancient broad-leaved woodland.

In terms of NVC community, analysis of the quadrat data using MAVIS has returned the following top five fit for the woodland communities:

W8b – *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland - *Anemone nemorosa* sub-community - 44.4% fit;

W21 – *Crataegus monogyna – Hedera helix* scrub - 42.7% fit;

W21b - *Crataegus monogyna – Hedera helix* scrub - *Mercurialis perennis* sub-community - 42.3% fit;

W21a - *Crataegus monogyna – Hedera helix* scrub – *Hedera helix – Urtica dioica* sub-community - 40.6% fit; and,

W10b – *Quercus robur – Pteridium aquilinum – Rubus fruticosus* woodland – *Anemone nemorosa* sub-community - 40.15% fit.

The community does not exhibit features which accord with communities W21. Although there is a relative abundance of hawthorn with the quadrats, W21 is indicative of a scrub community, and the vegetation within the stand is a well-developed woodland.

The woodland within Area 1 therefore most closely conforms to communities W8 or W10 – oak or ash woods that are generally found in lowland Britain on calcareous (W8) to acidic soils (W10). Both W8 and W10 woodlands are relatively variable in the composition of the canopy, with the species composition within the field layer defining the two communities and their respective sub-communities. Where soils are intermediate between calcareous and acidic, the separation between W8 and W10 can be problematic.

In the case of Area 1, the dominance of pedunculate oak in the canopy is indicative of W10 as is the abundance of bluebell and wood anemone in the field layer. The relative scarcity of dog's mercury, an indicator of base-rich soils, is also more characteristic of the W10 woodland. However, other species that are generally constants in W10 woodland, including bramble, honeysuckle, and bracken, were absent or relatively scarce, although this may be due to the survey being undertaken relatively early in the flowering season for these species. In terms of W8 woodland, the W8b community can support abundant pedunculate oak and supports a ground flora with abundant wood anemone, bluebell, and lesser celandine.

Area 1 is exhibits features of characteristics of both W8 and W10 woodland; likely a result of soils which are intermediate in terms of acidity / alkalinity. However, given the abundance of oak in the canopy and bluebell and wood anemone in the field layer, and relative paucity of dog's mercury, it is likely that the woodland most closely conforms to W10b – *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland – *Anemone nemorosa* sub-community.

3.3 AREA 2 – EAST OF THE M42

Area 2 comprises approximately 1.1ha of replanted woodland, which supports predominantly pedunculate oak, Scots pine, and areas of hybrid black poplar. As with Area 1, a single 50m x 50m quadrat was recorded for the canopy layer, with five 4m x 4m quadrats recorded for the field layer. The understorey comprised hazel, hawthorn and elder as constants, with bluebell, dog's mercury, ivy, and cleavers *Galium aparine* frequent to abundant within the field layer.

Table 3.2 Quadrat data for Area 2.

COMMON NAME	LATIN NAME	1	2	3	4	5	FREQUENCY
Bluebell	*Hyacinthoides non-scripta*	4	9	7	9	9	V
Hazel	*Corylus avellana*	5	5	7	5	5	V
Pedunculate oak	*Quercus robur*		9	4	5	8	IV
Common hawthorn	*Crataegus monogyna*		5		5	5	III
Elder	*Sambucus nigra*	5		4		5	III
Cleavers	*Galium aparine*	5	7		3		III
Dog's mercury	*Mercurialis perennis*	9		8	5		III
Common ivy	*Hedera helix*	2		4	2		III
White poplar	*Populus alba*	10	5	7			III
Lesser celandine	*Ficaria verna*	4			7		II
Lords and ladies	*Arum maculatum*				3	3	II
Bramble	*Rubus fruticosus*		4			2	II
Common nettle	*Urtica dioica*	5					I
Red campion	*Silene dioica*	4					I
Common ash	*Fraxinus excelsior*				9		I

Scots pine	*Pinus sylvestris*					6	I
Male fern	*Dryopteris felix-mas*	1					I
Cow parsley	*Anthriscus sylvestris*				2		I
Wood sorrel	*Oxalis acetosella*				7		I

The canopy layer is of a similar age to Area 1, with the oak species approximately 50 years of age. There is a greater abundance of Scots pine and hybrid black poplar within this stand when compared to Area 1. The ground flora is generally well developed, with an abundance of species which are indicative of ancient broad-leaved woodland, including bluebell, dog's mercury, lesser celandine, lords and ladies, wood anemone, and wood avens *Geum urbanum*. Notably, wood avens was absent from within the quadrats within this stand.

Analysis of the quadrat data using MAVIS has returned the following top five fit for the woodland communities:

W8b - *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland - *Anemone nemorosa* sub-community - 46.4% fit

W8d - *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland *Hedera helix* sub-community - 41.9% fit

W8f - *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland - *Allium ursinum* sub-community - 41.2% fit;

W10c - *Quercus robur-Pteridium aquilinum-Rubus fruticosus* woodland - *Hedera helix* sub-community - 41.2% fit; and,

W21b - *Crataegus monogyna – Hedera helix* scrub - *Mercurialis perennis* sub-community - 40.7% fit.

The woodland within Area 2 is generally of a similar character to Area 1, in that it supports similar species within the canopy, understorey, and field layers. Analysis with MAVIS has shown that Area 2 most closely fits with woodland community W8b *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland - *Anemone nemorosa* sub-community. A notable difference between Area 1 and 2, is the relative abundance of dog's mercury within Area 2, which is indicative of more basic soil conditions. This woodland community is, as with Area 1, an intermediary between W8 and W10 woodland, although it is likely to be a closer fit to W8b - *Fraxinus excelsior-Acer campestre-Mercurialis perennis* woodland - *Anemone nemorosa* sub-community, given the abundance of dog's mercury.

4 CONCLUSIONS AND RECOMMENDATIONS

The woodland blocks within Area 1 and Area 2 are relatively good examples of lowland semi-natural broad-leaved woodland. Both stands support an abundance of ancient woodland indicator species, including bluebell, wood anemone, dog's mercury, wood sorrel, lords and ladies, and lesser celandine (amongst others). Despite being replanted, and supporting species which are uncharacteristic of this woodland type (hybrid black poplar and Scots pine), both woodland retain ancient woodland features, including a well-developed and diverse ground flora.

The impacts arising from the proposed scheme will be assessed in the forthcoming Environmental Appraisal Report, which will include a detailed mitigation strategy for ancient woodland. This should aim to reduce habitat loss to ancient woodland wherever possible. Where loss is unavoidable, the ancient woodland seedbank should be retained through appropriate topsoil management. This soil should be reused in areas of woodland planting.

5 FIGURES

5.1 FIGURE 1: NVC SURVEY PLAN

APPENDIX

A TARGET NOTES

TARGET NOTE

TN1	Area of semi-natural broad-leaved woodland (replanted)
TN2	Stands of hybrid black poplar within Area 1
TN3	Plantation woodland dominated by field maple adjacent to area designated as ancient woodland
TN4	M42 verge habitats
TN5	Area of pedunculated oak/Scots pine
TN6	Field maple dominated plantations woodland
TN7	M42 verge habitats

APPENDIX

B PHOTOGRAPHS

Photograph 1 – Typical canopy and field layer community within Area 1

Photograph 2 – Woodland canopy and field layer within Area 2

Photograph 3 – Typical woodland habitat within near vicinity of M42 verge in Area 1

Photograph 4 – Woodland habitat adjacent to M42 verge within Area 2

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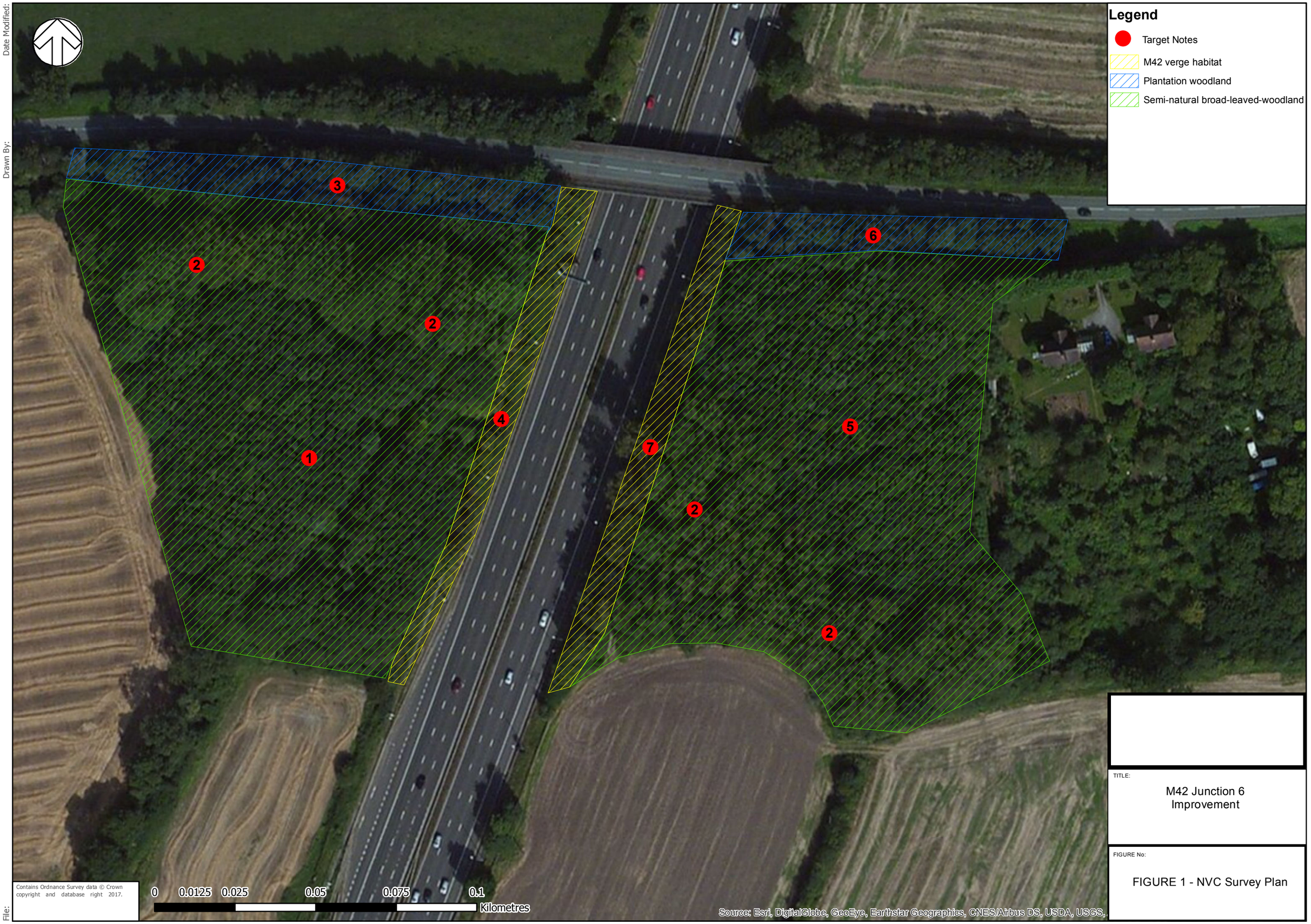

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M42 Junction 6 Improvement

FIGURE No:

FIGURE 1 - NVC Survey Plan

HIGHWAYS ENGLAND

M42 JUNCTION 6 IMPROVEMENT

GRASSLAND NATIONAL VEGETATION CLASSIFICATION SURVEY REPORT

AUGUST 02, 2017

CONFIDENTIAL

wsp

M42 JUNCTION 6 IMPROVEMENT

GRASSLAND NATIONAL VEGETATION CLASSIFICATION SURVEY

FINAL
CONFIDENTIAL

PROJECT NO.: 62241010
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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
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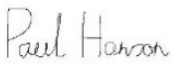
Signature				
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1 INTRODUCTION

1.1 BACKGROUND

WSP (formally Mouchel) was commissioned by Highways England to undertake a National Vegetation Classification (NVC) survey of areas of grassland within and adjacent to the proposed M42 Junction 6 Improvement Scheme. The scheme encompasses several areas of grassland within close proximity to Bickenhill Meadows Site of Species Scientific Interest (SSSI), designated for its grassland interest. Further botanical surveys were recommended to determine if grassland habitats similar to those for which the SSSI is designated are present within the scheme. This report presents the results of the NVC survey undertaken in July 2017.

1.2 SCHEME LOCATION

At the time of writing, three possible route options (Options 1, 2 and 3) are being considered. All three options are predominantly located to the south west of Junction 6 close to the village of Bickenhill, although all route options also include improvements to the junction itself. The land within the proposed scheme is predominantly used for agriculture and pasture grazing, although the scheme is also close to the National Exhibition Centre (NEC), Birmingham International Railway Station and Birmingham Airport as well as proposed developments including High Speed 2 (HS2) route and terminal, a Motorway Service Area (MSA) and UK Central development.

1.3 STUDY AREA

Bickenhill Meadows SSSI consists of two groups of fields comprising species-rich grassland situated to the south and west of the village of Bickenhill on predominantly neutral soils. The unit to the west of Catherine de Barnes Lane is 2.53ha. The unit to the east of Catherine de Barnes Lane is 3.15ha and forms part of the Shadowbrook Meadows Warwickshire Wildlife Trust Nature Reserve which covers an area of 4.40ha.

Immediately to the south of the western unit of Bickenhill Meadows SSSI are a number of semi-improved neutral grassland fields (identified as areas A and B on Figure 1). To the south and east of these areas of grassland is a large expanse of amenity grassland comprising Gaelic games sports pitches. To the south and west of these is a large improved grassland field (identified as area C on Figure 1). The survey work undertaken focused on these three areas of grassland.

1.4 STUDY AIMS AND OBJECTIVES

The aim of the study was to provide baseline ecological information about the botanical interest within the semi-improved grassland fields which will be bisected by the proposed junction improvement works and to compare the vegetation communities present with those described to be present within Bickenhill Meadows SSSI.

2 METHODOLOGY

2.1 OVERVIEW

Areas of homogeneous vegetation, comprising the grassland areas A, B and C, as shown in Figure 1, were subject to NVC surveys on the 24th July 2017. The methodology employed for the NVC surveys followed the methods outlined in *British Plant Communities* (Rodwell *et al.*). The extent of areas of homogeneous vegetation was mapped and sample quadrats (relevés) were located within these areas to record the abundance and frequency of vascular plants, bryophytes and lichens within each compartment. The field data was then analysed and each compartment was assigned, where possible, to a particular plant community.

2.2 QUADRAT SIZE

Within each survey field, samples were taken using an appropriate quadrat size, which for the short herbaceous vegetation and grassland present was 2m x 2m. An appropriate number of quadrats were positioned in areas supporting representative vegetation. This inevitably involved some surveyor bias, but avoided problems of the arrangement of random samples and incorporating obvious vegetation boundaries or unrepresentative floristic features.

2.3 MEASURING ABUNDANCE

Within each quadrat, a quantitative measure of the relative abundance of every vascular plant, bryophyte and lichen species was undertaken using the 10-point Domin scale. Cover was assessed by eye as a vertical projection on to the ground of all live, above-ground parts of the plants within the quadrat. The Domin scale categories are presented below:

— Cover of **91-100%** is recorded as Domin **10**
— Cover of **76-90%** is recorded as Domin **9**
— Cover of **51-75%** is recorded as Domin **8**
— Cover of **34-50%** is recorded as Domin **7**
— Cover of **26-33%** is recorded as Domin **6**
— Cover of **11-25%** is recorded as Domin **5**
— Cover of **4-10%** is recorded as Domin **4**
— Cover of **<4%** with many individuals is recorded as Domin **3**
— Cover of **<4%** with several individuals is recorded as Domin **2**
— Cover of **<4%** with few individuals is recorded as Domin **1**

Frequency was used in conjunction with abundance when determining the community type, either using dichotomous keys within *British Plant Communities* volume 3 (Rodwell *et al.,* 1992) or the MATCH computer program. Roman numerals I-V are used to measure frequency with

— **I** signifying a species present in **1-20%** of samples (**scarce**)
— **II** signifying a species present in **21-40%** of samples (**occasional**)
— **III** signifying a species present in **41-60%** of samples (**frequent**)
— **IV** signifying a species present in **61-80%** of samples (**constant**)
— **V** signifying a species **present** in **81-100%** of samples (**constant**)

Floristic tables were compiled from the quadrat data, showing the range of Domin scores of a particular species, and its frequency class within the community. Species occurring at frequencies of IV and V are described as

constants within the community, while species occurring at other frequencies are described as companions

2.4 DETERMINING VEGETATION COMMUNITY TYPE

Shortlists of possible communities were identified using the computer program MATCH (v.2.16) from the Unit of Vegetation Science, Lancaster University. This program compares the survey data with floristic tables of NVC communities. The shortlists were subsequently refined using NVC keys and the appropriate community descriptions as given in British Plant Communities volume 3 (Rodwell et al., 1992).

The coefficient of similarity generated by MATCH (calculated as a percentage) was used to improve the confidence with which data collected could be assigned to a particular NVC community. In line with the published guidance, however, the MATCH assessments were not used in isolation: a combination of the keys and descriptions within the published NVC handbooks, MATCH assessment, and surveyor experience was used to determine community types.

As a rough guide, MATCH coefficients below 40% are considered to represent particularly poor fits, while those over 50% are considered particularly good fits. Coefficients between 40% and 49% inclusive are not normally considered to provide a definitive result with confidence, and in these cases, the published keys and descriptions, plus surveyor experience should be used as the favoured method. In some cases, even particularly good fits for MATCH assessments may be disregarded where the result is not considered to be a true reflection of the existing conditions by the surveyor. This judgement is often made because of the absence of one or more species at the survey site, which are normally constant species within the community with the highest percentage similarity coefficient, using the MATCH program.

2.5 TAXONOMY

Names of vascular plants follow Stace (2010) with bryophytes following Hill *et al*. (2008).

2.6 NOTES AND LIMITATIONS

Every effort has been made to provide a comprehensive description of the NVC communities present within the survey area; however, the following specific limitations apply to this assessment:

— During the survey period the grassland within Areas A, B and C appeared to have been recently mown (see Photographs in Appendix B), with much of the vegetation coverage consisting only of vegetative parts, with most flowering parts having been removed. This made identification of some species problematical and made estimates of relative abundance more difficult. This was particularly evident in Area A, where large areas of grassland were covered in cut grass, obscuring the vegetation below (Appendix B, Photograph 1). Despite this it is still felt that enough living vegetation, showing identification features was present during the survey to be reasonably confident of the results of the NVC analysis. Even within Area A, there were strips of vegetation that had been missed by the mower (Appendix B, Photograph 2) which allowed identification of the majority of species present.

— Access was not possible to the semi-improved grassland directly to the north of Area B, which borders the southern edge of the western unit of Bickenhill Meadows SSSI. This was due to the landowner not giving access permission. The land was visible from the boundary fence with Area B, however, and an assessment of the vegetation was made using this information.

3 RESULTS

3.1 BICKENHILL MEADOWS SSSI

Bickenhill Meadows SSSI comprise one of the richest grassland floras in the county with good examples of both meadow foxtail *Alopecurus pratensis* – great burnet *Sanguisorba officinalis* floodmeadow and common knapweed *Centaurea nigra* – crested dog's-tail *Cynosurus cristatus* meadow and pasture. Both grassland types have declined very severely nationally in the 20th century due to agricultural improvement. The West Midlands Region contains a major part of the national resource of the common knapweed – crested dog's-tail grassland type which is typically associated with level topography, loam or clay soils, moderately free drainage and the retention of traditional farming methods with small fields.

There is a complex pattern of vegetation resulting from local variations in topography and drainage, such as the ridge and furrow pattern, evident in some of the fields. This has led to the development of mosaics where the main vegetation types intermingle, as well as to areas where each type can be recognised. Characteristic species include common bent *Agrostis capillaris*, meadow foxtail, Yorkshire-fog *Holcus lanatus*, sweet vernal-grass *Anthoxanthum odoratum*, common sorrel *Rumex acetosa*, cat's-ear *Hypochaeris radicata*, ribwort plantain *Plantago lanceolata* and yellow rattle *Rhinanthus minor*. The sward is enriched by the presence of cowslip *Primula veris*, quaking-grass *Briza media*, lady's bedstraw *Galium verum*, devil's-bit scabious *Succisa pratensis*, heath-grass *Danthonia decumbens* and common spotted-orchid *Dactylorhiza fuchsii*. The fields also contain a number of uncommon species such as betony *Stachys officinalis*, pepper-saxifrage *Silaum silaus*, saw-wort *Serratula tinctoria*, as well as meadow thistle *Cirsium dissectum*, a county rarity.

Further interest is provided by wetter areas characterised by rushes *Juncus* spp., sedges *Carex* spp. and tall herbs such as meadowsweet *Filipendula ulmaria* and great burnet. Both groups of meadows have streams and there is a good range of tree and shrub species in the hedgerows around the fields.

3.2 NVC SURVEY

Floristic tables for all areas subject to NVC survey are shown in Appendix A. The location and extent of the compartments is shown in Figure 1, with photographs of the site shown in Appendix B. The results of the NVC survey analysis for each compartment are given below.

3.2.1 AREA A

Area A comprises a long narrow field running north to south, just to the south of the western unit of Bickenhill Meadows SSSI. Quadrat sampling was undertaken in Area A using ten quadrats, with the floristic table shown in Appendix A (Table 1) and photographs shown in Appendix B (Photographs 1 & 2).

Analysis of the quadrat data using the MATCH program provided a 68.3% similarity coefficient with the MG1a *Arrhenatherum elatius* grassland – *Festuca rubra* sub-community. This is a high percentage match, with the red fescue *Festuca rubra* sub-community providing a good description of the vegetation present. This sub-community is characterised by the dominance of false oat-grass *Arrhenatherum elatius* and cock's-foot *Dactylis glomerata* but with a high proportion of red fescue also present. Red fescue was found to be constant within Area A, with occurrence in nine out of ten sampling quadrats.

Most of the constant species present were grasses, with the only constant herbaceous species being dandelion *Taraxacum officinale* agg. and pale persicaria *Persicaria lapathifolia*. All other herbs were present at a frequency of III or less. The next highest sub-community match, with a similarity coefficient of 63.8% was the MG1c *Filipendula ulmaria* sub-community. This sub-community is generally more species-rich than some other MG1 sub-communities, with constant meadowsweet *Filipendula ulmaria* presence. This species was not found to be present within Area A.

Generally MG1 grasslands are dominated by coarse-leaved tussock grasses, usually false oat-grass and cock's-foot, often with frequent large umbellifers present such as cow-parsley *Anthriscus sylvestris* or hogweed *Heracleum sphondyllium.* The development of large tussocks occurs when the land is infrequently mowed or grazed. Within Area A though the tussocks are less well developed, due to more frequent cutting and thereby allowing the shorter grass species such as red fescue to compete more effectively leading to a greater predominance of fine-leaved grasses.

3.2.2 AREA B

Area B comprises a long narrow field running east to west, immediately north of the amenity grassland comprising the Gaelic games sports ground. This area is separated by a boundary fence from a larger area of semi-improved grassland and scrub to the north, which extends northwards to the southern boundary of the western unit of Bickenhill Meadows SSSI. Quadrat sampling was undertaken in Area B using five quadrats, with the floristic table shown in Appendix A (Table 2) and a photograph shown in Appendix B (Photograph 3).

Analysis of the quadrat data using the MATCH program provided a 63.5% similarity coefficient with the MG6b *Lolium perenne – Cynosurus cristatus* grassland – *Anthoxanthum odoratum* sub-community. The MG6 community is generally grass-dominated, with a short, tight sward, with perennial rye-grass *Lolium perenne* usually being the most abundant grass species, with varying amounts of crested dog's-tail *Cynosurus cristatus.* This community is the major permanent pasture type on moist but free-draining soils in lowland Britain and also forms a large proportion of grassland present on village greens, road verges and lawns.

When first sown, perennial rye-grass is usually the most abundant grass species, with crested dog's-tail being rare. With age and less intensive grazing, however, the proportion of crested dog's-tail will normally increase, along with red fescue and common bent *Agrostis capillaris,* both of which are present at frequencies of V in the Area B samples. Crested dog's-tail and perennial rye-grass are both present with frequencies of III, which is lower than normal for this community.

The MG6b *Anthoxanthum odoratum* sub-community is normally more species-rich than other MG6 sub-communities, with red fescue, common bent, Yorkshire-fog *Holcus lanatus* and cock's-foot *Dactylis glomerata* being co-dominant with crested dog's-tail and perennial rye-grass. This is the case within Area B. Small amounts of sweet vernal-grass *Anthoxanthum odoratum* are also usually present, as is the case within Area B. Common sorrel *Rumex acetosa* and cat's-ear *Hypochaeris radicata* are also preferential within the MG6b sub-community, with frequencies of IV within the Area B sampling quadrats.

3.2.3 LAND TO THE NORTH OF AREA B

The land directly to the north of Area B was not accessible during the survey but could be observed from the boundary fence with Area B. The grassland was dominated by false oat-grass (Appendix B, Photograph 4), with the most frequent herbaceous species being common ragwort *Senecio jacobaea*, broad-leaved dock *Rumex obtusifolius*, creeping thistle *Cirsium arvense* and hogweed *Heracleum sphondyllium*. Within the grassland there was frequent, but widely spaced scrub comprising mostly hawthorn *Crataegus monogyna*, but with several small blackthorn *Prunus spinosa* bushes present.

Although no quadrat sampling was undertaken in this field the grassland appeared to closely resemble MG1 *Arrhenatherum elatius* grassland, due to the overall dominance of false oat-grass and the species-poor nature of the area.

3.2.4 AREA C

Area C comprises a large improved grassland field to the south and west of the sports pitches and immediately south of Area A. Quadrat sampling was undertaken in Area C using five quadrats, with the floristic table shown in Appendix A (Table 3) and a photograph shown in Appendix B (Photograph 5).

Analysis of the quadrat data using the MATCH program provided a 56.1% similarity coefficient with the MG7e *Lolium perenne* leys and related grasslands – *Lolium perenne – Plantago lanceolata* grassland sub-community.

Perennial rye-grass cultivars are frequently used in the creation of short-term agricultural grasslands used for grazing or in rotation with arable farming. Perennial rye-grass may also be used for permanent amenity or

recreational swards, developed for their resistance to heavy use. The grassland at Area C appears to be for agricultural usage. The most frequent species within newly created MG7 grassland are often perennial rye-grass and white clover *Trifolium repens.* Within Area C these two species have frequencies of V and IV.

With age, however, the cover of perennial rye-grass often declines in MG7e grassland and other grass species such as Yorkshire-fog, cock's-foot, red fescue and common bent increase in coverage. Within Area C perennial rye-grass is still constant and dominant but Yorkshire-fog and common bent are also constants with frequencies of IV.

In older stands of MG7e ribwort plantain *Plantago lanceolata* becomes abundant, along with frequent greater plantain *Plantago major* and dandelion *Taraxacum officinale* agg. Within Area C ribwort plantain was not evident within the sampling quadrats but greater plantain was present along with constant dandelion. The second and third best percentage matches were for the MG7b *Lolium perenne – Poa trivialis* leys (54.3%) and the MG7f *Lolium perenne – Poa pratensis* grassland (51.7%) communities. Both of these communities, however, should contain constant meadow-grass (*Poa* species), none of which were present within sampling quadrats

4 DISCUSSION

This section considers the communities present within the NVC survey areas, described in Section 4, when compared with the grassland communities described in the citation for Bickenhill Meadows SSSI.

4.1 COMPARISON OF SEMI-IMPROVED GRASSLAND NVC SURVEY AREAS WITH SSSI

The citation for Bickenhill Meadows SSSI describes the presence of MG4 meadow foxtail *Alopecurus pratensis* – great burnet *Sanguisorba officinalis* flood meadow and MG5 common knapweed *Centaurea nigra* – crested dog's-tail *Cynosurus cristatus* meadow and pasture.

MG4 is a lowland grassland community characteristic of areas where traditional hay-meadow treatment has been applied to seasonally flooded land. It is a species-rich community with a varied sward composed of grasses and herbaceous species. The two most frequent and prominent herbaceous species within the MG4 community are great burnet and meadowsweet *Filipendula ulmaria,* which will usually overtop the grass species by mid-summer. Meadowsweet was absent from all sampling quadrats, with great burnet present in only one quadrat, within Area A.

MG5 is the typical grassland of grazed hay-meadows on neutral soils throughout lowland Britain. It does not require periodic inundation like MG4. This species-rich community is variable and may have a tight, low growing sward or comprise tall lush growth. The most frequent grasses are fine-leaved species such as common bent, red fescue and crested dog's-tail, with constant herbaceous species including common knapweed, common bird's-foot trefoil *Lotus corniculatus* and ribwort plantain. Herbaceous species normally comprise a substantial proportion of the vegetation coverage, unlike the NVC Areas A and B where grasses dominate the sward, with relatively sparse herbaceous coverage.

The NVC communities present within Areas A and B do not closely resemble those described as occurring within Bickenhill Meadows SSSI, with a far lower species diversity than would be typical for MG4 and MG5 and a predominance of grasses over herbaceous species. The communities present within Areas A and B are of far lower ecological value than grasslands within the SSSI

4.2 ASSESSMENT OF BOTANICAL INTEREST OF AREA C

The improved grassland comprising Area C is dominated by perennial rye-grass with dandelion, white clover and creeping buttercup *Ranunculus repens* being the only constant herbaceous species within the sward. Large areas of the grassland are almost pure perennial rye-grass, indicating that parts of this field may have been recently re-seeded.

Due to the species-poor nature of the grassland within Area C it is felt that the potential conversion of this field to replacement sports pitches would not significantly impact upon the biodiversity value of this field, with conversion to amenity grassland merely replacing one type of species-poor grassland with another.

5 CONCLUSIONS

Data collected using standard NVC survey methodology and observations from adjacent land demonstrates that semi-improved grassland fields to the south of Bickenhill Meadows SSSI (including NVC Areas A and B) mostly comprise the NVC communities MG1 and MG6. These communities are common and widespread throughout the British Isles with MG6 being a frequent component of permanent pasture, whilst MG1 is more typical of ungrazed areas where coarse tussock grass species can develop. Both of these communities are of low conservation value.

An improved grassland field to the south of Areas A and B (Area C) consists of MG7 grassland. This community is also common and widespread and forms large areas of grazing land, where the sward has been re-seeded, using a seed mix dominated by perennial rye-grass to give resistance to heavy usage.

It is concluded that semi-improved grassland fields to the south of Bickenhill Meadows SSSI do not contain grassland which is similar to that for which the SSSI has been designated. It is also concluded that the potential conversion of improved grassland at Area C to amenity grassland will not significantly reduce biodiversity within this area.

6 REFERENCES

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7 FIGURES

7.1 FIGURE 1: NVC SURVEY MAP

APPENDIX

A FLORISTIC TABLES

Table 7.1 Area A NVC Floristic Table.

LATIN NAME	COMMON NAME	1 SP1819782007	2 SP1822182004	3 SP1817681959	4 SP1817381927	5 SP1820881894	6 SP1820881883	7 SP1819081815	8 SP1820281799	9 SP1819881792	10 SP1820681719	FREQ.	RANGE
Agrostis capillaris	Common Bent		3	8	7	3	4	5	2	3	3	V	2-8
Arrhenatherum elatius	False Oat-grass	8	8	6	7	7	6	3	3	4	5	V	3-8
Dactylis glomerata	Cock's-foot	6	5	6	6	7	6	6	6	3	4	V	4-7
Festuca rubra	Red Fescue		5	4	2	2	3	2	3	5	2	V	2-5
Holcus lanatus	Yorkshire-fog		2	2	2	3	6	3	4	3	5	V	2-6
Persicaria lapathifolia	Pale Persicaria	6	2		5	2	3	4	4	4	5	V	2-6
Taraxacum officinale agg.	Dandelion		2	3		6	5	6	6	7	5	IV	2-7
Cirsium arvense	Creeping Thistle	4	2		4	2	3					III	2-4
Heracleum sphondylium	Hogweed	3		3	3	4			5		6	III	3-6
Plantago lanceolata	Ribwort Plantain			2	1		2		3		2	III	1-3
Ranunculus acris	Meadow Buttercup			1		2		4	3	2		III	1-4
Ranunculus repens	Creeping Buttercup						4	7	5	8	3	III	3-8
Rumex acetosa subsp. *acetosa*	Common Sorrel			5		5	3		4		1	III	1-5
Senecio jacobaea	Common Ragwort	1	2	2				4	6			III	1-6
Trifolium repens	White Clover			1		5		7	3		2	III	1-7
Vicia cracca	Tufted Vetch		3	5			8	4			5	III	3-8
Achillea millefolium	Yarrow		3			4			3			II	3-4
Agrostis stolonifera	Creeping Bent				5				2		3	II	2-5
Anthriscus sylvestris	Cow Parsley	3				7	7					II	3-7

APPENDIX

LATIN NAME	COMMON NAME	1	2	3	4	5	6	7	8	9	10	FREQ.	RANGE
		SP1819782007	SP1822182004	SP1817681959	SP1817381927	SP1820881894	SP1820881883	SP1819081815	SP1820281799	SP1819881792	SP1820681719		
Brachythecium rutabulum	Rough-stalked Feather-moss			2		3	2					II	2-3
Centaurea nigra	Common Knapweed		9			4		5			2	II	2-9
Cerastium fontanum	Common Mouse-ear		1			4	1					II	1-4
Cynosurus cristatus	Crested Dog's-tail			4			6	5				II	4-6
Holcus mollis	Creeping Soft-grass	9	5		8							II	5-9
Lathyrus pratensis	Meadow Vetchling				3				4	6	2	II	2-6
Phleum pratense	Timothy					5			3		5	II	3-5
Potentilla reptans	Creeping Cinquefoil		8		5			6			4	II	4-8
Vicia hirsuta	Hairy Tare		3		2						1	III	1-3
Alopecurus pratensis	Meadow Foxtail				4			2				I	2-4
Anthoxanthum odoratum	Sweet Vernal-grass			5								I	5
Armoracia rusticana	Horse-radish									7		I	7
Calystegia sepium	Hedge Bindweed	5			4							I	4-5
Carex hirta	Hairy Sedge								6		3	I	3-6
Elytrigia repens	Common Couch	2										I	2
Equisetum arvense	Field Horsetail									3		I	3
Galium aparine	Cleavers	3			1							I	1-3
Kinbergia praelonga	Common Feather-moss			2			3					I	2-3

LATIN NAME	COMMON NAME	1 SP181978200 7	2 SP182218200 4	3 SP181768195 9	4 SP181738192 7	5 SP182088189 4	6 SP182088188 3	7 SP181908181 5	8 SP182028179 9	9 SP181988179 2	10 SP182068171 9	FREQ.	RANGE
Lotus pedunculatus	Greater Bird's-foot-trefoil										4	I	4
Poa pratensis	Smooth Meadow-grass		1									I	1
Poa trivialis	Rough Meadow-grass	1										I	1
Prunus spinosa	Blackthorn		2		2							I	2
Rubus fruiticosus agg	Bramble	4	3									I	3-4
Rumex crispus	Curled Dock							6				I	6
Rumex obtusifolius	Broad-leaved Dock	5					5					I	5
Sanguisorba officinalis	Great Burnet								5			I	5
Urtica dioica	Common Nettle		2		3							I	2-3

MATCH COEFFICIENTS (%)

MG1a	68.3
MG1	65.3
MG1c	63.8
MG9b	62.9
MG1b	60.0

APPENDIX

Table 7.2 Area B NVC Floristic Table.

LATIN NAME	COMMON NAME	1 SP1846081791	2 SP1844881789	3 SP1841381799	4 SP1838081804	5 SP1833281809	FREQ.	RANGE
Agrostis capillaris	Common Bent	8	6	5	6	5	V	5-8
Dactylis glomerata	Cock's-foot	5	5	4	4	3	V	3-5
Festuca rubra	Red Fescue	9	9	9	9	8	V	8-9
Hypochaeris radicata	Cat's-ear	6	6	5	6	2	V	2-6
Rumex acetosa subsp. *acetosa*	Common Sorrel	6	6	6	5	5	V	5-6
Holcus lanatus	Yorkshire-fog	5		5	3	2	IV	2-5
Leontodon autumnalis	Autumn Hawkbit	7	4	4	4		IV	4-7
Plantago lanceolata	Ribwort Plantain	3	5	5		1	IV	1-5
Ranunculus acris	Meadow Buttercup	6	4		3	4	IV	3-6
Taraxacum officinale agg.	Dandelion	5	5		2	1	IV	1-5
Tragopogon pratensis	Goat's-beard	2	3		2	2	IV	2-3
Trifolium pratense	Red Clover	5		5	3	2	IV	2-5
Trifolium repens	White Clover	8	5	2	3		IV	2-8
Cerastium fontanum	Common Mouse-ear	2	3		2		III	2-3
Cynosurus cristatus	Crested Dog's-tail			4	3	2	III	2-4
Lolium perenne	Perennial Rye-grass			2	2	3	III	2-3
Convolvulus arvensis	Field Bindweed		3	4			II	3-4
Anthoxanthum odoratum	Sweet Vernal-grass			4			I	4

LATIN NAME	COMMON NAME	1	2	3	4	5	FREQ.	RANGE
		SP1846081791	SP1844881789	SP1841381799	SP1838081804	SP1833281809		
Arrhenatherum elatius	False Oat-grass				3		I	3
Brachythecium rutabulum	Rough-stalked Feather-moss		2				I	2
Galium mollugo	Hedge Bedstraw		4				I	4
Heracleum sphondylium	Hogweed					2	I	2
Lotus corniculatus	Common Bird's-foot-trefoil					8	I	8
Vicia cracca	Tufted Vetch					1	I	1

MATCH COEFFICIENTS (%)

MG6b	63.5
MG6	62.1
MG6a	59.5
MG5	58.0
MG5a	57.9

APPENDIX

Table 7.3 Area C NVC Floristic Table.

LATIN NAME	COMMON NAME	1	2	3	4	5	FREQ.	RANGE
		SP1846081791	SP1844881789	SP1841381799	SP1838081804	SP1833281809		
Lolium perenne	Perennial Rye-grass	3	8	8	9	9	V	3-9
Taraxacum officinale agg.	Dandelion	7	3	5	6	6	V	3-7
Agrostis capillaris	Common Bent	4		2	4	2	IV	2-4
Bromus hordeaceus subsp. *hordeaceus*	Common Soft-brome	3		3	3	3	IV	3
Holcus lanatus	Yorkshire-fog	5	5	6	3		IV	3-6
Ranunculus repens	Creeping Buttercup	8	3	8	6		IV	3-8
Trifolium repens	White Clover		8	4	5	7	IV	4-8
Arrhenatherum elatius	False Oat-grass	6		4			II	4-6
Fraxinus excelsior	Ash				1	1	II	1
Phleum pratense	Timothy			3	6		II	3-6
Plantago major	Greater Plantain	3	2				II	2-3
Trifolium dubium	Lesser Trefoil		6			5	II	5-6
Crepis capillaris	Smooth Hawk's-beard			2			I	2
Cynosurus cristatus	Crested Dog's-tail					2	I	2
Hypochaeris radicata	Cat's-ear	1					I	1
Leontodon autumnalis	Autumn Hawkbit	2					I	2
Ranunculus acris	Meadow Buttercup			2			I	2

LATIN NAME	COMMON NAME	1	2	3	4	5	FREQ.	RANGE
		SP1846081791	SP1844881789	SP1841381799	SP1838081804	SP1833281809		
Rumex crispus	Curled Dock				1		I	1
Rumex obtusifolius	Broad-leaved Dock	2					I	2
Senecio jacobaea	Common Ragwort			2			I	2
Veronica serpyllifolia	Thyme-leaved Speedwell	2					I	2
Lolium perenne	Perennial Rye-grass	3	8	8	9	9	V	3-9
Taraxacum officinale agg.	Dandelion	7	3	5	6	6	V	3-7
Agrostis capillaris	Common Bent	4		2	4	2	IV	2-4

MATCH COEFFICIENTS (%)

MG7e	56.1
MG7b	54.3
MG7f	51.7
MG7a	51.6
MG6a	50.7

APPENDIX

B PHOTOGRAPHS

Photograph 1 – Area A closely mown grassland

Photograph 2 – Patches of vegetation in Area A missed by mower

APPENDIX

Photograph 3 – Area B grassland

Photograph 4 – Land to the north of Area B

Photograph 5 – Area C grassland

N

A
MG1a

B
MG6b

C
MG7e

Key

NVC Survey Area 2017

Habitats

- Amenity Grassland
- (A)rable/(I)mproved Grassland
- Bare Ground
- Broad-leaved Plantation Woodland
- Broad-leaved Semi-natural Woodland
- Coniferious Plantation Woodland
- Dense Scrub
- Marshy Grassland
- Mixed Semi-natural Woodland
- Semi-improved Grassland
- Standing Water
- Unimproved Neutral Grassland
- Site of Special Scientific Interest
- Fenc e
- Species Poor Defunct Hedge
- Species Poor Hedge and Trees
- Species Poor Intact Hedge
- Watercourse
- Scrub
- Tree

Version	Amendment	Drawing Date	Review Date	Approved Date
A	First Issue	02/08/17 JR	02/08/17 LE	02/08/17 AB

Client: Highways England

Project: M42 J6 Improvement Scheme

Drawing Title: NVC Survey Map

Scale (at A3 size): 1:3,924

Purpose of Issue: Information

Office: Blackfriars

Tel: 020 7822 2497

Drawing Number: Page 1 of 1

APPENDIX 8A Wildlife Legislation and Planning Policy

Table 8A.1 Summary of relevant legislation

Statute	Relevant legal requirements
The Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations)	The Regulations require the compilation and maintenance of a register of European sites, to include Special Area Conservation (SACs) and Special Protection Areas (SPAs) classified under Council Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive). When considering potentially damaging operations, the precautionary principle applies i.e. consent for the operations cannot be given unless it is demonstrated that there will be no adverse effect on the integrity of the European site. Affords protection to European Protected Species, e.g. bats and great crested newt, listed on Schedule 2. It is an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in listed animals. In certain circumstances, licences can be granted to permit some actions prohibited under the Act. Regulation 9A of the Conservation of Habitats and Species (Amendment) 2012 Regulations requires that competent authorities must take such steps in the exercise of their functions as they consider appropriate to secure the preservation, maintenance and re-establishment of a sufficient diversity and area of habitat for wild birds … as appropriate, and having regard to the requirements of Article 2 of the Wild Birds Directive. This includes the use of planning and development control measures (Defra and Welsh Government, 2016, see also Table 8A.2).
Wildlife and Countryside Act 1981 (as amended) (WCA)	Part 1 of the Act affords general protection to all species of wild bird, and specific protection to flora and fauna listed on Schedules 1 (birds protected by special penalties), 5 (other animals), and 8 (flora, fungi and lichens). It is an offence (subject to exceptions) to: • kill, injure, or take any wild bird; • take, damage or destroy the nest of any wild bird while that nest is in use or being built; • take or destroy an egg of any wild bird;

Statute	Relevant legal requirements
	• disturb any wild bird listed on Schedule 1of the Act while it disturb the dependent young of such a bird (e.g. quail); and • kill, injure or take any wild animal listed on Schedule 5 (e.g. bats, great crested newt, common lizard); • damage, destroy or obstruct places used for shelter or protection by wild animals listed on Schedule 5 and covered by Part 4a of the Act (e.g. bats and great crested newt); • intentionally disturb wild animals listed in Schedule 5, and covered by Part 4a of the Act, that are occupying places of shelter and protection (e.g. bats and great crested newt); • pick, uproot or destroy any plant, fungi or lichen listed on Schedule 8. In certain circumstances, licences can be granted to permit some actions prohibited under the Act. Schedule 9 provides lists of non-native flora and fauna that it is an offence to release or cause to spread in the wild. Of primary relevance in the context of proposed developments are flora e.g. invasive non-native plant species. Part 2 of Act detail the law regarding SSSIs and other protected areas within Great Britain.
Countryside & Rights of Way (CRoW) Act 2000	Schedule 9 of the Act amends SSSI provisions of the Wildlife and Countryside Act 1981, including increased powers for their protection and management of SSSIs. These strengthened provisions extend powers for entering into management agreements; place a duty on public bodies to further the conservation and enhancement of SSSIs; increases penalties on conviction where the provisions are breached; and introduce a new offence whereby third parties can be convicted for damaging SSSIs. Schedule 12 of the Act amends the species provisions of the Wildlife and Countryside Act 1981, strengthening the legal protection for threatened species. The provisions make certain offences 'arrestable', and created a new offence of reckless disturbance.
Natural Environment and Rural Communities (NERC) Act 2006	The Act places a duty on Government Departments and public authorities to have regard for the conservation of biodiversity. Section 41 (s41) includes a list of habitats and species to be used by decision-

Statute	Relevant legal requirements
	makers, including local authorities, to guide the implementation of their duties under section 40 of the Act to have regard to the conservation of biodiversity in England, when carrying out their normal functions.
Protection of Badgers Act 1992	Makes it an offence to kill or take a badger, to cruelly ill-treat a badger, or to interfere with a badger sett, including disturbing a badger while it is occupying a sett. In certain circumstances, licences can be granted to permit some actions prohibited under the Act.
The Hedgerow Regulations 1997	Does not apply to acts of hedgerow removal covered by the process for granting planning permission. However, it retains value as part of the process for determining the relative value of specific hedgerows/ hedgerow networks and requirements for appropriate mitigation.
Salmon & Freshwater Fisheries Act 1975	This Act contains provisions relating to: • prohibition of certain methods for taking or destroying fish; • obstructions to the passage of fish in watercourses.
Animal Welfare Act 2006	The Act contains the general laws relating to animal welfare. It is an offence to cause unnecessary suffering to any animal. The Act makes owners and keepers (including landowners) responsible for ensuring that the welfare of animals within their control is met.

Table 8A.2 Summary of relevant national and local planning policy and associated guidance

Document	Relevant policies	Purpose
National Planning Policy Framework (NPPF)	Section 11	The NPPF states the commitment of the UK Government to minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity. It specifies the obligations that the Local Authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation and how this it to be delivered in the planning system. Protected or notable habitats and species can be a material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development, or if development is permitted, mitigation measures may be required to avoid or minimise impacts on certain habitats and species, or where impact is unavoidable, compensation may be required.
Natural	Protected	Guidance has been published covering protected sites, habitats and

Document	Relevant policies	Purpose
England and Defra Standing Advice	sites and species	species. This includes guidance on providing and protecting wild bird habitats to address legal requirements set out in the Habitats Regulations. The purpose of standing advice is to guide decision-makers on the determination of proposals with potential to affect protected sites, habitats and species. The guidance sets out responsibilities and minimum requirements for survey and mitigation, including the need to consider objectives for no net loss and provision of net gain. Where impacts cannot be avoided, then planning applications should be determined with regard to ensuring: • no more habitat is lost than is replaced (no net loss); • as a minimum like-for-like habitat replacements; • consideration of options to secure better alternative habitat in terms of quality or area, compared to what will be lost.
Solihull Local Plan: Shaping a Sustainable future (adopted December 2013)	P10 – Natural Environment	The Council recognises the importance of a healthy natural environment in its own right, and for the economic and social benefits it provides to the Borough. The full value and benefits of the natural environment will be taken into account in considering all development proposals, including the contribution to the green economy and the health of residents, and the potential for reducing the impacts of climate change. Joint working with neighbouring authorities will be supported, recognising the need for a landscape scale approach to the natural environment and conservation of biodiversity. The Council will seek to protect, enhance and restore the diverse landscape features of the Borough and to create new woodlands and other characteristic habitats, so as to halt and where possible reverse the degrading of the Arden landscape and promote local distinctiveness. Development should take full account of national and local guidance on protecting and restoring the landscape and the areas in need of enhancement, including guidance relating to the countryside. Developers will be expected to incorporate measures to protect, enhance and restore the landscape, unless it is demonstrated that it is not feasible, disproportionate or unnecessary. The Council will seek to conserve, enhance and restore biodiversity and geodiversity, to create new native woodlands and other habitats

Document	Relevant policies	Purpose
		and to protect, restore and enhance ancient woodland and green infrastructure assets across the Borough. Protection of ancient woodland, designated sites and priority habitats shall include the establishment of buffers to any new development. Development should be informed by the latest information on habitats and species, and take full account of national and local guidance on conserving biodiversity, opportunities for biodiversity enhancement and for improving and restoring the Borough's green infrastructure. When appropriate, development should seek to enhance accessibility to the natural environment, especially for disabled people. The Council will protect areas of national and local importance for biodiversity and geodiversity, where it is reasonable, proportionate and feasible to do so. Development likely to have an adverse effect on a Site of Special Scientific Interest, whether directly or indirectly, will be subject to special scrutiny and will be permitted only if the reasons for the development clearly outweigh the nature conservation value of the site and the national policy to safeguard such sites. Where development may have an adverse effect on a Site of Special Scientific Interest, developers will be expected to incorporate measures to enhance the condition of the site, unless it is demonstrated that it is not feasible. Development likely to have an adverse effect on a Local Nature Reserve or a Local Wildlife or Geological Site will be permitted only if the reasons for the development clearly outweigh the nature conservation or geological value of the site and its contribution to wider biodiversity objectives. Where development would have an adverse effect on a site of local value, developers will be expected to incorporate measures to enhance the site or to restore the links between sites in accordance with the Green Infrastructure study, unless it is demonstrated that it is not feasible. Outside designated sites, developers will be expected to take full account of the nature conservation or geological value, and the existence of any habitats or species included in the Local Biodiversity Action Plan, or sites in the Local Geological Action Plan. Developers will be required to undertake a full ecological survey and to deliver a

Document	Relevant policies	Purpose
		net gain or enhancement to biodiversity, unless it is demonstrated that it is not appropriate or feasible. In considering the need for green space improvements associated with new development, developers should have regard for the standards and priorities in the Green Spaces Strategy in relation to accessible natural green space. Where development is likely to have significant harmful effects on the natural environment, as a result of the development itself, or the cumulative impact of developments, developers must demonstrate that all possible alternatives that would result in less harm have been considered. Where development is permitted, appropriate mitigation of the impacts and compensation where relevant will be required to deliver a net gain in biodiversity, habitat creation, landscape character and local distinctiveness. Enhancements should be undertaken either on the site, or in its vicinity, but where it is demonstrated that this is not possible, offsetting in alternative strategic locations within the biodiversity or green infrastructure network, to deliver biodiversity or other objectives may be considered. Where appropriate, developers should demonstrate compliance with this policy through an ecological statement or by relevant information in the West Midlands Sustainability Checklist.
Nature Conservation Strategy 'Nature Conservation in Solihull'	Strategy 3.4 Impact of Development	Sets out the strategic objectives for biodiversity conservation and provides guidance on how the authority expects nature conservation to be taken into account in the development control process.
Warwickshire, Coventry and Solihull Local Biodiversity Action Plan		Contains 54 actions plans for locally important species and habitats comprising 28 Species and 24 Habitat Action Plans. The following plans are relevant to the proposed scheme: woodland, neutral grassland, arable field margins, ponds, rivers and streams.
Highways England BAP	Action 3.2	As part of normal delivery, network improvement projects will mitigate and compensate their biodiversity impacts in order achieve no net loss of biodiversity, as far as the projects are reasonably able. In addition,

Document	Relevant policies	Purpose
		projects will identify biodiversity opportunities and deliver actions that will achieve net biodiversity gain, wherever possible. The identification of such opportunities should be included within the Environmental Assessment Report. If no such opportunities are found then a clear statement explaining why should be provided instead.

APPENDIX 13.1 - SITE PHOTOGRAPHS

Photo 1- Hollywell Brook flowing east from Pendigo Lake

Photo 2- Additional outfall in Hollywell Brook assumed to be from the surrounding car parks.

Photo 3- Hollywell Brook culvert inlet west of the M42.

Photo 4- Hollywell Brook culvert outlet east of the M42.

Photo 5 - Shadow Brook close to its source as shown on OS mapping. The channel was dry with large amounts of leaf litter.

Photo 6- Shadow Brook at the culvert (1m x 1m) crossing with Shadow Lane.

Photo 7 - Tributary of Shadow Brook, close to its source according to OS mapping. The channel was dry and overgrown.

Photo 7- Shadow Brook flowing east and beneath the M42. The channel is very overgrown and the culvert opening is not visible.

Photo 8- Pendigo Lake Tributary, culvert outlet from beneath the A45.

Photo 9- Pendigo Lake Tributary culvert outlet from beneath the A45 (on the left), unknown outlet located to the right.