highways england

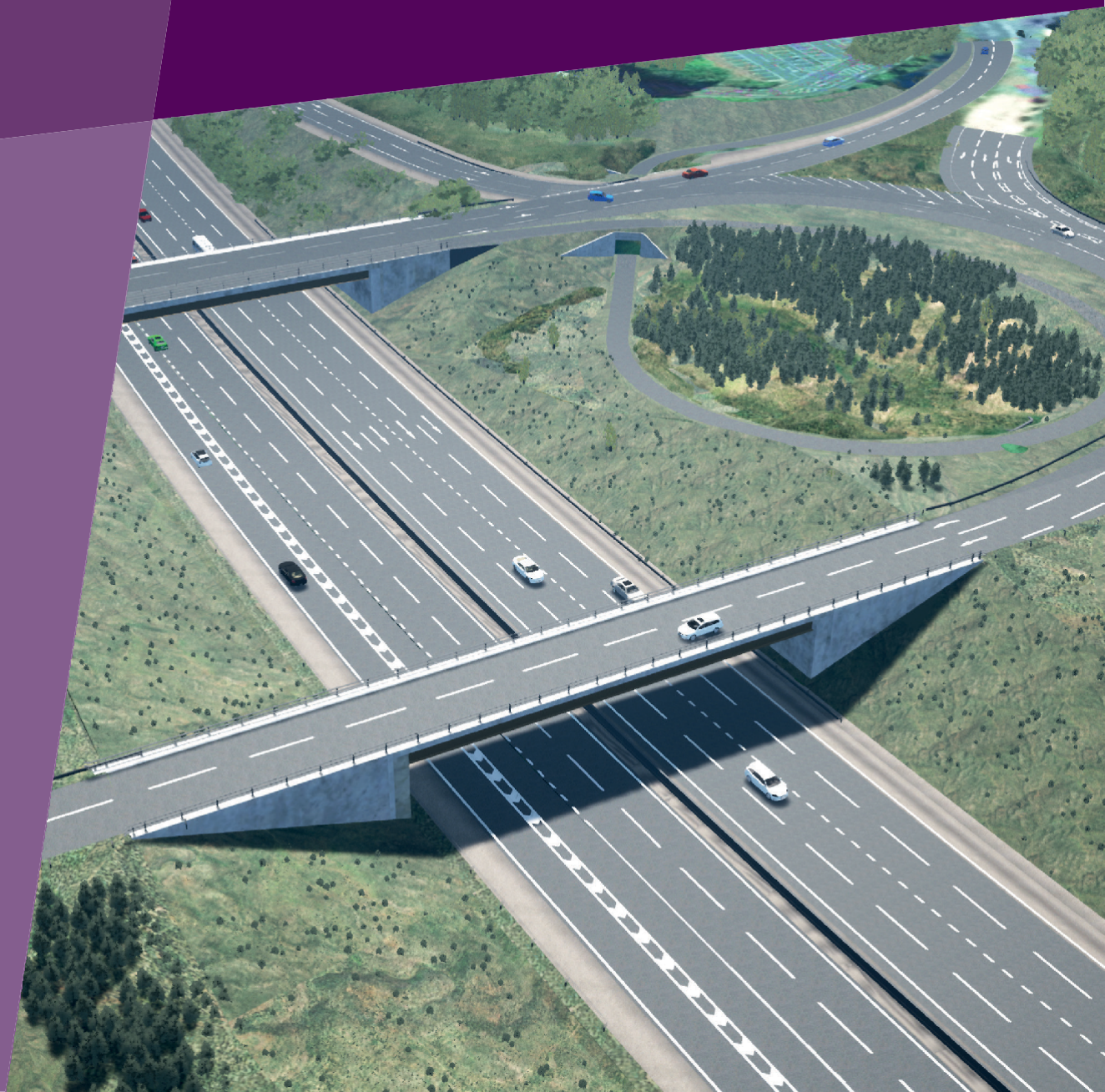
M3

junction 9 improvement scheme

Preliminary Environmental Information Report

Appendix 8.2 – Baseline Reports (Part 2 of 5)

May 2021



Habitat type	Parcel Code	Photograph number	Notes
Amenity grassland	AM4		Managed grassland adjacent to residential area.
Amenity grassland with tall ruderal vegetation	AM/TR1		2-4m wide verge vegetated with mixture of managed amenity grassland that grade into tall ruderal vegetation.

Habitat type	Parcel Code	Photograph number	Notes
Introduced shrub	IS1		Landscaped area within Tesco's car park.
	IS2		Area of verge dominated by Wilson's honeysuckle.

Habitat type	Parcel Code	Photograph number	Notes
Species rich hedgerow	RH1		Managed hedgerow adjacent to Easton Lane, approximately 1.5m x 1.5m width, height (w, h).
Species rich hedgerow	RH2		Managed hedge adjacent to residential property, approximately 1m x 2m (w, h).

Habitat type	Parcel Code	Photograph number	Notes
Species rich hedgerow	RH3		Hedge approximately 1.5m x 3m (w, h).
Intact species poor hedgerow	PH3		Flailed hedge approximately 3m x 4m (w, h).

Habitat type	Parcel Code	Photograph number	Notes
Intact species poor hedgerow	PH4		Flailed hedge approximately 1.5m x 1.5m (w, h).
Intact species poor hedgerow	PH5		Flailed hedge approximately 1.5m x 1.5m (w, h).

Habitat type	Parcel Code	Photograph number	Notes
Intact species poor hedgerow	PH7		Managed roadside hedge approximately 2m x 1.5m (w, h).
Intact species poor hedgerow	PH8	As PH7	Managed roadside hedge approximately 2m x 1.5m (w, h).
Intact species poor hedgerow	PH9	As PH7	Managed roadside hedge approximately 2m x 1.5m (w, h).

Habitat type	Parcel Code	Photograph number	Notes
Intact species poor hedgerow	PH10		Young planted hedge adjacent to foot path approximately 1m x 1.5m (w, h).
Species rich hedgerow with trees	RHT1		Heavily flailed hedgerow with small number of *Acer sp*. trees approximately 1m x 1m (w, h).

Habitat type	Parcel Code	Photograph number	Notes
Species rich hedgerow with trees	RHT2		As RHT1 but not recently flailed. approximately 1.5m x 4.5m.
Species rich hedgerow with trees	RHT3		Managed hedge, approximately 1.5m x 2m (w, h). Adjacent to Easton Lane with abundant tall ruderal to base.

Habitat type	Parcel Code	Photograph number	Notes
Species rich hedgerow with trees	RHT4		Mature hedgerow south of Easton Lane
Species rich hedgerow with trees	RHT5		Dense mature hedgerow approximately 3m x 4m (w, h) with some mature trees present.

Habitat type	Parcel Code	Photograph number	Notes
Species poor hedgerow with trees	PHT1		Tall, narrow hedgerow close Junction 9 and likely planted when the road was constructed.
Species poor hedgerow with trees	PHT2		Established hedgerow either side of the footpath. Includes some mature trees and relatively diverse ground flora.

Habitat type	Parcel Code	Photograph number	Notes
Species poor hedgerow with trees	PHT3	As PHT2	Established hedgerow either side of footpath. Includes some mature trees and relatively diverse ground flora.
Species poor hedgerow with trees	PHT4		Wide hedge (approximately 3m x 3m) over a ditch that contains a small amount of water.

Habitat type	Parcel Code	Photograph number	Notes
Species poor hedgerow with trees	PHT5		Established hedgerow with mature trees along the A34. approximately 3m x 4m (w, h)

Habitat type	Parcel Code	Photograph number	Notes
Species poor hedgerow with trees	PHT6		Sparse hedgerow approximately 1m x 2m (w, h), likely replanted fairly recently. Occasional semi-mature trees.
Species poor hedgerow with trees	PHT7		Sparse hedge with many gaps. Some new infill planting present. Occasional semi mature trees.

Habitat type	Parcel Code	Photograph number	Notes
Bare ground	BG1		Yard used by *R&W* contractors for storage and or processing of aggregates/ building materials.
Bare ground	BG2		Recently disturbed ground likely a result of works too adjacent SW3.

Appendix C

HABITAT SPECIES LISTS

N.B. Tables in this Appendix utilise the DAFOR scale to indicatively asses the relative abundance of plant species recorded within surveyed habitats, as follows: D: Dominant; A: Abundant; F: Frequent, O: Occasional; AND R: Rare. Additionally, the prefix 'L' was used where a species had a markedly local distribution within a habitat parcel.

SEMI NATURAL BROADLEAVED WOODLAND AND SEMI-NATURAL MIXED WOODLAND

Latin name	Common name	BW1	BW2	BW3	BW4	BW5	BW6	BW7	BW8	BW9	BW10	BW11	BW12	BW13	BW14	BW15	BW16	BW17	BW18	BW19	MW1	SBW1	SBW2
Acer campestre	Field maple								O	O							O				O		
Aesculus hippocastanum	Horse chestnut						O	O															
Acer psuedoplantanus	Sycamore		LD			O	F	O			D		A		A	D							
Aegopodium podagraria	Ground elder						LA									LA							
Alnus glutinosa	Alder		A			D	LA	D		LD		A											
Arum maculatum	Lords and ladies		A							O	F		F	F		R							
Asplenium scolopendrium	Hart's tongue fern						R					O		R									
Betula spp.	Birch									R													
Brachypodium pinnatum	False brome													O									
Buddleia davidii	Butterfly bush						R			O													
Cephalanthera damasonium	White helleborine									O													
Carex sp.	Sedge	O			A			LD				LA											
Conium maculatum	Hemlock								O			O											
Cornus spp.	Dogwood									O	R										O		
Corylus avellana	Hazel		F	D	O		R		O												LD		
Crataegus monogyna	Hawthorn		F		O									R	A		O						
Dryopteris filix-mas	Male fern														R								
Euonymus europaea	Spindle											O											
Fagus sylvatica	Beech							R		O				A	F								D
Ficaria verna	Lesser celendine			O																			
Filipendula ulmaria	Meadowsweet	O																					
Fraxinus exelsior	Ash					R			R	O		O				F							
Hedera helix	Ivy		D	D				F	F	LD	D		LD	A	O	A	D						D
Iris foetidissima	Stinking iris													R									
Iris pseudacorus	Yellow flag iris						R					O											
Lonicera nitida	Wilson's Honeysuckle						R						LD										
Mercurialis perennis	Dog's mercury											R											
Neottia ovata	Common twayblade														R								
Phalaris arundinacea	Reed canary grass	D					LA	LD															
Polplar sp.	Poplar species					R	LD	O	O				F										
Phragmites australis	Common reed																						
Prunus laurocerasus	Laurel					R	R							R									
Rubus fruticosus agg.	Bramble										R	A	A	R			F					D	
Salix	Willow			O	A			LA	F		R											D	
Salix alba	White willow											LD											
Salix fragilis	Crack willow	D																					

Latin name	Common name	BW1	BW2	BW3	BW4	BW5	BW6	BW7	BW8	BW9	BW10	BW11	BW12	BW13	BW14	BW15	BW16	BW17	BW18	BW19	MW1	SBW1	SBW2
Symphoricarpos albus	Snowberry											LD	LD			LA							
Taxus baccata	Yew													D							LD		
Ulmus sp.	Elm					O				LA		R											
Urtica dioica	Nettle	O		O	LA				F		F	LA	A			LA					LF		
Vinca minor	Periwinkle											LD											

PLANTATION BROADLEAVED WOODLAND

Latin name	Common name	PBW 1	PBW 2	PBW 4	PBW 5	PBW8	PBW 9	PBW 10	PBW 11	PBW 12	PBW 14	PBW 15	PBW 16	PBW 17	PBW 18	PBW 19	PBW 20	PBW 21	PBW 22	PBW 23	PBW 24	PBW 25	PBW 26
Acer campestre	Field maple	LA		O		O				F	A		F		A	F	A	D	D	F		LD	A
Acer psuedoplatanus	Sycamore									F			R			F							
Acer sp.	Maple species																					LD	
Aesculus hippocastanum	Horse chestnut																				D		
Anthriscus sylvestris	Cow parsley							A	A														
Arum maculatum	Lords and ladies				O					A											F		
Buddleia davidii	Butterfly bush	R					LA																
Carpinus betula	Hornbeam						LD														A		
Clematis vitalba	Traveller's joy			O														F					
Cornus spp.	Dogwood	O	LA				O				R	LF	R	LA						D		LA	
Corylus avellana	Hazel	A	F		A												O	R					
Crataegus monogyna	Hawthorn			O			O				A	D		A	A		O					O	O
Euonymus europaea	Spindle				O							A			A								
Eupatorium cannabinum	Hemp agrimony																O						
Fagus sylvatica	Beech		O				O	D	D												LA		
Fraxinus exelsior	Ash					D								A		O						LD	
Hedera helix	Ivy			D						O		LD					LD	LD	D			LD	
Ligustrum sp.	Privet species												F	F		O			A		O		
Ligustum ovalifolium	Garden privet											F										O	
Narcissus sp.	Daffodil				O																		
Prunus sp.	Cherry		O		O																		
Prunus spinosa	Blackthorn	O																					O
Rosa spp.	Rose																					O	
Rubus fruticosus agg.	Bramble												O					O	F				
Sambucus nigra	Elder									F													
Taxus baccata	Yew																				R		
Tilia platyphyllos	Lime			F																			
Ulmus sp.	Elm											O											
Urtica dioica	Nettle			R																	O		
Ficaria verna	Lesser celendine							F	F	O													
Sorbus aucuparia	Rowan																	O				O	
Quercus ilex	Holly oak																				R		

MIXED PLANTATION WOODLAND

Latin name	Common name	PMW1	PMW2	PMW3	PMW4	PMW5	PMW6	PMW/ SI 1
Acer campestre	Field maple	A		O			A	
Acer psuedoplantanus	Sycamore	A						O
Acer sp.	Maple species			LD				
Arum maculatum	Lords and ladies	O		R	O		O	
Asplenium scolopendrium	Hart's tongue fern			R			F	
Betula spp.	Birch	O						
Brachypodium sylvaticum	False brome			R				
Crataegus monogyna	Hawthorn		F					
Cupressaceae sp.	Cypress/ cedar species	LA	LD	LD		D		
Dactylis glomerata	Cock's foot							D
Dipsacus fullonum	Common teasel							O
Euonymus europaea	Spindle				F	F		
Fagus sylvatica	beech		A	F			O	
Helminthotheca echioides	Bristly ox-tongue							O
Fraxinus exelsior	Ash			O				
Hedera helix	Ivy			D	LD		D	
Ilex aquifolium	Holly			O				
Larix sp.	Larch				R			
Ligustum vulgare	Wild privet				O			
Rosa spp.	Rose				O			
Rubus fruticosus agg.	Bramble	F						
Salix sp.	Willow species						R	
Sambucus nigra	Elder					A		
Taxus baccata	Yew			R			D	O
Urtica dioica	Nettle	LD				F		A

DENSE SCRUB

Latin name	Common name	DS1	DS3	DS4	DS5	DS6	DS7	DS8	DS9	DS12		DS14	DS15	DS16
Acer campestre	Field maple									R	O			
Acer psuedoplantanus	Sycamore											O	O	O
Buddleia davidii	Butterfly bush								O					
Clematis vitalba	Traveller's joy			F				F		O				
Cornus spp.	Dogwood	D				D	D			A			A	A
Corylus avellana	Hazel		LD						O					
Crataegus monogyna	Hawthorn		LD	D						LD	A	R	F	F
Eupatorium cannabinum	Hemp agrimony									O				
Fraxinus exelsior	Ash		R								O	D	A	A
Hedera helix	Ivy									LD	O			
Ligustrum sp.	Privet species			R		LA	LA		F				O	O
Rosa spp.	Rose									O	O			
Rubus fruticosus agg.	Bramble				D			D	F					
Sambucus nigra	Elder			O	R									
Ulex europeaus	Gorse												R	R
Urtica dioica	Nettle				O							O		
Viburnum lantana	Wayfaring tree								A		R			

SCATTERED SCRUB AND SCATTERED BROADLEAVED TREES

Latin Name	Common Name	SS1	SS2	SBW1	SBW2	SBW/AM1
Acer campestre	Field maple		O			
Clematis vitalba	Traveller's joy		O			
Crataegus monogyna	Hawthorn		O			
Fagus sylvatica	Beech					D
Festuca rubra	Red fescue				D	A
Fraxinus exelsior	Ash		O			
Hedera helix	Ivy	D	D		D	
Holcus lanatus	Yorkshire fog					A
Hypericum perforatum	Perforate St John's-wort		O			
Leucanthemum vulgare	Ox-eye daisy		O			
Rosa sp.	Rose species		O			
Prunus spinosa	Balckthorn		O			
Salix spp.	Willow species			D		
Crataegus monogyna	Hawthorn	O				
Rubus fruticosus agg.	Bramble	F		D		

SEMI-IMPROVED CALCAREOUS GRASSLAND

Latin name	Common name	SCG1/SS	SCG2/SS	SCG3/SS	SCG4/SS	SCG5/SS	SCG7/SS	SCG8/SS	SCG9/SS	SCG10	SCG11	SCG12	SCG13	SCG14	SCG15	SCG16
Achillea millefolium	Yarrow				O	O		O	O		O	O	O	O		
Arrhenatherum elatius	False oat-grass										A	A	A	A		
Blackstonia perfoliata	Yellow-wort			R	R	R										
Brachypodium pinnatum	False brome			O	O	O	R	R	A	O	F	F	F	F		
Bromus hordeaceus	Soft brome				O	O									O	O
Bromus sterilis	Barren brome						O	LA	F		O	O				
Bryophyta	Mosses			A												
Centaurea nigra	Knapweed				R	R		R	R				R	R		
Clematis vitalba	Traveller's joy	O	O	D	F	F			A				F	F		
Cochlearia danica	Danish scurvy grass						O	LA	O		O	O				
Crataegus monogyna	Hawthorn			O	O	LA		F	O							
Dactylis glomerata	Cock's foot	O	O	O	LA	O							F	F	A	A
Daucus carota	Wild carrot			R	R	R	O		O				O	O		
Eupatorium cannabinum	Hemp agrimony	F	F	F	O	O			F				F	F		
Festuca rubra	Red fescue	A	A	O	O	O	O	O		O	A	A	O	O	A	A
Fumaria sp	Fumitory species	R	R													
Galium mullugo	Hedge bedstraw						F	F								
Glechoma hederacea	Ground ivy	R	R													
Hedera helix	Ivy				LA	LA	LA	LA					R	R		
Holcus lanatus	Yorkshire fog	O	O	O		O										
Hypericum perforatum	Perforate St John's-wort	O	O	O	R	R	F	F	F	O	O	O	F	F		
Lathrys pratensis	Meadow vetchling	R	R										O	O		
Leucanthemum vulgare	Ox-eye daisy	O	O	LA		O	F	F	O	F	O	O	O	O		
Ligustrum vulgare	Wild privet	O	O													
Linaria vulgaris	Common toadflax	F	F	R	O	R					O	O	O	O		
Linum cartharticum	Fairy flax															O
Lolium perenne	Perrenial rye-grass															F
Origanum vulgare	Wild marjoram													O	O	
Medicago lupulina	Black medick	O	O	R						O			O	O	F	F
Mentha sp.	Mint species			R												
Myosotis sp.	Forget-me-not species	O	O							O						
Plantago lanceolata	Ribwort plantain	O	O		O				F	F	O	O	O	O		
Poa pratensis	Smooth meadow-grass			R			O	O								
Poa trivalis	Rough meadow-grass			O												
Primula veris	Cowslip				R	R										
Ranunculus bulbosus	Bulbous buttercup							R	R	O						
Reseda lutea	Wild mignonette			R						O						
Rubus fruticosus agg.	Bramble	O	O	O	O		F	F	F							
Senecio jacobaea	Ragwort					R			O							
Senecio erucifolius	Hoary ragwort														O	O
Silene vulgaris	Bladder campion							R			O	O				
Tragopogon pratensis	Goat's beard			R												
Trifolium dubium	Lesser trefoil			R												
Trifolium pratense	Red clover										R	R				
Verbascum thapsus	Great mullein			R			R			O						
Veronica chamaedrys	Germander speedwell									O						

Latin name	Common name	SCG1/SS	SCG2/SS	SCG3/SS	SCG4/SS	SCG5/SS	SCG7/SS	SCG8/SS	SCG9/SS	SCG10	SCG11	SCG12	SCG13	SCG14	SCG15	SCG16
Vicia cracca	Tufted vetch	O	O	R												
Vicia sativa	Common vetch						R		F							
Vicia sp.	Tare species						R		R							

MARSHY GRASSLAND

Latin name	Common name	MG1	MG2	MGG3	MG5	MG6	MG7	MG8	MG9	MG10	MG11	MG12	MG13	MG14	MG15	MG17	MG18
Achillea millefolium`	Yarrow															O	O
Alopecurus pratensis	Meadow foxtail															A	A
Agrostis stolonifera	Creeping bent																
Angelica sylvestris	Wild angelica	R													O	R	R
Caltha palustris	Marsh marigold						O	O		O	O	O	O				
Carex spp.	Sedges	A	F	F	A	A	F	A		A	F	F	F	LA		O	O
Cirsium arvense	Marsh thistle				O		R	R		R	R	R	R				
Digitalis purpurea	Foxglove														O		
Festuca rubra	Red fescue					F		F		F							
Ficaria verna	Lesser celendine	R															
Filipendula ulmaria	Meadowsweet	O			R	F	A	A	F	A	A	A	A	F		O	O
Galium aparine	Cleavers														O		
Galium palustre	Marsh bedstraw						O	O		O	O	O	O				
Geum rivale	Water avens					R		R		R							
Glyceria maxima	Reed sweet-grass													LA	D		
Holcus lanatus	Yorkshire fog		LD	LD		A	O	F	A	F	O	O	O			A	A
Iris psuedacorus	Yellow flag-iris	O			O	R		O		O				LA		A	A
Juncus articulatus	Jointed rush					F	F				F	F	F				
Juncus effusus	Soft rush		LA	LA										LD			
Juncus spp.	rush species					A		A	O	A							
Junucua inflexus	Hard rush		O	O	O											R	R
Lolium perenne	Perennial rye-grass		LD	LD												O	O
Lotus pedunculatus	Greater bird's foot trefoil							R		R							
Mentha aquatia	Water mint															O	O
Phalaris arundinacea	Reed canary grass	A			D	A											
Phragmites australis	Common reed					O	O				O	O	O				
Plantago lanceolata	Ribwort plantain						A	O		O	A	A	A			O	O
Potentilla answerina	Silver weed													O			
Potentilla reptans	Creeping cinquefoil						R				R	R	R				
Pulicaria dysenterica	Common fleabane		O	O	R											O	O
Ranunculus acris	Meadow buttercup						O				O	O	O				
Ranunculus repens	Creeping buttercup					O	F				F	F	F			O	O
Rumex acetosa	Common sorrel		O	O		R			A								
Rumex sp.	Dock species							O		O				O			
Salix sp.	Willow				O	O		O		O				F			
Senecio aquaticus	Marsh ragwort							F		F							
Trifolium pratense	Red clover							R		R						O	O
Urtica dioica	*Common nettle*		O	O	O				F					LD		LA	LA
Veronica beccabunga	Brooklime					O											
Veronica chamaedrys	Germander speedwell	R															
Vicia sp.	Vetch species						R				R	R	R				

SPECIES POOR SEMI-IMPROVED GRASSLAND, SEMI-IMPROVED NEUTRAL GRASSLAND AND IMPROVED GRASSLAND

Latin Name	Common Name	SI(P)1	SI(P)2	SI(P)3	SI(P)4	Si(P)5	SI(P)6	SI(P)7	SI(P)8	SI(P)9	SNG1	I1	I2
Achillea millefolium	Yarrow										O		
Anthriscus sylvestris	Cow parsley						LA	O			O		
Alopecurus pratense	Meadow foxtail								O				
Arrhenatherum elatius	False oat-grass					D				A			
Centaurea nigra	Knapweed										R		
Cerastium fontanum	Common mouse-ear				O	A							
Cirsium arvense	Creeping thistle	O											
Dactylis glomerata	Cock's foot	D	O	A	A			F		A	F		
Daucus carota	Wild carrot						F						
Filipendula ulmaria	Meadow sweet											R	R
Festuca rubra	Red fescue	O					F				A	LA	LA
Ficaria verna	Lesser celendine											R	R
Galium aparine	Cleavers									LA			
Geum rivale	Water avens						R						
Geranium molle	Dove's foot crane's bill				R								
Heracleum sphondylium	Hogweed								O	A	R		
Holcus lanatus	Yorkshire fog		A	D	A		A	LA	D		A	A	A
Junucua inflexus	Hard rush		O	O			LA						
Leucanthemum vulgare	Ox-eye daisy										F		
Lolium perenne	Perennial rye-grass		A		A							D	D
Plantago lanceolata	Ribwort plantain			O							O		
Ranunculus bulbosus	Bulbous buttercup										F		
Ranunculus repens	Creeping buttercup	O	F	R			O					O	O
Rumex sp.	Dock species							O	O				
Trifolium repens	White clover				O		O						
Symphytum officinale	Common comfrey										R		
Urtica dioica	Common nettle			R				O	F				

TALL RUDERAL VEGETATION

Latin Name	Common Name	TR1	TR/ SS/ SBW
Acer psuedoplatanus	Sycamore		O
Aegopodium podagraria	Ground elder	A	
Anthriscus sylvestris	Cow parsley		A
Heracleum sphondylium	Hogweed	F	
***Salix* sp.**	Willow species		A
Symphytum officinale	Common comfrey		F
Urtica dioica	Common nettle	A	LD
Rubus fruticosus agg.	Bramble	O	
Chamerion angustifolium	Rosebay willowherb	A	
Phragmites australis	Common reed		F
Conium maculatum	Hemlock		O

SWAMP AND MARGINAL VEGETATION

Latin Name	Common Name	SP1	SP3	SP4	SP5	SP6	SP7		MV1	MV2	MV3
Alnus glutinosa	Alder					O	O				
Angelica sylvestris	Wild angelica			O	O						O
Caltha palustris	Marsh marigold			O	O						O
Cardamine pratensis	Cuckoo flower			R	R						
Carex spp.	Sedge species			O	O		R	O	D		O
Deschampsia cespitosa	Tufted hair-grass			O	O						
Epilobium hirsutum	Greater willowherb							F			
Galium palustre	Marsh bedstraw			R	R						
Impatiens capensis	Orange balsam							R			
Iris pseudacorus	Yellow flag-iris			O	O		O				O
Juncus spp.	Rush species			F	F						
Mentha aquatica	Water mint						R	O			
Phragmites australis	Common reed	D	D	D	D	D	D	A	O	D	D

Latin Name	Common Name	SP1	SP3	SP4	SP5	SP6	SP7		MV1	MV2	MV3
Salix spp.	Willow species					O	R		O	O	
Solanum dulcamara	Bittersweet							F			
Symphytum officinale	Common comfrey							F			
Typha sp.	Bulrush species			R	R						R
Urtica dioica	Common nettle		LA			A	O	F			

AMENITY GRASSLAND AND INTRODUCED SHRUB

Latin Name	Common Name	AM1	AM2	AM3	AM4	IS1	IS2
Bellis perennis	Common daisy						
Buxus sempervirens	Box					O	
Centaurea nigra	Knapweed		R				
Dactylis glomerata	Cock's foot		LA				
Daucus carota	Wild carrot	R					
Dipsacus fullonum	Common teasel		O				
Fagus sylvatica	Beech					O	
Festuca rubra	Red fescue	O					
Forsythia suspensa	Forsythia					O	
Helminthotheca echioides	Bristly ox-tongue		O				
Holcus lanatus	Yorkshire fog		A				
Hypericum androsaemum	Tutsan					O	
Leucanthemum vulgare	Ox-eye daisy		O				
Lolium perenne	Perennial rye-grass	F	F	D	D		
Lonicera nitida	Wilson's Honeysuckle						D
Plantago lanceolata	Ribwort plantain	F	O				
Ranunculus repens	Creeping buttercup			O			
Trifolium repens	White clover	O					
Urtica dioica	Common nettle		O				

SPECIES RICH HEDGEROW AND SPECIES POOR HEDGEROW

Latin Name	Common Name	RH1	RH2	RH3	PH3	PH4	PH5	PH7	PH8	PH9	PH10
Acer campestre	Field maple		F								
Acer pseudoplatanus	Sycamore	O				O					R
Clematis vitalba	Traveller's joy			F							
Cornus sanguinea	Dogwood	O	A	O							
Corylus avellana	Hazel										R
Crataegus monogyna	Hawthorn	O	O	O	D	D	D	D	D	D	D
Euonymus europaea	Spindle										R
Ligustum vulgare	Wild privet	A									
Prunus spinosa	Blackthorn	R	F	O							
Quercus robur	Pedunculate oak										
Rosa spp.	Rose	O	O	O							

SPECIES RICH HEDGEROW WITH TREES

Latin Name	Common Name	RHT1	RHT2	RHT3	RHT4	RHT5
Acer campestre	Field maple	R	R	O	R	
Acer psuedoplantanus	Sycamore			A	R	O
Alnus glutinosa	Alder					R
Cornus sanguinea	Dogwood			F	R	F
Crataegus monogyna	Hawthorn	O	O	O	O	F
Hedera helix	Ivy			F		
Ligustum vulgare	Wild privet	O	O	O	A	O
Prunus spinosa	Blackthorn	O	O		R	
Quercus robur	Pedunculate oak					
Rosa spp.	Rose	O	O			O
Rubus fruticosus agg.	Bramble					O

SPECIES POOR HEDGEROW WITH TREES

Latin Name	Common Name	PHT1	PHT2	PHT3	PHT4	PHT5	PHT6	PHT7
Acer campestre	Field maple	D				O		
Alnus glutinosa	Alder		O	O				
Cornus sanguinea	Dogwood		O	O				O
Corylus avellana	Hazel					D		
Crataegus monogyna	Hawthorn	O			D		A	A
Euonymus europaea	Spindle						O	
Fagus sylvatica	Beech							O
Fraxinus exelsior	Ash							O
Prunus sp.	Cherry						O	
Prunus spinosa	Blackthorn		O	O		O		
Rubus fruticosus agg.	Bramble		A	A	A			
Sambucus nigra	Elder				O			

APPENDIX B8-3
BOTANICAL SURVEY REPORT

M3

Junction 9 Improvement Scheme

Botanical Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

BOTANICAL SURVEY REPORT

Highways England

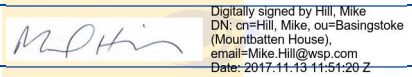
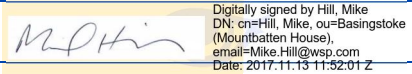
Second Issue

Project no: 70016638
Date: November 2017

Mountbatten House
Basing View
Basingstoke
Hampshire
RG21 4HJ

Tel: +00 44(0) 1256 318 800
Fax: +00 44(0) 1256 318 700

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	P01	P02		
Date	September 2017	November		
Prepared by	Luke Roberts	Rosie Pope		
Signature				
Checked by	David Kirby	Mike Hill		
Signature				
Authorised by	Mike Hill	Mike Hill		
Signature				
Project number	70016638	70016638		
Report number	HE551511-WSP-GEN-M3J9PCF3-RP-LE-00006	HE551511-WSP-GEN-M3J9PCF3-RP-LE-00006-P02		
File reference				

PRODUCTION TEAM

CLIENT (HIGHWAYS ENGLAND)

Major Projects Programme Lead	Steve Hoesli
Major Projects Senior Project Manager	Neil Andrew
Major Projects Project Manager	Simon Hewett
RIS Area 3 Coordinator	Harbi Ali-Ahmed
Senior User Representative	Paul Benham

WSP

RIS Area 3 Programme Director	Steve O'Donnell	Tel: +44 (0)1684 851751
RIS Area 3 Programme Manager	Stuart Craig	Tel: +44 (0)1256 318 660
M3 Junction 9 Project Director	Roland Diffey	Tel: +44 (0)1256 318 777
M3 Junction 9 Project Manager	Pradeep Agrawal	Tel: +44 (0)207 337 1700
RIS DCO Programme Lead	Amy Hallam	Tel: +44 (0)1392 229 700

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

M3 Junction 9 has been highlighted as requiring redevelopment in order to help reduce congestion. This will be achieved by improving the flow of traffic and three options are currently being considered for implementation (hereafter 'the Proposed Works').

An ecological desk study and Phase 1 habitat survey were undertaken by WSP in 2016 and 2017 respectively, which identified the presence or potential presence of notable plant species and habitats within *the Site* (*i.e.* the anticipated maximum extent of the works area) and *the Survey Area* (*i.e.* a 250m radius around the Site).

In order to investigate the potential for notable plant species and habitats to be negatively affected by the Proposed Works, a botanical survey was carried out. The botanical survey focused on those habitats within or close to the Site which are most likely to be directly affected by the Proposed Works. A variety of approaches were utilised including visual searches, National Vegetation Classification (NVC) survey and hedgerow surveys.

The botanical survey identified the presence of two notable plant species (greater butterfly orchid and white helleborine) occurring on the verge of the M3 (outside of the Site) and broadleaved woodland (including one location within the Site), respectively. Both species are listed on the National Red Data book as being vulnerable to extinction but are relatively widespread in the local area. White Helleborine is a Species of Principal Importance (SPI) for the conservation of Biodiversity under the Natural Environment and Rural Communities (NERC) Act (2006). Neither species receives specific legal protection.

The NVC survey concluded that the surveyed grasslands represent atypical examples of widespread grassland communities, MG1 *Arrhenatherum elatius* grassland and MG6 *Lolium perenne-Cynosurus cristatus* grassland. None of the grasslands are considered to represent examples of Habitats of Principal Importance (HPI), though some of the stands contain a relatively high diversity of species. No notable or legally protected species were identified within the grassland habitats.

Four hedgerows were surveyed of which two are considered to be '*Important'* as defined under the Hedgerow Regulations (1997); these hedgerows would be directly affected by two of the three design options under consideration. All hedgerows are considered to be HPI.

A preliminary assessment was made of the conservation value of the surveyed habitats in accordance with good practice guidelines (CIEEM, 2016). They are all considered to be of Local value, with the exception of the grassland within Easton Down Site of Importance for Nature Conservation (SINC). It is located to the north of the Site and may be of value at up to the County Scale, although the grassland is of limited interest.

Under a range of local and national planning policy, development is expected to avoid impacts to habitats and species of conservation value and achieve biodiversity net-gain where possible. In addition, under the NERC Act (2006) all public bodies must have regard to the conservation of biodiversity in exercising their functions, with SPI and HPI identified in order to guide them in fulfilling this duty. Accordingly recommendations have been made for mitigation and compensation/ enhancement measures, including:

- Translocating colonies of notable plants species affected by the Proposed Works and reusing associated topsoil in habitat creation
- Replacing hedgerows lost to the Proposed Works on at least a like for like basis
- Consideration given to translocating sections of Important hedgerow affected by the Proposed Works

- Including the creation of ecologically valuable habitats within development proposals including species rich grassland
- Enhancing retained habitats such as Easton Down SINC which is in poor ecological condition due to lack of management

1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.

1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within this report, namely:

- Option 14: Northbound and Southbound A34 Free Flow Design
- Option 16B: Incremental Delivery – Northbound A34 Free Flow Link
- Option 16C: Incremental Delivery – Southbound A34 Free Flow Design

1.1.3 The works are hereafter referred to as the 'Proposed Works'. Further details of the Proposed Works are presented within the PCF Stage 2 Environmental Assessment Report (EAR) (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works is shown on Figure 8.1, and is hereafter referred to as 'the Site.' An ecological Survey Area has been defined comprising land within 250m of the Site.

1.2 ECOLOGICAL BACKGROUND

1.2.1 An ecological desk study was carried out with respect to the Proposed Works in 2016 (WSP, 2016). This identified the presence of HPI within the vicinity of Junction 9 in addition to records of notable plant species from grid squares that overlap with the Site.

1.2.2 Three designated Sites occur within the Survey Area (see WSP, 2016) In order to give context to this report a brief summary of these designated sites in relation to the Site:

- The River Itchen passes underneath the A34 and A33 roads in the north of the Site, flowing in a south-westerly direction. The river channel is designated at a European level as a Special Area of Conservation (SAC) and at a national level as a Site of Special Scientific Interest (SSSI). The extent of SSSI designated land is broader, extending into floodplains associated with the river. These sites are both designated in part due to their important botanical communities. The Site boundary only overlaps with the edge of these designated sites and they should not be directly affected by the Proposed Works. Detailed consideration of the potential for effects (direct or indirect) upon the SAC will be provided within a Habitats Regulations Assessment accompanying the EAR and they are not considered further within this report.
- Easton Down SINC is designated at a local level on the basis of the presence of relict unimproved calcareous grassland. It is located just to the north of the Site boundary.
- The distribution of these sites is shown on Figure 8.2.

1.2.3 A Phase 1 habitat survey was carried out of a Survey Area comprising the Site plus a 250m buffer, with field visits largely carried out during March and April (WSP, 2017). As this is outside of the optimal period for botanical survey in grassland habitats, grasslands within and close to the Site have been included within the botanical survey.

1.3 BRIEF AND OBJECTIVES

1.3.1 WSP were commissioned to:

- Undertake botanical surveys (including a combination of hedgerow surveys, NVC and visual searching for rarer species in suitable habitat areas)
- Provide a concise technical report setting out the survey methods used, reporting the survey results, and providing outline recommendations in relation to the project and botanical communities and species (with reference to relevant legislation and planning policy)

2 METHODS

2.1 OVERVIEW

2.1.1 Data gathered during the desk study and Phase 1 habitat survey were used to devise an appropriate suite of surveys to gather detailed botanical data regarding habitats within the Site.

2.2 VISUAL SEARCHES

WOODLAND HABITATS

2.2.1 The Phase 1 habitat survey was undertaken during March and April 2017, with additional visits made to the woodland habitats during May and June by the surveyors during which time observations were made regarding woodland flora. These visits span the optimal survey period for surveying woodland ground flora.

2.2.2 The Phase 1 habitat survey report (WSP, 2017) contains notes regarding each woodland parcel including details of woodland habitat structure and flora recorded. The woodlands within the Site comprise a mixture of young plantation woodland and secondary woodland that has predominantly developed on the remnants of a disused railway cutting that traverses the Site. Whilst it was not considered that woodland habitats warranted detailed botanical assessment, incidental records of a notable species were made during the course of ongoing survey work and are detailed within this report.

GRASSLAND ON THE M3 VERGE

2.2.3 The verges of the M3 largely comprise semi-improved calcareous grasslands. A species list was compiled of grassland species present during multiple visits made under traffic management between May and August 2017.

2.2.4 The DAFOR scale was used to indicatively asses the relative abundance of plant species recorded within surveyed habitats, as follows:

- D: Dominant
- A: Abundant
- F: Frequent
- O: Occasional
- R: Rare

2.2.5 Additionally, the prefix ‘L’ is used to denote a species with a markedly local distribution.

2.3 NVC SURVEY

2.3.1 The NVC was carried out in accordance with the following best practice survey guidance:

- National Vegetation Classification: Users’ Handbook (JNCC, 2008)
- British Plant Communities: Volume 3 – Grasslands and montane communities (Rodwell, 1992)
- Review of coverage of the National Vegetation Classification. Joint Nature Conservation Committee Report No. 302 (Rodwell et al., 2000)

2.3.2 Four stands of grassland were selected for further assessment due to their proximity to the Site and because the Phase 1 habitat survey was undertaken outside of the optimal period for botanical assessment of grassland habitats. They are detailed within Table 2-1 below and their distribution can be seen on Figure 8.3.

Table 2-1: Grassland selected for further survey

HOMOGENOUS STAND OF GRASSLAND (PHASE 1 HABITAT CODE (SEE WSP, 2017)	DESCRIPTION/NOTES
SI3	Unmanaged grassland within Easton Down SINC
SCG15	Area of pasture between the M3 and A34
SCG16	Area of pasture between the M3 and A34
PMW/SI1	Area of grassland occurring amongst an area of recently planted woodland east of Winnal Roundabout

2.3.3 The surveyor carried out an initial walk-over of each of the areas of grassland to confirm that they could be considered as homogenous stands of vegetation. A quadrat size of 2 metres (m) x 2 m was selected as appropriate to sample the range of variation present in each stand of grassland. Five quadrat samples were then collected from each stand of vegetation. Quadrat locations were selected to sample all parts of a parcel, whilst avoiding areas which did not conform to the typical stand type within the parcel, for example areas in close proximity to hedgerows, where additional non-typical species may extend into the parcel, or where nutrient enrichment as a result of grazing localised is evident. The quadrat locations were indicatively annotated upon a plan of the Site.

2.3.4 Within each quadrat, all species of higher plant were recorded with the percentage cover for each plant species was estimated according to the *Domin* scale (see Table 2-2 below).

Table 2-2: The Domin Scale

DOMIN VALUE	COVER
1	<4% Rare
2	<4% Occasional
3	<4% Frequent
4	4-10%
5	11-25%
6	26-33%
7	34-50%
8	51-75%
9	76-90%
10	91-100%

2.3.5 Data were collated in floristic tables and frequency values were calculated. Frequency values describe how often a species is encountered in different stands or samples of a vegetation type, irrespective of the abundance of that species is present in each stand or sample. It is summarised in floristic tables using the Roman numerals I-V and referred to in descriptions of vegetation types using the terms listed in Table 2-3 below.

Table 2-3: Vegetation frequency class

FREQUENCY CLASS	RANGE OF FREQUENCY CLASS	TERMS USED TO DESCRIBE FREQUENCY CLASS
I	1-20% (i.e. appears in 1 quadrat sample in 5)	Scarce
II	21-40%	Occasional
III	41-60%	Frequent
IV	61-80%	Constant
V	81-100%	Constant

2.3.21 This information was then used in conjunction with the key in British Plant Communities Volume 3 Grassland and Montane Communities to assign the most closely corresponding NVC community type based on the abundance and frequency of plant species within each plot. The computer software MAVIS (Modular Analysis of Vegetation Information System) by the Centre for Ecology and Hydrology was used to produce 'matching coefficients' indicating the confidence level by which field data matches data published in British Plant Communities.

2.3.22 As a result of the variation in natural plant communities and the fact that NVC communities are based on average species composition considering numerous samples from across the UK; it is rare for a matching coefficient for any individual stand of vegetation to exceed 0.6 (60% similarity to the published NVC communities). For this reason also, MAVIS analysis is rarely conclusive. The final decision as to which NVC community a stand of vegetation relates to must be made using the results of MAVIS analysis alongside published community descriptions in Rodwell (1992) and surveyor experience.

2.4 ECOLOGICAL SURVEY OF HEDGEROWS

2.4.1 Four species rich hedgerows (as defined within JNCC 2010) were selected for further surveys. These comprised all of the hedgerows within the Site that which were not dominated by one species during the Phase 1 habitat survey (WSP, 2017). These are described in Table 2-4 below and displayed on Figure 8.3. These were subject to further survey in order to establish whether they qualified as 'Important Hedgerows' under the Hedgerow Regulations 1997 (hereafter referred to as 'the Regulations').

Table 2-4: Hedgerows selected for survey

HEDGEROW REFERENCE (SEE WSP, 2017)	APPROXIMATE LENGTH	DESCRIPTION
RHT1 (Easton Lane south)	180m	Heavily flailed hedgerow with small number of *Acer* sp. trees. c. 1m x 1m (w, h)
RHT4 (Easton Lane north)	200m	Mature hedgerow north of Easton Lane, c. 2m x 4m (w, h).
PHT5 (Easton Down south)	220m	Established hedgerow with mature trees along the A34. c 3m x 4m (w, h).
RHT5 (Easton Down north)	320m	Dense mature hedgerow c. 3m x 4m (w, h) with some mature trees present.

2.4.2 In accordance with the Regulations the hedgerows were measured from the point or points where they met another hedgerow(s) or where there was a gap of more than 20 metres between the end of the hedgerow and the nearest line of hedgerow. Gaps within a hedgerow were included in the total length provided they were 20 metres or less in length.

2.4.3 Notes were made on the following in accordance with the criteria outlined in Schedule 1, Part II of the Regulations:

- Number of woody species, on average, in a 30 metre length
- Presence of rare tree species such as black poplar *Populus nigra ssp. betulifolia*, large-leaved lime *Tilia platyphyllos* and small-leaved lime *Tilia cordata* and wild service tree *Sorbus torminalis*
- Number of standard trees, on average, within each 50 metre section
- Number of gaps in the hedge
- Presence of woodland ground flora species listed in Schedule 2 of the Regulations
- Presence of ditches, banks or walls
- Number of connections with other hedgerows, ponds or woodland
- Presence of parallel hedges within 15 metres of the hedge
- Presence of bridleways, footpaths, byways or public paths

2.4.4 In accordance with the Regulations the number of woody species present per 30 metre length was recorded in the following manner:

- Where the length of the hedgerow did not exceed 30 metres, the total number of woody species present in the hedgerow was recorded
- Where the hedgerow was between 30 metres and 100 metres in length, the number of woody species present in the central 30 metre stretch was recorded
- Where the hedgerow length was between 100 metres and 200 metres, the number of woody species present in the central 30 metre stretches of the two halves of the hedgerow were recorded and the mean of the two calculated
- Where the length of the hedgerow was over 200 metres, the numbers of woody species present in the central 30 metre stretch of each third of the hedgerow were recorded and the mean of

the three calculated

2.4.5 With regard for the Hedgerow Survey Handbook (2nd Edition) (DEFRA, 2007) further details, not required under the Regulations, such as hedgerow height, width, integrity, structure, and management history were recorded.

2.4.6 The field survey information was then assessed to establish whether each hedge fulfilled the Wildlife and Landscape criteria within the Regulations.

2.5 EVALUATION

2.5.1 The results of the above surveys were used to provide a preliminary valuation of conservation value using the CIEEM guidance (CIEEM, 2016). This guidance recommends that valuation of nature conservation importance is made with reference to a geographical framework, e.g. a site is of local, district, county, regional or national value.

2.5.2 The following sources of reference were used to inform the evaluation:

- Criteria for Selecting Sites of Importance for Nature Conservation in Hampshire HCC, 1996); Habitat of Principal Importance definitions listed by Maddock (2011)
- Hampshire Local Biodiversity Action Plan (LBAP)
- The Vascular Plant Red Data List for Great Britain (Cheffings *et al.* 2005)
- Hampshire Rare Plant Register (Rand & Mundell, 2011)

2.6 DATES OF SURVEY AND PERSONNEL

2.6.1 The botanical survey was completed by an Associated Member of the Chartered Institute for Ecology and Environmental Management with WSP who has over 6 years' experience of ecological survey. This includes extensive experience of habitat surveys on a variety of sites across the UK and holds a Field Studies Identification Certificate at Level 4 which is recommended by the Botanical Society of Britain and Ireland as the competence threshold for NVC survey.

2.6.2 Visual searches were undertaken throughout spring in summer during multiple visits to the Site to complete a variety of ecological surveys. The hedgerow and NVC surveys were carried in late August 2017. The weather conditions were dry and fine and were not a constraint to the Survey. August is within the optimal period for botanical survey of grassland when a large proportion of species are in flower and readily identifiable.

2.7 NOTES AND LIMITATIONS

VISUAL SEARCHES

2.7.1 The visual searching was undertaken on an *ad-hoc* basis. This is considered appropriate due to the nature of the habitats present which are comparatively recent in origin or disturbed by adjacent land uses.

2.7.2 Some of the embankments to the M3 are very steep and not accessible for health and safety reasons. Whilst the species lists collated with respect to these habitats may not comprise a complete inventory of species present, it is considered that sufficient information has been gathered to make an informed evaluation of habitat value.

NVC SURVEYS

2.7.3 The NVC surveys were completed in late August which is within the optimal season for grassland survey and therefore considered sufficient to gain an understanding of the botanical value of these habitats. It should be noted that botanical survey of grasslands is seasonally limited; some species such as soft brome *Bromus hordeaceus* and sweet vernal grass *Anthoxanthum odoratum* flower early in the season, whilst others, such as bents *Agrostis* spp. flower later in the summer. Whilst early flowering species will still be present within the sward later in the season it is likely the perception of dominance will change, whilst late flowering species may not be noticeable early in the season. Therefore, there is no one time at which it is optimal to complete grassland surveys and any survey will always be a snapshot of the condition of a grassland, with perception of species dominance potentially changing dependent upon the seasonal timing of the survey.

HEDGEROW SURVEYS

2.7.4 One qualifying criterion within the Hedgerow Regulations 1997 relates to whether the hedgerow in question supports protected species and, or species of conservation concern. It is not possible to establish the presence or likely absence of all protected species within one visit. Therefore information relating to protected species within the hedgerows has been excluded from this assessment. Further surveys for legally protected species which may be associated with hedgerows have been recommended as separate assessments of the Site and are not reported within this document.

2.7.5 Only Wildlife and Landscape criteria of the Regulations were considered within this assessment. Therefore, it is possible hedgerows which do not qualify as 'important hedgerows' under these criteria may still qualify under archaeology and history criteria.

2.7.6 All hedgerows on the Site are believed to be over 30 years old. Therefore, for the purpose of this assessment all hedgerows have been considered as though subject to the Regulations.

2.7.7 The hedgerow surveys were undertaken in late-August and as such woody species were readily identifiable. However, some woodland specialist species are only evident during spring and as such may not have been recorded during this survey. It was possible to make a robust assessment of whether hedgerows qualify as Important under the regulations and make a robust evaluation of their nature conservation value.

3 RESULTS

3.1 VISUAL SEARCHES

WOODLAND HABITATS

3.1.1 The ground flora of the woodland areas within the Site is generally comprised of common and widespread species such as bramble *Rubus fruticosus* agg. and nettle *Urtica dioica*. However, one notable species, white helleborine *Cephalanthera damasonium* was recorded as detailed within Table 3-1 below and Figure 8.3.

Table 3-1 Notable plan species recorded within woodland area

SPECIES	CLASSIFICATIONS	LOCATION
White helleborine *Cephalanthera damasonium*	→ SPI for the conservation of biodiversity under the Natural Environment and Rural Communities Act (2006). → National status: Vulnerable, not scarce. → Local status: Not ranked (not rare)	Recorded in two of the woodlands occurring close to and within the Site respectively, at SU4951 3075 and SU 49599 30810 (see Figure 8.3). Several individuals were observed in these locations.

GRASSLAND ON THE M3 VERGE

3.1.3 The verges of the M3 comprise varying extents of grassland habitat ranging between around 1m wide up to around 4m wide. The grassland occurs in mosaic with scrub with ivy *Hedera helix* dominant in places. Beyond the grassland, the verges are bound by hedgerows or plantation woodland. Extensive cuttings with steep banks occur along most of the verge. The verges are thought to date from the construction of the motorway during the 1980s.

3.1.4 A total of 44 species were recorded on the western verge of the M3 and 49 species were recorded on the eastern verge, which includes more extensive areas of grassland. The species lists are included within Appendix A. The species recorded are characteristic of infrequently managed coarse grassland on calcareous soils. One notable plant species was recorded, as detailed within Table 3-2 below and on Figure 8.3.

Table 3-2 Notable plant species recorded on the M3 verge

SPECIES	CLASSIFICATIONS	LOCATION
Greater butterfly-orchid *Platanthera chlorantha*	→ National status: Vulnerable, not scarce. → Local status: Not ranked (not rare)	Recorded in one location on the eastern verge of the M3 outside of the Site (SU 49715 31668, see Figure 8.3).

EVALUATION

3.1.5 With respect to the woodland habitats, the presence of white helleborine, a widespread species of some conservation concern, means that the woodlands should be valued at least local importance.

3.1.6 With respect to the verges of the M3, these support a relatively high diversity of species, including one species listed as nationally vulnerable to extinction, although is relatively widespread in the local area. The grasslands will provide foraging opportunities to a range of fauna, particularly invertebrates. The verges are a relatively recently created habitat and one that can be readily recreated. Overall they are considered to be of value at up to the local scale.

3.2 NATIONAL VEGETATION CLASSIFICATION SURVEY

3.2.1 Frequency tables for each grassland parcel are presented in Appendix B. Figure 8.3 shows the location of each of the surveyed grassland parcels and the location of quadrat samples. Photographs of grassland parcels are also shown in Appendix B.

3.2.2 Table 3-3 presents the findings of the NVC survey and an evaluation of the nature conservation importance of each of the surveyed grasslands in the Site.

Table 3-3: NVC Survey Results

STAND	AREA (HA)	NUMBER OF SPECIES RECORDED	MAVIS NVC COEFFICIENTS	DESCRIPTION AND ANALYSIS	ASSESSMENT OF CONSERVATION VALUE
SI3	0.05ha	17	MG1b 53.99 OV24 46.64 OV24b 44.39 MG1a 42.92 S26b 41.79	This stand comprises unmanaged, rank, overgrown grassland that is dominated by the coarse grass false-oat grass *Arrhenatherum elatius.* It is located on a relatively steep slope and is fenced off from the adjacent cattle grazed pastures. Salad burnet *Sanguisorba minor*, a species characteristic of less-improved calcareous grassland, occurred in one quadrat. This probably indicates that historically the grassland was an unimproved or semi-improved calcareous grassland which has succeeded to rough grass with the cessation of grazing. The closest match from MAVIS analysis was for **MG1b *Arrhenatherum elatius* grassland, *Urtica dioica* sub-community**. Review of Rodwell (1992) indicates that this is an appropriate classification. MG1 grasslands are characteristic of ungrazed grasslands, representing a temporary stage in succession to scrub and woodland.	The stand forms a significant part of the Easton Down SINC, which is designated as it met the criteria '*Grasslands which have become impoverished through inappropriate management but which retain sufficient elements of relic unimproved grassland to enable recovery'*. Given the lack of species present, the grassland itself is considered to be of no more than **local value**. However, it forms part of a wider SINC which it is appropriate to value on a **county level.**

STAND	AREA (HA)	NUMBER OF SPECIES RECORDED	MAVIS NVC COEFFICIENTS	DESCRIPTION AND ANALYSIS	ASSESSMENT OF CONSERVATION VALUE
SCG15	1.5ha	35	OV23 40.85 MG6a 40.64 MG6 39.54 MG7E 39.36 MG11a 39.18	This stand comprises a relatively herb-rich cattle grazed pasture. Whilst it has been treated as a homogenous stand some variation was observed including an area of wet ground in the north of the parcel (which was excluded from sampling). In addition, it was noted that peripheral areas tended to me more herb-rich than central areas. It is considered that sampling captured this variation. The strongest MAVIS coefficient was for OV23 *Lolium perenne - Dactylis glomerata* community though with a relatively weak coefficient. OV23 is described as a coarse weedy grassland characteristic of resown recreational areas such as play grounds and institutional grounds. Whilst the stand clearly bears some resemblance to this community, given the land use ***MG6 Lolium perenne-Cynosurus cristatus*** **grassland** is considered to be a more appropriate classification. MG6 is the characteristic improved pasture community. It is noted that the stand is significantly more species rich than the typical community is detailed within Rodwell (2006), with a lower cover and frequency of *Lolium perenne*. It Is likely that the grassland has a history of agricultural improvement but is gradually reverting to a more species rich community. Historical disturbance and/ or reseeding could account for the poor fit to NVC communities with a broad range of species present including ruderal species such as bristly ox-tongue *Helminthotheca echioides* and those characteristic of calcareous conditions such as marjoram *Origanum vulgare.*	This grassland contains a reasonable diversity of herbaceous vegetation which will provide resources for a range of invertebrates and associated fauna. It is formed of formed of common and widespread species. The habitat type is reasonably widespread in the local area and can readily be recreated. It does not meet criteria to qualify as a SINC or HPI. Overall, it is considered appropriate to value the stand as of importance on a **local** level.

STAND	AREA (HA)	NUMBER OF SPECIES RECORDED	MAVIS NVC COEFFICIENTS	DESCRIPTION AND ANALYSIS	ASSESSMENT OF CONSERVATION VALUE
SCG16	6.3	22	MG11a 48.87 MG11 45.16 MG7B 43.15 MG6 41.93 MG6c 41.70	This stand is similar in nature to SCG15 to which it is adjacent, though less species rich. Some variation occurs across the stand likely relating to the sloped nature of the habitat parcel. The strongest coefficient was for MG11 *Festuca rubra- Agrostis stolonifera- Potentilla answerina* grassland, a community characteristic of free draining soils that are frequently inundated. This may be appropriate for the lower lying parts of this stand, but overall it is considered that the stand is best described by ***MG6 Lolium perenne-Cynosurus cristatus* grassland,** albeit an atypical fit. Differences could be due to historical disturbance and/ or land uses. For example it is reasonably likely that these fields will have been used for arable production at some stage in the past. The diversity of species present indicates the residual fertility soil is declining.	As for SCG 15- **Local value**
PMW/SI1	1.6	22	MG1a 46.28 MG1b 46.08 MG1 37.13 OV25b 36.20 MG9b 36.18	This stand comprises a relatively diverse area of grassland which is not obviously managed. The grassland is located to the periphery of arable fields and it likely to be relatively recent in origin. The grassland occurs amongst recently planted trees. The strongest match from MAVIS analysis was for **MG1a Arrhenatherum elatius grassland, *Festuca rubra* sub-community,** which is considered to be an appropriate classification for this stand.	

3.3 ECOLOGICAL SURVEY OF HEDGEROWS

3.3.1 Of the four hedgerows surveyed, two qualify as 'Important Hedgerows' under the Wildlife and Landscape criteria of the Regulations. They qualify largely due to their position adjacent to a public right of way located on Easton Lane.

3.3.2 These hedgerows are considered to be of local nature conservation value on the basis that they constitute important ecological features providing resources and habitat connectivity to a range of flora and fauna. Hedgerows of this sort are likely to be widespread in the surrounding landscape.

3.3.3 The results are summarised within Table 3-4 below. Hedgerow locations are shown on Figure 8.3 and survey data is included within Appendix C.

Table 3-4: Hedgerow Survey Results

Phase 1 Hedgerow Reference	Phase 1 Classification	Phase 1 Description	Evaluation of hedgerow importance under the Wildlife and Landscape Criteria of the Regulations					
			7 woody species	6 woody species and 3 associated features	6 woody species, including black poplar, large leaved lime, small leaved lime, wild service tree	5 woody species and 4 associated features	Is adjacent to a PROW or road or byway and includes 4 woody species and 2 associated features	Important under ecological criteria
RHT1 (Easton Lane south)	Species hedgerow with trees	Heavily flailed hedgerow with small number of Acer sp. trees. c. 1m x 1m (w, h)	N	N	N	N	Y	Y
RHT4 (Easton Lane north)	Species rich hedgerow with trees	Mature hedgerow north of Easton Lane, c. 2m x 4m (w, h).	N	N	N	N	Y	Y
PHT5 (Easton Down south)	Species poor hedgerow with trees	Mature hedgerow north of Easton Lane, c. 2m x 4m (w, h).	N	N	N	N	N	N
RHT5 (Easton Down north)	Species hedgerow with trees	Established hedgerow with mature trees along the A34. c 3m x 4m (w, h).	N	N	N	N	N	N

4 LEGISLATIVE AND POLICY FRAMEWORK

4.1 LEGAL COMPLIANCE

WILDLIFE AND COUNTRYSIDE ACT 1981 (AS AMENDED)

4.1.1 Under the Wildlife and Countryside Act 1981 (as amended), it is an offence if one: 'intentionally picks, uproots or destroys any wild plant included in Schedule 8'. No such plant species were recorded in the Site.

HEDGEROW REGULATIONS (1997)

4.1.2 Under the Hedgerow Regulations it is an offence to remove a hedgerow (as defined within the Regulations) without applying to the local planning authority (LPA) for permission. Should the hedgerow be deemed unimportant according to the criteria within the Regulations the LPA is obliged to allow removal. However, if the hedgerow qualifies as 'Important' under the Regulations the LPA must decide whether the reasons for removal justify the loss of an 'Important Hedgerow', with a presumption for retention. It is not necessary to apply for permission to remove a hedgerow if it is included within a planning application, as will be the case with the Proposed Works. Furthermore, the Hedgerow Regulations stipulate that '*The removal of any hedgerow to which these Regulations apply is permitted if it is required…. for the carrying out by the Secretary of State of his functions in respect of any highway for which he is the highway authority(22) or in relation to which, by virtue of section 4(2) of the Highways Act 1980, he has the same powers under that Act as the local highway authority.*

NATURAL ENVIRONMENT AND RURAL COMMUNITIES ACT 2006

4.1.3 The NERC Act 2006 places a duty on all public authorities, including planning authorities, to have regard for the conservation of biodiversity when discharging their duties. The NERC Act refines the definition of biodiversity conservation, stating that it includes restoring or enhancing a population or habitat.

4.1.4 Habitats and species of principal importance (HPIs and SPIs) for the conservation of biodiversity in England are listed in accordance with Section 41 of the NERC Act in order to guide public authorities in exercising their duty.

4.1.5 Grassland habitats surveyed within this report are not considered to meet the criteria to qualify as HPI, whereas all hedgerows and broadleaved woodlands within the Survey Area are considered to be HPI. Greater butterfly orchid is a SPI.

4.2 PLANNING POLICY

RELEVANT PLANNING POLICY

4.2.1 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport 2014). This states inter alia that the principals and objectives of the government's 2012 Natural Environment White Paper (NEWP) and Biodiversity 2020 strategy should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats, on other species identified as being of principal importance for the conservation of biodiversity and that potential impacts on ecosystems should be clearly set out.

4.2.2 At the national level the National Planning Policy Framework (NPPF) (2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including great crested newts. The Office of the Deputy Prime Minister circular 06/2005 also provides supplementary guidance, including confirmation that '*the presence of a protected species is a material consideration when a planning authority is considering a development proposal*'.

4.2.3 The NPPF sets out, amongst other points, how at an overview level the *'planning system should contribute to and enhance the national and local environment by:*

- *…recognising the wider benefits of ecosystem services*
- *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, including by establishing coherent ecological networks that are more resilient to current and future pressures…'*

4.2.4 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:

- *'- if significant harm resulting from a development cannot be avoided…adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused*
- *- …opportunities to incorporate biodiversity in and around developments should be encouraged*
- *- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland…unless the need for, and benefits of, the development in that location clearly outweigh the loss…'*

4.2.5 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled *Biodiversity*. This states *'The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:*

- protecting sites of international*, European, and national importance, and local nature conservation sites, from inappropriate development. supporting habitats that are important to maintain the integrity of European sites*
- *new development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas*
- *new development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort*

- *Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species*
- *maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change*
- *supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species*
- *Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys*

5 RECOMMENDATIONS

5.1 OVERVIEW

5.1.1 The results of the botanical survey are considered in context of design drawings available at the time of writing and the legal and planning policy context. Outline recommendations for mitigation measures are made for consideration.

5.2 AVOIDANCE AND MITIGATION MEASURES

NOTABLE PLANT SPECIES

5.2.1 Review of design drawings indicate one of the white helleborine colonies is likely to be directly affected by all of the route alignments. In order to mitigate these affects the following outline recommendations are made:

- The individual colonies within the affected area could be translocated. This would be achieved by hand digging the orchid colonies, including surrounding topsoil, and moving them to a similar area of habitat in the close vicinity, matching as closely as possible for habitat type.
- This could be supplemented by the collection of seed at an appropriate time of year (indicatively early summer) which would be stored and reseeded in an appropriate location during early spring.
- Subsequent to the translocation of individual colonies, topsoil form the area of woodland supporting this species should be retained and reused within areas of woodland planting within the Proposed Works as it is likely to contain a seedbank that includes white helleborine.
- Following completion of the Proposed Works, monitoring could be implemented and where the above measures were not successful revised attempts could be made using seed gathered from nearby colonies.

5.2.2 The identified greater butterfly orchid colony is not likely to be affected by the Proposed Works, though in light of the access limitations the potential for further colonies within the works footprint cannot be ruled out. In the event of colonies being identified within the works footprint, the above mitigation measures should be implemented.

GRASSLAND

5.2.3 Grassland within SCG16, SCG16 and PMW/SI1 is likely to be affected to some degree by all of the design options, whilst road verge habitat will also be lost. It is recommended that provision should be made for replacing grassland habitat lost on at least a like for like basis. The following measures are advised with respect to newly created grassland within the Proposed Works:

- Grassland created within the Proposed Works is more likely to develop into a diverse community where soil fertility is kept to a minimum. Accordingly, it is advised that the use of topsoil and fertilizers should be avoided as far as possible.
- Where grassland seed is used, appropriate locally sourced mixes should be used, appropriate for the calcareous soils that characterise the local area.

HEDGEROWS

5.2.4 Where possible, it is recommended effects upon hedgerows (in particular 'Important Hedgerows RHT1 and RHT4) are avoided as possible. Review of current design drawings indicates that all of

the Options will affect hedgerows to some degree, whereas options 14 and 16c would directly affect Important Hedgerows RHT1 and RHT4.

5.2.5 Where hedgerows are to be retained, the risk of negative effects during the construction phase should be considered and mitigation measures implemented as necessary, for example protection following methods described in BS5837:2012 'Trees in relation to design, demolition and construction – Recommendations'.

5.2.6 Where hedgerow retention (in entirety or in part) will not be possible, it is advised the mitigation or compensation measures would be required. These could include replacement planting or hedgerow translocation.

5.2.7 Where hedges are replaced by new planting, the new hedgerows should comprise native species of local provenance, with species composition based on those naturally found to be present within hedgerows in the local area, and where possible and appropriate, enhanced to be more species rich than the hedgerows to be lost. Where possible new hedgerows should incorporate bank and ditch features and standard trees.

5.2.8 With respect to translocation, which is particularly advised with respect to the Important hedgerows, a detailed mitigation strategy would need to be prepared. In summary, it would include the following methods:

- Translocation should be carried out in Autumn when the soils are warm and moist and new root growth is possible before winter
- Digging of trenching receptor area immediately prior to translocation to prevent drying out
- Sectional movement of the hedgerow, retaining as much of the root as possible and retaining thick horizontal sections were possible
- Placement in receptor trench with careful backfilling to minimise soil compaction
- Subsequent aftercare, such as replacement planting and watering as appropriate

5.3 OPPORTUNITIES FOR ENHANCEMENTS

5.3.1 Grassland within Easton Down SINC (SI3) is under grazed, with a resultant suppression of species diversity. It is likely that the grassland represents relict calcareous grassland, and therefore there is a significant opportunity to restore the grassland to a habitat of greater conservation value here by reintroducing grazing to the SINC and selectively clearing some of the invasive scrub.

5.3.2 The Proposed Works could achieve a net-gain in biodiversity, as is promoted by planning policy and guidance by creating sufficient amounts of ecologically valuable habitat to offset those lost to development. This will be explored in detail within the net-gain assessment which will accompany the EAR. These habitats should include hedgerow and grassland creation as detailed above, in addition to other habitats such as wetlands and woodlands. Habitat creation should include native species appropriate to the local area and be designed with regard to strengthening habitat connectivity wherever possible.

6 CONCLUSION

6.1.1 The botanical surveys identified that the surveyed habitats are of conservation value in the local context and therefore mitigation measures should be incorporated into the Proposed Works to ensure compliance with planning policy and guidance. A range of mitigation options are presented for consideration which if pursued should be investigated in greater detail.

7 REFERENCES

7.1 PROJECT REFERENCES

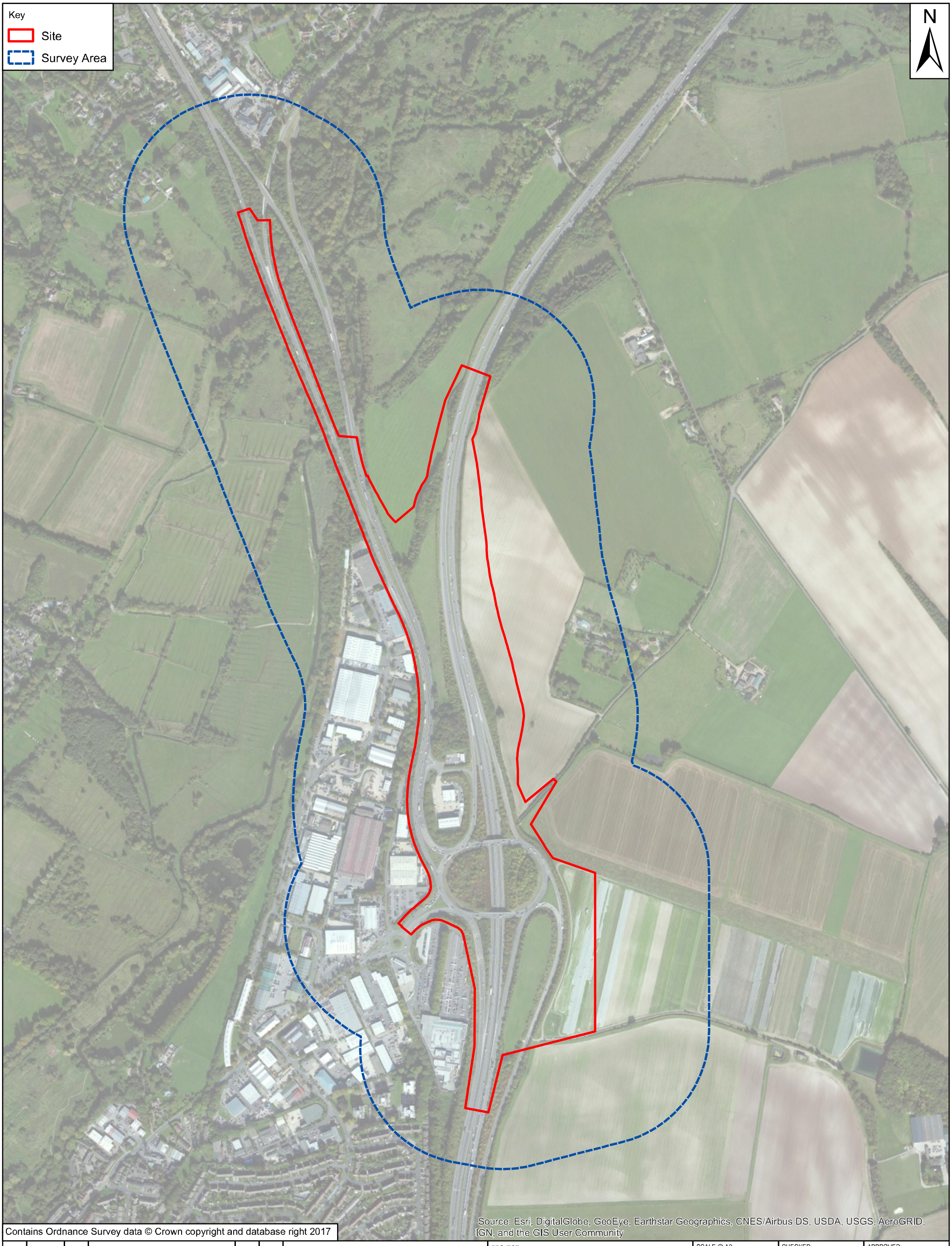
- WSP (2016) M3 Junction 9 Improvement PCF Stage 1. Ecological Desk Study
- WSP (2017) M3 Junction 9 Improvement PCF Stage 2. Phase 1 Habitat Survey

7.2 TECHNICAL REFERENCES

- British Standards Institution (2012) BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations.
- Cheffings, C.M. & Farrell, L. (Eds), Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman,D.A., Preston, C.D., Rumsey, F.J., Taylor, I. (2005). The Vascular Plant Red Data List for Great Britain.
- Species Status 7: 1-116. Joint Nature Conservation Committee, Peterborough. Department for Communities and Local Government (2012). *National Planning Policy Framework*.
- Department for Environment, Food and Rural Affairs (Defra) (2007) Hedgerow Survey Handbook: A Standard Procedure for Local Surveys in the UK, 2nd edition. Defra, London. Available at: http://www.defra.gov.uk/publications/files/pb11951-hedgerow-survey-handbook-070314.pdf
- Hampshire County Council (HCC) (1996) Criteria for selecting Sites of Importance for Nature Conservation in Hampshire http://documents.hants.gov.uk/biodiversity/SINCCriteria.pdf
- Her Majesty Stationery Office (HMSO) The Hedgerows Regulations 1997, SI 1997/1160. HMSO: London.
- HMSO (2005) Biodiversity and Geological Conservation – Statutory Obligations and Their Impact Within the Planning System. Office of the Deputy Prime Minister (ODPM) Circular 06/2005 HMSO, Norwich.
- HMSO (2006) Natural Environment and Rural Communities Act.
- Maddock, A. (Ed). (2011). UK Biodiversity Action Plan - Priority Habitat Descriptions. BRIG.
- Rand, M. & Mundell, T. (2011) Hampshire Rare Plant Register
- UK Biodiversity Action Plan (2007) UK List of Priority Species and Habitats. Joint Nature Conservation Committee. Available at: http://www.ukbap.org.uk/NewPriorityList.aspx

8 FIGURES

FIGURE 8.1 SITE LOCATION PLAN



REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: DRAWING STATUS

wsp

highways england

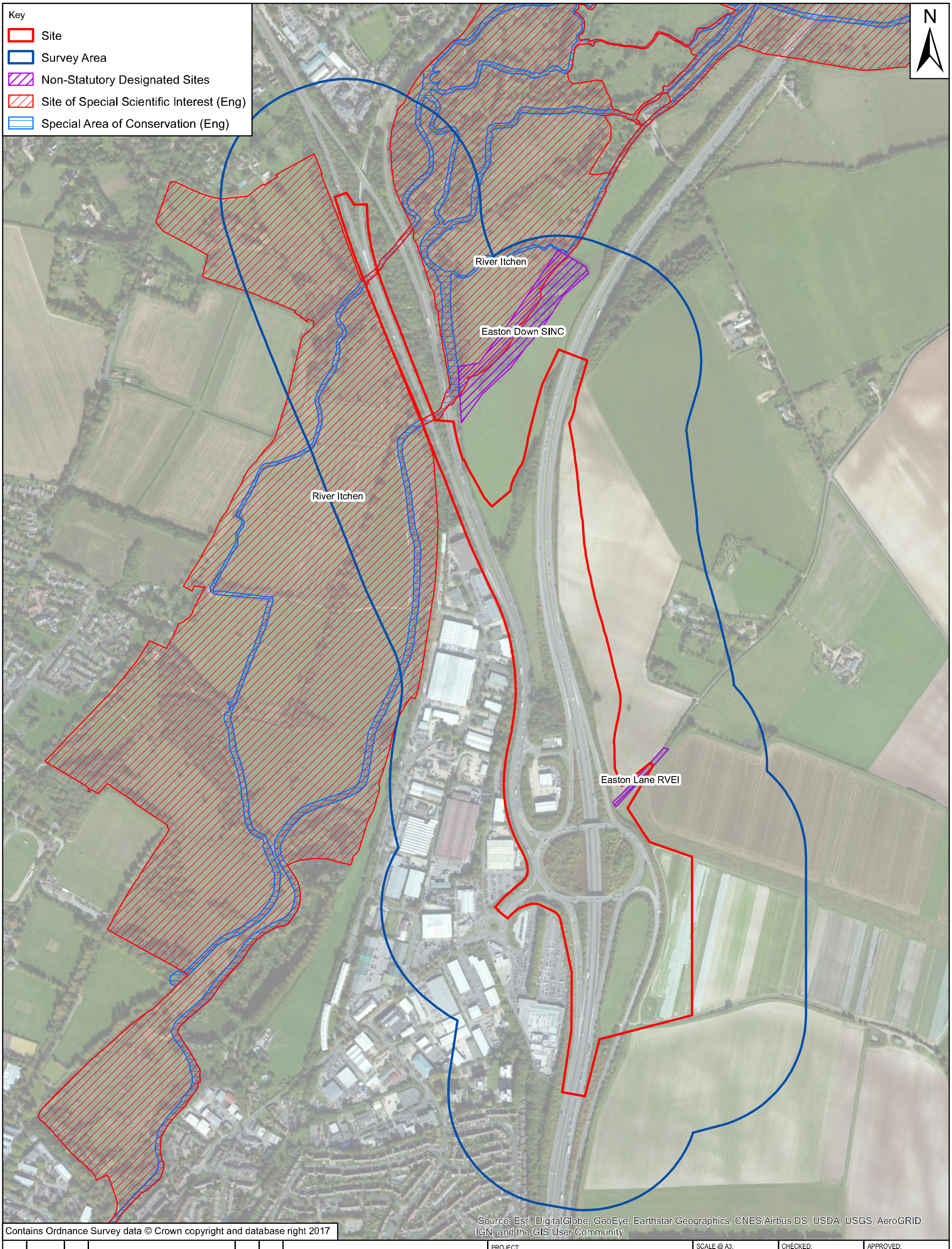
PROJECT: M3 Junction 9

TITLE: Figure 8.1 - Site Location Plan

SCALE @ A3:	CHECKED:	APPROVED:
7,500	LR	HS
FILE:	DRAWN:	DATE:
1	BW	August 2017

PROJECT No:	DRAWING No:	REV:
70016638	1	A

FIGURE 8.2 DESIGNATED SITES



REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: FINAL

highways england

PROJECT: M3 Junction 9

TITLE: Figure 8.2 - Designated Sites

SCALE @ A3:	CHECKED:	APPROVED:
7,500	LR	APP
FILE: 2	DRAWN: BW	DATE: September 2017
PROJECT No: 70016638	DRAWING No: 2	REV: A

FIGURE 8.3 BOTANICAL SURVEY

Key

- Site
- Survey Area
- Hedge with Trees - Species-Poor (PHT5)
- Hedge with Trees - Species-Rich (RHT1/4/5)
- Calcareous Grassland - Semi-Improved (SCG15/16)
- Mixed Woodland - Plantation (PMW/SI1)
- Poor Semi-Improved Grassland (SI3)
- White Helleborine
- Greater Butterfly Orchid
- Quadrats

N

Greater butterfly-orchid

SI3

SCG16

RHT5

SCG15

PHT5

White Helleborine

White Helleborine

RHT1

RHT4

PMW/SI1

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: FINAL

PROJECT: M3 Junction 9

TITLE: Figure 8.3 - Botanical Survey

SCALE @ A3:	CHECKED:	APPROVED:
7,500	LR	APP
FILE:	DRAWN:	DATE:
3	BW	September 2017

PROJECT No:	DRAWING No:	REV:
70016638	3	A

Appendix A

M3 VERGE GRASSLAND SPECIES LISTS

TABLE A1 NORTHBOUND/ WESTERN VERGE GRASSLAND SPECIES LIST

SPECIES NAME	COMMON NAME	DAFOR
Arrhenatherum elatius	False oat grass	D
Hedera helix	Ivy	LD
Brachypodium sylvaticum	False brome	A
Clematis vitalba	Traveller's joy	A
Dactylis glomerata	Cock's foot	A
Eupatorium cannabinum	Hemp agrimony	A
Festuca rubra	Red fescue	A
Leucanthemum vulgare	Ox eye daisy	A
Anacamptis pyramidalis	Pyramidal orchid	LA
Epipactis helleborine	Broad-leaved helleborine	LA
Artemisia vulgaris	Mugwort	F
Bromus hordeaceus	Soft brome	F
Cochlearia danica	Danish scurvy-grass	F
Daucus carota	Wild carrot	F
Dipsacus fullonum	Teasel	F
Galium album	Hedge bedstraw	F
Linaria vulgaris	Common toad flax	F
Medicago lupulina	Black medick	F
Solidago canadensis	Canadian goldenrod	F
Achillea millefolium	Yarrow	O
Bellis perennis	Common daisy	O
Bromus sterilis	Barren brome	O
Hypericum perforatum	Perforate St John's-wort	O
Origanum vulgare	Wild Marjoram	O
Plantago lancelota	Ribwort plantain	O
Poa trivalis	Rough meadow grass	O
Reseda lutea	Wild mignonette	O
Silene vulgaris	Bladder campion	O
Vicia cracca	Tufted vetch	O
Vicia sativa	Common vetch	O
Allium oleraceum	Field garlic	R
Anagallis arvensis	Scarlet pimpernel	R
Centaurea scabiosa	Greater knapweed	R
Filipendula ulmaria	Meadow sweet	R
Fumaria sp.	Fumitory sp.	R
Galium verum	Ladies bedstraw	R
Trifolium campestre	Hop trefoil	R
Trifolium repens	White clover	R
Tussilago farfara	Colt's foot	R
Verbascum blattaria	Moth mullein	R

SPECIES NAME	COMMON NAME	DAFOR
Verbascum thapsus	Great mullein	R
Veronica hederifolia	Ivy speedwell	R
Veronica persica	Field speedwell	R

TABLE A2 NORTHBOUND/ WESTERN VERGE GRASSLAND SPECIES LIST

SPECIES NAME	COMMON NAME	DAFOR
Arrhenatherum elatius	False oat grass	D
Brachypodium sylvaticum	False brome	A
Clematis vitalba	Traveller's joy	A
Festuca rubra	Red fescue	A
Leucanthemum vulgare	Ox eye daisy	A
Anacamptis pyramidalis	Pyramidal orchid	LA
Artemisia vulgaris	Mugwort	F
Cochlearia danica	Danish scurvy-grass	F
Dactylis glomerata	Cock's foot	F
Daucus carota	Wild carrot	F
Eupatorium cannabinum	Hemp agrimony	F
Linaria vulgaris	Common toad flax	F
Plantago lancelota	Ribwort plantain	F
Pulicaria dysenterica	Common fleabane	F
Solidago canadensis	Canadian goldenrod	F
Bromus hordeaceus	Soft brome	O
Bromus sterilis	Barren brome	O
Cirsium arvense	Creeping thistle	O
Glechoma hederacea	Ground ivy	O
Hypericum perforatum	Perforate St John's-wort	O
Jacobaea vulgaris	Common ragwort	O
Myosotis sp.	Forget-me-not	O
Origanum vulgare	Wild Marjoram	O
Poa trivalis	Rough meadow grass	O
Silene vulgaris	Bladder campion	O
Stachys sylvatica	Hedge woundwort	O
Trifolium dubium	Lesser trefoil	O
Verbascum blattaria	Moth mullein	O
Veronica serpyllifolia	Thyme-leaved speedwell	O
Vicia cracca	Tufted vetch	O
Vicia sativa	Common vetch	O
Agrimonia eupatoria	Agrimony	R
Blackstonia perfoliata	Yellow-wort	R
Centaurea scabiosa	Greater knapweed	R
Centaurium erythraea	Common Centaury	R

SPECIES NAME	COMMON NAME	DAFOR
Conium maculatum	Hemlock	R
Schedonorus arundinaceus	Tall fescue	R
Geranium pyrenaicum	Hedgerow cranesbill	R
Heracleum sphondylium	Hogweed	R
Knautia arvensis	Field scabious	R
Mentha sp.	Mint sp.	R
Orobanche sp.	Broomrape sp.	R
Platanthera chlorantha	Greater butterfly orchid	R
Poa pratensis	Smooth meadow grass	R
Reseda lutea	Wild mignonette	R
Tragopogon pratensis	Goat's beard	R
Veronica chamaedrys	Germander speedwell	R
Vicia hirsuta	Hairy tare	R

Appendix B

NVC FLORISTIC TABLES

Scientific name	Common name	Frequency	Quadrat/ Domin Score				
			1	2	3	4	5
Arrhenatherum elatius	False oat grass	V	10	10	10	10	10
Urtica dioica	Common nettle	IV	4	1	2	4	
Dactylis glomerata	Cock's foot	III			4	4	4
Eupatorium cannabinum	Hemp agrimony	III	1		1		2
Cirsium arvense	Creeping thistle	II		1			3
Festuca rubra	Red fescue	II		2	4		
Glechoma hederacea	Ground ivy	II				2	3
Heracleum sphondylium	Hogweed	II				1	3
Lamium album	White nettle	II	1	1			
Centaurea nigra	Common knapweed	I					1
Odontites vernus	Red bartsia	I			1		
Potentilla reptans	Creeping cinquefoil	I					3
Pulicaria dysenterica	Common fleabane	I	1				
Sanguisorba minor	Salad burnet	I		2			
Silene vulgaris	Bladder campion	I					1
Solanum dulcamara	Bittersweet	I	1				
Torilis japonica	Upright hedge parsley	I					2

TABLE B1- FLORISTIC TABLE FOR SI3

HABITAT PHOTOGRAPHS

TABLE B2- FLORISTIC TABLE FOR SCG15

SCIENTIFIC NAME	COMMON NAME	FREQUENCY	QUADRAT/ DOMIN SCORE				
			1	2	3	4	5
Dactylis glomerata	Cock's foot	V	5	6	4	3	3
Festuca rubra	Red fescue	V	5	5	7	9	9
Trifolium repens	White clover	V	4	3	3	4	4
Linum catharticum	Fairy flax	IV	2	1	3	2	
Torilis japonica	Upright hedge parsley	IV	2	3	3		2
Agrostis stolonifera	Creeping bent	III		3	3		4
Clematis vitalba	Traveller's joy	III		1	1		2
Crepis tectorum	Narrow leaved hawks beard	III			3	3	3
Daucus carota	Wild carrot	III	3	2		2	
Eupatorium cannabinum	Hemp agrimony	III	1	1	4		
Holcus lanatus	Yorkshire fog	III	2		4		4
Senecio erucifolius	Hoary ragwort	III	2		3	1	
Senecio vulgaris	Common ragwort	III	2	1			1
Lolium perenne	Perennial rye-grass	III	5	4			3
Medicago lupulina	Black medick	III	1	3			3

SCIENTIFIC NAME	COMMON NAME	FREQUENCY	QUADRAT/ DOMIN SCORE				
			1	2	3	4	5
Achillea millefolium	Yarrow	II	3			2	
Agrostis capillaris	Common bent	II			3	3	
Anagallis arvensis	Scarlet pimpernel	II			2	2	
Bromus hordeaceus	Soft brome	II	4				1
Vicia tetrasperma	Smooth tare	II	2	2			
Arrhenatherum elatius	False oat grass	I			1		
Cerastium fontanum	Common mouse-ear	I	3				
Cirsium arvense	Creeping thistle	I			3		
Dipsacus fullonum	Teasel	I		1			
Epilobium montanum	Broad-leaved willowherb	I	1				
Erigeron acris	Blue fleabane	I	3				
Geranium molle	Dove's-foot cranesbill	I	1				
Helminthotheca echioides	Bristly ox tongue	I	1				
Hypericum pulchrum	Slender St John's-wort	I			1		
Inula conyzae	Ploughman's-spikenard	I		1			
Leucanthemum vulgare	Ox-eye daisy	I					5
Origanum vulgare	Marjoram	I				2	
Ranunculus repens	Creeping buttercup	I					4
Sherardia arvensis	Field madder	I	1				
Veronica persica	Field speedwell	I	1				

TABLE B3- FLORISTIC TABLE FOR SCG16

SCIENTIFIC NAME	COMMON NAME	FREQUENCY	QUADRAT/ DOMIN SCORE				
			1	2	3	4	5
Agrostis stolonifera	Creeping bent	5	5	3	3	5	3
Bromus hordeaceus	Soft brome	5	5	3	3	8	5
Dactylis glomerata	Cock's foot	5	5	4	4	4	5
Festuca rubra agg.	Red fescue	5	5	9	3	4	4
Trifolium repens	White clover	5	3	3	1	3	4
Geranium molle	Dove's-foot cranesbill	4	2	1	3	2	

SCIENTIFIC NAME	COMMON NAME	FREQUENCY	QUADRAT/ DOMIN SCORE				
			1	2	3	4	5
Medicago lupulina	Black medick	3	1	3		1	
Lolium perenne	Perennial rye-grass	III	1			1	5
Cirsium arvense	Creeping thistle	III	1		2	1	
Cerastium fontanum	Common mouse-ear	III			1	1	1
Clematis vitalba	Traveller's joy	II	1			1	
Senecio erucifolius	Hoary ragwort	II		1	1		
Odontites vernus	Red bartsia	II	1		1		
Taraxacum agg.	Dandelion	II			3	1	
Agrostis capillaris	Common bent	I	3				
Arrhenatherum elatius	False oat grass	I			1		
Bromus erectus	Upright brome	I	2				
Helictotrichon pubescens	Downy oatgrass	I		2			
Holcus lanatus	Yorkshire fog	I			2		
Hypericum pulchrum	Slender St John's-wort	I		1			
Tragopogon pratensis	Goat's beard	I				3	
Veronica persica	Field speedwell	I	1				

TABLE B4- FLORISTIC TABLE FOR PMW/SI1

SCIENTIFIC NAME	COMMON NAME	FREQUENCY	QUADRAT/ DOMIN SCORE				
			1	2	3	4	5
Dactylis glomerata	Cock's foot	V	8	7	5	5	8
Taraxicum agg.	Dandelion	V	2	2	3	2	3
Jacobaea erucifolia	Hoary ragwort	IV	4	1	1	3	
Arrhenatherum elatius	False oat grass	III		8	2	9	
Cirsium arvense	Creeping thistle	III	1			2	2
Festuca rubra	Red fescue	III	2		9		5
Elymus repens	Common couch	II		4			4
Epilobium parviflorum	Hoary willowherb	II			3	2	
Inula conyza	Ploughman's-spikenard	II			1	1	
Plantago lanceolata	Ribwort plantain	II	1	1			
Rubus fruticosus	Bramble	II		1	1		
Crategus monogyna	Hawthorn	I					1
Daucus carota	Wild carrot	I	1				
Epilobium montanum	Broad-leaved willowherb	I		3			
Geranium molle	Dove's-foot cranesbill	I	2				
Holcus lanatus	Yorkshire fog	I		2			
Hypericum perforatum	Perforate St John's-wort	I			3		
Plantago major	Greater plantain	I	2				

SCIENTIFIC NAME	COMMON NAME	FREQUENCY	QUADRAT/ DOMIN SCORE				
			1	2	3	4	5
Sonchus asper	Prickly sow thistle	I	2				
Trifolium dubium	Lesser trefoil	I	1				
Trifolium repens	White clover	I	1				
Tussilago farfara	Colt's foot	I	1				

APPENDIX B8-5
BAT ACTIVITY SURVEY REPORT

M3

Junction 9 Improvement Scheme

Bat Activity Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

BAT ACTIVITY SURVEY REPORT

Highways England

First Issue

Project no: 70016638
Date: November 2017

Mountbatten House
Basing View
Basingstoke
Hampshire
RG21 4HJ

Tel: +00 44(0) 1256 318 800
Fax: +00 44(0) 1256 318 700

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Final for comment			
Date	September 2017			
Prepared by	John Baker (BSG Ecology)			
Signature	Roberts, Luke pp 2017.11.27 14:55:09 Z			
Checked by	L Roberts			
Signature	Roberts, Luke 2017.11.27 14:55:34 Z			
Authorised by	A Hutchings			
Signature	Hutchings, Adrian I am approving this document 2017.11.27 15:06:31 Z			
Project number	70016638			
Report number	HE-WSP-GEN-M3J9PCF5-RP-LE-00010			
File reference				

PRODUCTION TEAM

CLIENT (HIGHWAYS ENGLAND)

Major Projects Programme Lead	Steve Hoesli
Major Projects Senior Project Manager	Neil Andrew
Major Projects Project Manager	Simon Hewett
Senior User Representative	Paul Benham

WSP

RIS Area 3 Programme Director	Steve O'Donnell	Tel: +44 (0)1684 851751
RIS Area 3 Programme Manager	Stuart Craig	Tel: +44 (0)1256 318 660
M3 Junction 9 Project Director	Roland Diffey	Tel: +44 (0) 1256 318 777
M3 Junction 9 Project Manager	Pradeep Agrawal	Tel: +44 (0)207 337 1700
RIS DCO Programme Lead	Amy Hallam	Tel: +44 (0)1392 229 700

TABLE OF CONTENTS

TABLES

EXECUTIVE SUMMARY

M3 Junction 9 has been highlighted as requiring redevelopment in order to help reduce congestion. This will be achieved by improving the flow of traffic, and three options are currently being considered for implementation (the 'Proposed Works').

In order to gather baseline data with regards to the bat community in the area, a suite of surveys were carried out between June and October 2017, which involved walked transects and deployment of static bat detectors. A 'Survey Area' was defined that encompassed the three options' maximum extent of works ('the Site') plus a 250m buffer.

This work has established that the Survey Area supports a range of species, dominated by largely common species, though rarer species do occur on occasion and several Species of Principal Importance as listed in Section 41 of the NERC Act 2016 were recorded. In particular, high level of activity from *Myotis* species bats was noted. This group, which cannot easily be identified to species level based on call parameters, includes some rare species. The static detectors revealed that much of the foraging activity is concentrated in and around the fields to the centre of the Site located between the A34 and M3, to the south of the River Itchen. The River Itchen is also likely to offer foraging habitat for a range of bat species.

Once the final route is selected, it is recommended that additional analysis of the call data and/ or additional surveys are carried out in order to obtain further information with regard to the use of the area by *Myotis* species. Indicatively, further surveys would involve two visits May-September inclusive, avoiding June to mid-July (when young bats are born).

The Proposed Works are likely to negatively affect bats to some degree and therefore it is advised that mitigation and compensation measures are included within detailed designs. These include the sensitive design of necessary lighting and including habitats within landscape design to benefit bats. It may be appropriate to consider provision of compensatory habitat in an off-site area.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.

1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 to be assessed within the Environmental Assessment Report (EAR), namely:

- Option 14: 100kph Three-Step Relaxation Under M3 Free Flow Design;
- Option 16B: Incremental Delivery – Northbound A34 Free Flow Link;
- Option 16C: Incremental Delivery – Southbound A34 Free Flow Link.

1.1.3 Further details of the Proposed Works are presented within the PCF Stage 2 EAR (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works for all options is shown on Figure 1-1, and is hereafter referred to as 'the Site'.

1.1.4 For the purposes of ecological assessment, in order to consider indirect effects on adjacent/nearby receptors, a Survey Area of 250m around the Site was defined.

1.2 ECOLOGICAL BACKGROUND

1.2.1 An ecological desk study was carried out with respect to the Proposed Works by WSP in 2016 to gain an ecological background of the surrounding area using a 5km search radius (WSP, 2016). No records of bats were found from within the Site. A total of seven species were however, identified within a 5km radius: Daubenton's bat *Myotis daubentonii*; Natterer's bat *Myotis nattereri*; noctule bat *Nyctalus noctula*; brown long-eared bat *Plecotus auritus*; common pipistrelle *Pipistrellus pipistrellus*; soprano pipistrelle *Pipistrellus pygmaeus* and serotine *Eptesicus serotinus*. The closest bat record represents a soprano pipistrelle, located 20m south-east from the Site, with all others more than 350m away from Site.

1.2.2 A broad suite of baseline ecological surveys are being undertaken by WSP during 2017, including a Phase 1 habitat survey, which was used to identify areas of potential value to foraging and commuting bats and inform the design of the bat activity surveys,

1.2.3 The Survey Area, which is traversed by several roads, includes a range of habitats. East of the M3, the landscape is dominated by arable land, with associated hedgerows and parcels of broadleaved woodland. The central area between the three major roads (A34, A33 and M3) also contains a variety of habitats, including grazed semi-improved pastures and several semi-natural and plantation broadleaved woodlands. The majority of woodland is located within the highway boundary. The River Itchen passes through the north and west of the Survey Area flowing in a south-westerly direction and is characterised by a number of interconnected channels with associated wetland and flood meadow grasslands.

1.3 BRIEF AND OBJECTIVES

1.3.1 Highways England commissioned WSP UK Ltd to complete bat activity surveys of the Survey Area. The brief was to:

- Complete a bat activity survey comprising repeated manual transect surveys and the deployment of automated bat detectors to identify the species of bat active on Site, and provide an indication of relative activity levels;
- Provide an initial appraisal of the likely conservation value of the bat assemblage present and make recommendations as to how proposals should account for bats with respect to legislation, planning and biodiversity policy.

1.3.2 The methods and results of this survey, and subsequent recommendations, are included within this report.

2 METHODOLOGY

2.1 WALKED TRANSECT SURVEY

2.1.1 The activity transect surveys were carried out with consideration of the relevant industry standard guidance (Collins, 2016). The Survey Area includes habitats which are of low suitability (arable land) and habitats which are of high suitability (River Itchen corridor) for foraging bats. The Survey Area overall therefore is likely to be of moderate suitability.

2.1.2 The walked transect surveys involved walking two transect routes. These were selected to sample a representative range of habitats within the Survey Area, which took in the Site and a buffer 250m around it. The transect routes are shown on Figure 2-1.

2.1.3 Monthly visits were made to these transects at dusk between late May and September 2017. An additional dawn transect was carried out in late August 2017. On each survey visit, the direction of travel and where possible, the starting points, were changed to ensure that different parts of the Survey Area were surveyed at different times of the night.

2.1.4 Bat activity was recorded using EM3 full spectrum detectors. These automatically record all bat passes detected, which significantly reduces the chances that bats could be missed due to human error. Wherever possible, surveyors recorded the observed behaviour and numbers of bats onto a standard field pro forma. This was to aid identification and also to provide additional detail on the behaviour of observed bats such as direction of flight and type of activity (e.g. foraging or commuting). Field notes included a record of the time of each bat encounter, allowing results to be cross-referenced with the recorded data.

2.2 STATIC DETECTOR SURVEYS

2.2.1 Static detectors were employed between early June and mid-October 2017. A total of six detectors were deployed in the Survey Area in representative locations. These are shown in Figure 2-1. A total of five deployment periods were covered, with two periods in June and monthly deployments thereafter. The early June deployment was considered a proxy for May data.

2.2.2 Each deployment was set to cover a minimum of five nights, though some technical malfunctions resulted in fewer nights being covered on some occasions. Where data gathering fell below the required amount, measures were undertaken to rectify the situation; these instances are outlined below (see Section 2.4).

2.2.3 The static detectors consisted of Wildlife Acoustics Song Meter 2 (SM2) bat detectors. These detectors are full spectrum detectors that are triggered automatically to record bat echolocation calls. These detectors can be deployed and left to remotely record bat activity for a period of several nights.

DATA ANALYSIS

2.2.4 Bat calls were analysed using Analook software to allow identification of the bat species present, where possible, and their relative levels of activity. For the purpose of the analysis a bat pass is defined as a single, uninterrupted sequence of echolocation calls lasting a maximum of 10 seconds (SM2 detectors).

2.2.5 For *Pipistrellus* species, the following criteria based on measurements of peak frequency are used to classify calls:

- Common pipistrelle *Pipistrellus pipistrellus* ≥ 42 and <49KHz
- Soprano pipistrelle *Pipistrellus pygmaeus* ≥ 51KHz
- Nathusius pipistrelle *Pipistrellus nathusii* < 39KHz
- Common / soprano pipistrelle ≥49 and <51KHz
- Common / Nathusius' pipistrelle ≥39 and <42KHz

2.2.6 In addition, the following categories are used for calls which cannot be identified with confidence due to the overlap in call characteristics between species or species groups:

- *Myotis sp.* (to include six possible species: Daubenton's bat *M. daubentonii*, Natterer's bat *M. nattereri*, whiskered *M. mystacinus*, Brandt's bat *M. brandtii*, alcathoe bat *M. alcathoe*, and/or Bechstein's bat *M. bechsteinii*)
- *Myotis / Plecotus* sp. (*Myotis* or brown long-eared bat *Plecotus auritus*. It is assumed that all *Plecotus* passes will be that of a brown long-eared bat rather than grey long-eared *Plecotus austriacus* because the Site is outside grey long-eared bat's known natural range (Harris & Yalden, 2008).
- *Nyctalus* sp. (either Leisler's bat *Nyctalus leisleri* or noctule *Nyctalus noctula*).
- Serotine *Eptesicus serotinus* / Leisler's bat.
- Serotine / *Nyctalus sp.*

DATES AND PERSONNEL

2.2.7 A total of five dusk visits were made to each transect and an additional dawn visit was undertaken in August (totalling six visits to each transect). Each transect was walked by a team of two ecologists. The dusk surveys started 15 minutes before sunset and finished two hours after sunset. The dawn transects were started two hours before sunrise and finished at sunrise. The survey dates, timings and weather conditions during the survey visits are detailed in Table 2-1.

Table 2-1 Survey dates, timings and weather conditions

DATE	TRANSECT	START TIME	END TIME	WEATHER CONDITIONS SUMMARY
31 May 2017	2	20:50	23:10	Light breeze, largely clear skies, dry conditions, temperature: 20° C.
1 June 2017	1	20:50	23:10	Light breeze, largely clear skies, dry conditions.
26 June 2017	1 & 2	21:09	23:24	Calm, largely clear skies, dry conditions, temperature: 16-14° C.
24 July 2017	1 & 2	20:50	23:28	Light breeze, clear skies, dry conditions, temperature: 16-15° C.
21 August 2017	1 & 2	19:59	22:14	Calm, light cloud cover, dry conditions, temperature: 22° C.
22 August 2017	1 & 2	04:00	06:05	Light breeze, overcast sky, dry conditions, light mist, temperature: 19° C
25 September 2017	1 & 2	18:45	20:59	Calm, overcast sky, dry conditions, temperature: 16° C.

2.2.8 The surveys were completed by experienced bat surveyors. They all have extensive consultancy experience and have undertaken bat survey work to inform the planning applications for a range of types of projects.

2.3 EVALUATION

2.3.1 The value of the Survey Area for bats was evaluated using the CIEEM guidance. This guidance recommends that valuation of site importance is made with reference to a geographical framework, for example a site is of local, regional, national value etc. To inform this assessment, the species assemblage and relative levels of activity recorded on Site were considered in the context of national abundance and geographical range of the species concerned. Consideration has also been given to which habitats/parts of the Survey Area are of highest value.

2.4 NOTES AND LIMITATIONS

2.4.1 On some occasions, the survey effort undertaken and the data gathered were either slightly short of five nights or were gathered in subsequent months to compensate for technical issues. In summary these were as follows:

- Locations 1, 2, 3, 4 and 6: Four nights of data was obtained in early June. This was compensated for by obtaining seven nights of data in late June with the exception of Location 4. At this location the late June deployment failed and five nights were gathered in mid-July. This is not likely to have resulted in any limitations with regards to the robustness of the data gathered.
- Location 6: four nights of data was gathered in July, however as an extra night of data was gathered in June, this is not likely to have resulted in any limitations with regards to the robustness of the data gathered.
- Location 1: A total of four nights of data was gathered in August. However eight nights of data was gathered for Locations 2-5 in August. An extra day of data was recorded for this location in September. Therefore, this is not likely to have resulted in any limitations with regards to the robustness of the data gathered.
- Locations 2 and 4: due to a technical malfunction, no data was gathered in September, however static detectors were redeployed at these locations in early October for five nights. Therefore, this is not likely to have resulted in any limitations with regards to the robustness of the data gathered.

2.4.2 Overall these variations are not likely to have resulted in a significant limitation to the survey as during the survey period, over 25 nights of data was gathered for all static detector locations.

3 RESULTS

3.1.1 WALKED TRANSECT SURVEYS

3.1.2 The transect surveys revealed the presence of several relatively common and widespread bat species, such as common pipistrelle, soprano pipistrelle and noctule. Very few recordings of other species such as serotine or Leisler's bat were noted during these surveys. The levels of activity recorded across the survey period showed little variation.

3.1.3 On Transect 1 (T1), activity was recorded along much of the route. The results did not indicate pronounced concentrations of activity in any one location. Observations were more frequent along the boundaries of the two pasture fields sampled by the transect (north and south of static detector Location 5) than the narrow path along which the transect runs approximately parallel to the River Itchen through dense woodland habitats. Small numbers of noctule and serotine were recorded in the fields with six confirmed observations of noctule throughout the survey period and serotine being observed on one occasion in September, though multiple passes (at least three recorded to allow identification) were noted adjacent to the northern edge of the northern field. *Myotis* passes were also recorded occasionally, with several along the River Itchen or in its vicinity across the survey period. Common pipistrelle and soprano pipistrelle were observed more frequently. The activity within the fields appeared higher along the western and southern edges of the northern field and occasionally in the southern corner of the southern field adjacent to a block of woodland. Both these areas are more sheltered and are likely to offer better foraging opportunities than the more exposed eastern edge which is on higher ground and adjacent to the M3.

3.1.4 The surveys along Transect 2 (T2) revealed very limited bat activity north of Easton Lane. This area is dominated by open arable land with little or no set aside. It is therefore likely that the invertebrate community in this area is very limited and as a result, foraging resource for bats is limited. The exposed nature of the areas covered by this transect is also likely to be a contributing factor in the lower levels of foraging activity compared to other areas sampled. Low levels of activity were recorded along Easton Lane itself, despite supporting unlit hedgerows on both sides, which are relatively well screened from the artificial light originating from the junction of the M3 and A34 (located at the western end of the lane). The habitats south of this lane include larger areas of set aside and a young, sparse plantation woodland belt, though this is located along a ridge and therefore relatively exposed. From here the land drops away south into a small valley, along which the southern part of T2 runs. This includes an unpaved track with widely spaced patches of scrub and small trees. The majority of the recordings noted during the walked transect surveys on T2 were along this track and the western edge of this southern field. The species recorded included much the same community as recorded along T1. Common and soprano pipistrelle were the most frequently recorded species with small numbers of *Myotis* and noctule being recorded. Serotine was recorded more frequently than on T1 though still with no more than seven observations.

3.1.5 In terms of the timing of the earliest recordings, the September visit to T1 revealed that a soprano pipistrelle and a *Myotis* bat were present foraging under the eastern part of the two large bridges which span the Itchen at 6 minutes after sunset. During the August visit to T2, four common pipistrelles were recorded moving north into the Survey Area along the western edge of the southernmost field between 25 and 34 minutes after sunset. As this timing coincides with the period in which common pipistrelles are known to emerge from their roosts; it is assumed that a roost is present to the south of the Survey Area.

3.1.6 Other early recordings included noctule 18 minutes after sunset on T1 in the north-eastern corner of the northern field on the early June visit, and several common pipistrelles approximately 20 minutes after sunset recorded in the northern field of T1 in July.

3.1.7 Based on the data set out above, the more valuable areas for foraging activity identified as a result of the transect are the River Itchen and associated habitats along the northern part of T1, the western, southern and (potentially) the northern edges of the two fields covered by T1, the western edge of the southern field covered by T2 (also seemingly a commuting route for common pipistrelle) and the lane along the southern edge of T2.

3.2 STATIC DETECTOR SURVEYS

3.2.1 The following tables set out summaries of the data gathered between June and October 2017 through the use of static detectors. Table 3-1 sets out the number of passes by each species recorded at each static detector location. Table 3-2 sets out the number of passes by each species, across the whole Survey Area, in each period of the night. This shows how the activity within the Survey Area is distributed through the night and whether early or late recordings (close to sunset or sunrise) indicate the presence of nearby roosts. Table 3-3 details the number of passes per night for each species at each location.

Table 3-1 Number of passes per species at each location

SPECIES	LOCATION 1	LOCATION 2	LOCATION 3	LOCATION 4	LOCATION 5	LOCATION 6	TOTAL
Common pipistrelle	42	806	391	415	1878	257	**3789**
Soprano pipistrelle	33	120	69	626	2378	221	**3447**
Noctule	172	158	56	200	192	291	**1069**
Serotine	3	89	104	2	1092	71	**1361**
Greater horseshoe bat	0	0	0	0	2	0	**2**
Barbastelle bat	0	5	0	0	1	4	**10**
Leisler's bat	1	7	9	0	21	8	**46**
Long eared bat sp.	0	9	3	0	18	15	**45**
Myotis sp	8	24	982	92	274	381	**1761**
Nathusius' pipistrelle	0	1	0	0	2	0	**3**
Noctule / Leisler's bat	1	0	0	0	0	0	**1**
PI-40[1]		3	5	1	2	1	**12**
PI-50[1]	6	124	12	116	2808	50	**3116**
Plecotus / Myotis	0	0	0	0	0	1	**1**
Nyctalus sp	10	15	11	20	28	27	**111**
Common / Soprano pipistrelle	3	0	0	0	0	0	**3**
Serotine / *Nyctalus* sp	1	3	6	0	16	5	**31**
Grand Total	**280**	**1364**	**1648**	**1472**	**8712**	**1332**	**14808**

[1] These are recordings of pipistrelle which could not be attributed with certainty to a single species but that show a closer association to either 40 kHz (common pipistrelle / Nathusius' pipistrelle) or 50 kHz (soprano pipistrelle).

Table 3-2 Number of passes per species during the distinct night periods

Species	Between sunrise and sunset	Time after sunset						Night period	Time before sunrise					
		0 – 20 mins	21 – 40 mins	41-60 mins	61-80 mins	81-100 mins	101-120 mins		120-101 mins	100-81 mins	80-61 mins	60-41 mins	40-21 mins	0-20 mins
Common pipistrelle	0	17	103	503	490	202	221	1456	122	154	113	303	105	0
Soprano pipistrelle	0	4	97	376	347	117	122	1792	49	69	83	306	85	0
Noctule	6	52	206	173	64	30	7	313	10	12	10	45	82	59
Serotine	0	0	184	249	238	146	128	220	9	24	22	78	63	0
Greater horseshoe bat	0	0	0	0	0	2	0	0	0	0	0	0	0	0
Barbastelle bat	0	0	0	0	0	0	1	9	0	0	0	0	0	0
Leisler's bat	0	4	4	5	7	5	7	12	1	0	0	0	1	0
Long eared bat sp.	0	0	0	1	1	3	2	38	0	0	0	0	0	0
Myotis sp	0	0	0	10	22	52	92	1268	54	74	144	44	1	0
Nathusius' pipistrelle	0	0	0	0	0	0	1	2	0	0	0	0	0	0
Noctule / Leisler's bat	0	0	0	0	0	0	0	1	0	0	0	0	0	0
PI-40	0	0	0	4	2	0	0	5	0	0	0	0	1	0
PI-50	0	2	108	229	152	152	228	2018	35	58	79	46	9	0
Plecotus / Myotis	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Nyctalus sp	0	3	2	10	12	8	7	51	5	2	5	1	4	0
Common / Soprano pipistrelle	0	0	0	0	1	0	0	2	0	0	0	0	0	1
Serotine / *Nyctalus* sp	0	0	0	5	5	3	4	12	0	0	0	1	1	0
Grand Total	**6**	**82**	**704**	**1565**	**1341**	**720**	**820**	**7200**	**285**	**393**	**456**	**824**	**352**	60

Table 3-3 Average number of passes per night for each species at each location

Species	Location 1	Location 2	Location 3	Location 4	Location 5	Location 6	Average
Common pipistrelle	1.61	27.79	12.61	15.370	60.58	9.52	**21.25**
Soprano pipistrelle	1.27	4.14	2.23	23.19	76.71	8.19	**19.29**
Noctule	6.62	5.45	1.81	7.41	6.19	10.78	**6.38**
Serotine	0.12	3.07	3.35	0.07	35.23	2.63	**7.41**
Greater horseshoe bat	0.00	0.00	0.00	0.00	0.06	0.00	**0.01**
Barbastelle bat	0.00	0.17	0.00	0.00	0.03	0.15	**0.06**
Leisler's bat	0.04	0.24	0.29	0.00	0.68	0.30	**0.26**
Long eared bat sp.	0.00	0.24	0.10	0.00	0.52	0.56	**0.24**
Myotis sp	0.31	0.83	31.68	3.41	8.84	14.11	**9.86**
Nathusius' pipistrelle	0.00	0.03	0.00	0.00	0.06	0.00	**0.02**
Noctule / Leisler's bat	0.04	0.00	0.00	0.00	0.00	0.00	**0.01**
PI-40	0.00	0.10	0.16	0.04	0.06	0.04	**0.07**
PI-50	0.23	4.28	0.39	4.30	90.58	1.85	**16.94**
Plecotus / Myotis	0.00	0.00	0.00	0.00	0.00	0.04	**0.01**
Nyctalus sp	0.38	0.52	0.35	0.74	0.90	1.00	**0.65**
Common / Soprano pipistrelle	0.12	0.00	0.00	0.00	0.00	0.00	**0.02**
Serotine / *Nyctalus* sp	0.04	0.10	0.19	0.00	0.52	0.19	**0.17**
Grand Total	**10.78**	**46.96**	**53.16**	**54.53**	**280.96**	**49.36**	**82.63**

3.2.2 The data summarised in Table 3-1 shows that overall the highest number of recordings by all species was made at Location 5 (8,712 of the 14,808 - 58.8% of all calls across all locations and survey locations - with an average of 281 passes per night). At this location, the highest number attributed to any one species was 2,378 by soprano pipistrelle, though 2,808 calls which could only be identified as common or soprano pipistrelles were also recorded. Common pipistrelle accounted for a further 1,878 passes with serotine accounting for a further 1,092 passes. This was the highest total of passes by serotine at any of the locations, with the next highest peak being 104 at Location 3. This number was largely due to a large number of passes recorded during the late June deployment at Location 5, where 1,057 passes by serotine were recorded. This was not in any way reflected in the numbers recorded by the previous or subsequent deployments and the recordings were evenly spread through the late June deployment. This could suggest the presence of a locally available food source being used for a short period.

3.2.3 Activity levels at the other locations were much lower in comparison. Locations 2, 3, 4 and 6 seem to support broadly comparable levels of bat activity with between 1,332 and 1,648 (between 47.03 and 54.52 passes per night) passes of all species being recorded through the survey period. Location 1, located within the roundabout, had much lower levels of activity with only 280 passes (an average of 10.77 passes per night recorded throughout the survey period.

3.2.4 In terms of the relative levels of use by the various species, common and soprano pipistrelle accounted for the highest numbers of passes overall (with 25.5% and 23.3% of total passes respectively). Similarly to the trend identified above, both these species were recorded more often at Location 5 that at the other locations, with 1,878 of the 3,789 (49.5%) common pipistrelle passes at all locations and 2,378 of the 3,447 soprano pipistrelle passes (68.9%) recorded across all locations. A relatively high number of passes which could not be attributed with certainty to either common or soprano pipistrelle species (shown as PI-50 in the tables above) were also recorded. These showed a similar trend to common and soprano pipistrelles, with 2,808 of the 3116 passes (90%) recorded across all locations.

3.2.5 Noctule and serotine were the next most numerous in terms of numbers of passes recorded. The highest number of noctule passes was recorded at Location 6 (291 passes) and Location 4 (200 passes) with slightly lower numbers at Locations 1, 2 and 5 and only 56 passes at Location 3.

3.2.6 In total, 1,761 passes by *Myotis* sp. were recorded. Over half of these passes were from Location 3 with Locations 6 and 5 respectively recording the next highest numbers of passes of this species group.

3.2.7 Several species were recorded very infrequently. A total of ten Barbastelle bat *Barbastella barbastellus* passes was recorded, with five from Location 2, four from Location 6 and one at Location 5. Two Greater horseshoe bat *Rhinolophus ferrumequinum* were recorded at Location 5. These were within four minutes of each other on 25 August 2017.

3.2.8 The analysis of the timings of the passes recorded as shown in Table 3-2 highlights that six noctule passes were recorded at or just before sunset. A further 52 passes were recorded shortly after, between sunset and 20 minutes after sunset. Of these 58 passes, the majority were from Location 4 (24) and Location 2 (17). Noctule typically emerge in the early evening and occasionally emerge before sunset (University of Bristol, 2005), indicating the possibility of a roost in the vicinity of these detector locations.

3.2.9 Few early or late recordings of the other species were noted, though 17 passes of common pipistrelle and four of soprano pipistrelle were recorded between sunset and 20 minutes after sunset. All but two of these were from Location 3 on 21 August 2017 (with the remaining two passes at the same location the following night both at nine minutes after sunset). As this activity was not repeated on subsequent survey nights, it is likely that a single bat or a small number of bats were foraging in the vicinity of the detector, rather than using a habitual commuting route from a nearby roost.

3.2.10 Three of the four early soprano pipistrelle passes that were recorded at Location 3 on 28 June 2017 were within 19 and 20 minutes after sunset. The fourth was recorded at Location 6 on 26 September 2017, at 19 minutes after sunset. Again, this may suggest emergence from a nearby roost, though the first three may be the same individual foraging near the detector. A further two early passes attributed to pipistrelle species were recorded. Both were recorded on 28 June 2017 at Location 5, 19 minutes after sunset. The lack of regularly occurring passes by a given species at the times indicative of emergence or re-entry suggests that the static detectors were not located on regularly used commuting routes.

3.2.11 Late returning bats were recorded on a number of occasions, with 59 passes of noctule recorded between 20 minutes before sunrise and sunrise. Of these, 29 were at Location 4 and 23 were at Location 5. Of the remaining seven passes, six were recorded at Location 6 and one at Location 3. Of the 29 passes at Location 4, 14 were from the 26 July 2017 and the remaining passes were from three other dates in July and two in June. Of the 23 passes at Location 5, 13 were from the 2 July 2017, with the remaining passes being from 26 July 2017 (nine passes) and 3 July 2017 (one pass). No clear trend in this occurrence is immediately obvious. The lack of regular occurrence again suggests that the static detectors were located on routes used occasionally by commuting bats. It is however likely that roosts of this species are present in the vicinity of the Survey Area.

3.3 EVALUATION OF THE SURVEY AREA FOR BATS

3.3.1 The evaluation uses the CIEEM geographic frames of reference as set out in Section 2.3. Relative frequency of each species based on the bat call data generated during the activity surveys is considered in the context of their UK status and population estimates (using the categories set out in Section 2.3) and is shown in Table 3-4 below.

3.3.2 The status of *Myotis* species varies according to the species, therefore given the uncertainty as to the identification of species present the statuses are not given here. However, the Survey Area is likely to be of at least local level importance for some *Myotis* species given the comparatively high levels of activity encountered and because all *Myotis* species are relatively uncommon and some are very rare.

Table 3-4: Evaluation of Importance of Survey Area to Bat Species Recorded

SPECIES	UK STATUS[2]	COUNTY STATUS[3]	EST. UK POP[4]	RELATIVE FREQUENCY IN THE SURVEY AREA	LIKELY VALUE OF SURVEY AREA TO POPULATIONS OF BAT SPECIES
Barbastelle	Rare	Rare but widespread	5,000	Infrequent with 10 passes only.	Zone of Influence
Brown long-eared	Common	Common and widespread	245,000	Infrequent	Zone of Influence
Greater horseshoe	Rare	Very rare	6,600	Very infrequent with two passes only	Zone of Influence

[2] UK Status is based on the National Bat Monitoring Programme (NBMP) Population Trends 2016 (BCT, 2017)
[3] County Status based on information gained from the Hampshire Bat Group website http://www.hampshirebatgroup.org.uk/bats-in-hampshire/hampshire-bats
[4] Estimated UK Population based on Battersby (2005) or Harris *et al* (1995)

SPECIES	UK STATUS[2]	COUNTY STATUS[3]	EST. UK POP[4]	RELATIVE FREQUENCY IN THE SURVEY AREA	LIKELY VALUE OF SURVEY AREA TO POPULATIONS OF BAT SPECIES
Noctule	Uncommon	Uncommon and mostly present in the southern part of the County.	50,000	Regular	Local
Leisler's	Scarce	Scarce	10,000	Very infrequent	Zone of Influence
Serotine	Uncommon	Uncommon but widespread	15,000	Infrequent and largely limited to a peak of activity of very short duration in one location	Local
Common pipistrelle	Common	Common	2.43 million	Very frequent	Local
Soprano pipistrelle	Common	Common	1.3 million	Very frequent	Local

4 IMPLICATIONS FOR DEVELOPMENT

4.1 OVERVIEW

4.1.1 The bat surveys carried out in 2017 concentrated on identifying the areas or linear features likely to be most important for bats in terms of foraging and commuting.

4.1.2 Based on the information gathered and set out above, the areas which have been identified as most important for foraging and commuting are shown in Figure 4-1 and listed below:

- The linear features (hedgerow and scrub) along the western and southern parts of the fields covered by T1. The gateway between these two fields is also covered by the static detector placed at Location 5. These were mostly foraging areas for pipistrelle species as well as noctule and serotine. The data obtained from the static detector at Location 5 also suggests that this area is of importance to the above species and is where the majority of the *Myotis* activity was recorded.
- The western edge of the southernmost field covered by T2 (a linear feature formed by planted woodland on the roadside) which was used by foraging individuals of pipistrelle species, as well as commuting common pipistrelle.
- The track along the southern edge of the southern field covered by T2 which was also used by foraging pipistrelles.
- The river corridor habitats along the Itchen.

4.1.3 The Proposed Works have potential to affect all of these areas to some degree. Legislation and planning policy pertaining to bats is set out below. Recommendations, including for further survey and detailed design, is provided within Section 5.

4.2 LEGAL COMPLIANCE

4.2.1 Bats and their roosts are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2010 (as amended) (the 'Habitat Regulations'), the legislation means that it is an offence to:

- *deliberately capture, injure or kill a wild bat;*
- *deliberately disturb wild bats; 'disturbance of animals includes in particular any disturbance which is likely:*
  - *(a) to impair their ability —*
    - *(i) to survive, to breed or reproduce, or to rear or nurture their young; or*
    - *(ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or*
  - *(b) to affect significantly the local distribution or abundance of the species to which they* belong'
- *damage or destroy a breeding site or resting place used by this species.*

4.2.2 Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of animals when using places of shelter, and obstruction of access to places of shelter.

4.2.3 Certain species of bats including the noctule bat, brown long-eared bat and soprano pipistrelle bat recorded during these surveys are also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

4.3 PLANNING POLICY COMPLIANCE

4.3.1 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport 2014). This states inter alia that the principals and objectives of the government's 2012 Natural Environment White Paper (NEWP) and Biodiversity 2020 strategy should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats, on other species identified as being of principal importance for the conservation of biodiversity and that potential impacts on ecosystems should be clearly set out.

4.3.2 At the national level the National Planning Policy Framework (NPPF) (2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including reptile species. The Office of the Deputy Prime Minister circular 06/2005 also provides supplementary guidance, including confirmation that '*the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.*

4.3.3 The NPPF sets out, amongst other points, how at an overview level the '*planning system should contribute to and enhance the national and local environment by:*

- recognising the wider benefits of ecosystem services;
- 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,

including by establishing coherent ecological networks that are more resilient to current and future pressures…'

4.3.4 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:

- *' if significant harm resulting from a development cannot be avoided…adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *opportunities to incorporate biodiversity in and around developments should be encouraged;*
- *planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland…unless the need for, and benefits of, the development in that location clearly outweigh the loss…'*

4.3.5 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled Biodiversity. This states '*The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:*

- *Protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development.*
- *Supporting habitats that are important to maintain the integrity of European sites.*
- *New development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.*
- *New development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort.*
- *Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.*
- *Maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.*
- *Supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.*
- *Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys'.*

4.3.6 The Biodiversity Action Plan for Hampshire (2000) lists four species/ species groups recorded within the survey area: Barabastelle, serotine, Bechstein's bat, Greater horseshoe and Pipistrelle bats.

5 RECOMMENDATIONS

5.1 FURTHER SURVEY

5.1.1 Comparatively high levels of *Myotis* activity was recorded to the centre of the Site, in particular at static detector Location 3. As this species group includes some rare species and much of this area will be affected by the Proposed Works, it is recommended that further investigative work is undertaken to help establish the likely composition of the *Myotis* fauna using this area. This would allow a more robust impact assessment to be made and would inform requirements for avoidance, mitigation and compensation measures.

5.1.2 Initially, this could involve further analysis on the existing call data[5] which may provide an indication of species composition. This could be supported by an updated desk study to search for new records. In addition, consideration should be given to undertaking bat trapping surveys, which is the only way to reliably identify *Myotis* bats. Such surveys require suitable expertise (*i.e.* surveyors with class 3 or 4 bat licences) and can be undertaken between May and October (indicatively, two visits, avoiding June to mid-July when young bats are born).

5.2 LANDSCAPE DESIGN

5.2.1 New planting (trees, hedgerows and shrubs) to compensate for lost commuting and foraging habitat should be included in the scheme. Planting adjacent to the road should be set back from the road with an appropriate buffer in order to ensure that the road corridor itself does not become an attractive feature to foraging and commuting bats which could increase the risk of collision with motor vehicles. Ideally, hedgerows should be allowed to grow as tall as possible and be a mix of native woody species.

5.2.2 Drainage designs should seek to include areas of wet ground vegetated with native species which would attract invertebrates upon which bats forage.

5.2.3 Dependent upon the outcome of detailed landscape design (and the net balance of habitat loss and gain), it may be appropriate to provide compensatory habitat in an off-Site area.

5.2.4 Further recommendations with respect to landscape design are provided in Section 5.4 below.

5.3 LIGHTING DESIGN

5.3.1 Lighting both during the construction phase and operational phase of the Proposed Works could have a negative effect upon bat activity. Whilst some lighting occurs in the area already and illumination of new carriageways is likely to be necessary for road safety reasons, it is recommended that lighting should be sensitively designed to minimise potential effects upon wildlife in general and bats in particular. The following recommendations are made:

- → Use the minimum light levels necessary for the relevant task / function, this may equate to reducing light intensity, and/or using the minimum number or light sources or minimum column height;

[5] Whilst it is not always possible to identify individual *Myotis* species based on calls alone, analysis by an expert should be able to provide an indication of species composition.

- Use hoods, louvres or other luminaire design features to avoid light spill onto retained and newly created areas of vegetation likely to be used by foraging and commuting bats;
- Use narrow spectrum light sources where possible to lower the range of species affected by lighting, specifically avoiding shorter wavelength blue light, using instead warm/neutral colour temperature <4,200 kelvin lighting (BCT, 2014b); and
- Use light sources that emit minimal ultra-violet light to avoid attracting night-flying invertebrate species which in turn may attract bats to the light.

5.3.2 Where possible, consideration should also be given to varying the lighting levels in particularly ecologically valuable areas. For example, it may be possible to reduce lighting levels or perhaps even switch installations off after certain times, e.g. between 00:00 and sunrise in the vicinity of tree lines of proposed landscaping. This use of “adaptive lighting” can tailor the installation to suit human health and safety as well as wildlife needs (BCT, 2014b).

5.4 ECOLOGICAL ENHANCEMENT

5.4.1 Ecological enhancement measures to benefit bats present in the local landscape should be designed into the Proposed Works. These should include the provision of new roosting opportunities (i.e. bat boxes) and the use of a range of native plant and shrub species in landscaping to maximise structural diversity (and value as foraging habitat for bats) and botanical species selected to be beneficial to night flying insects to improve foraging opportunities for bats in the landscape surrounding the road route. The following species could also be included within any soft-landscaping proposals to encourage night flying insects, thus improving foraging opportunities on site for bats: ox-eye daisy *Leucanthemum vulgare*, common mallow *Malva sylvestris*, elder *Sambucus nigra*, hawthorn *Crataegus monogyna*, and honeysuckle *Lonicera periclymenum*. (BCT, 2012a).

6 CONCLUSIONS

6.1.1 From the data gathered, it is reasonable to conclude that in general, the Survey Area supports a fairly typical assemblage of widespread bat species, with the exception of a small number of rarer species (such as greater horseshoe and barbastelle bats). However, high levels of *Myotis* activity were observed from an area which will be directly affected by the Proposed Works, and for this reason further investigative work is recommended to allow a robust impact assessment and to inform mitigation requirements.

7 REFERENCES

7.1 PROJECT REFERENCES

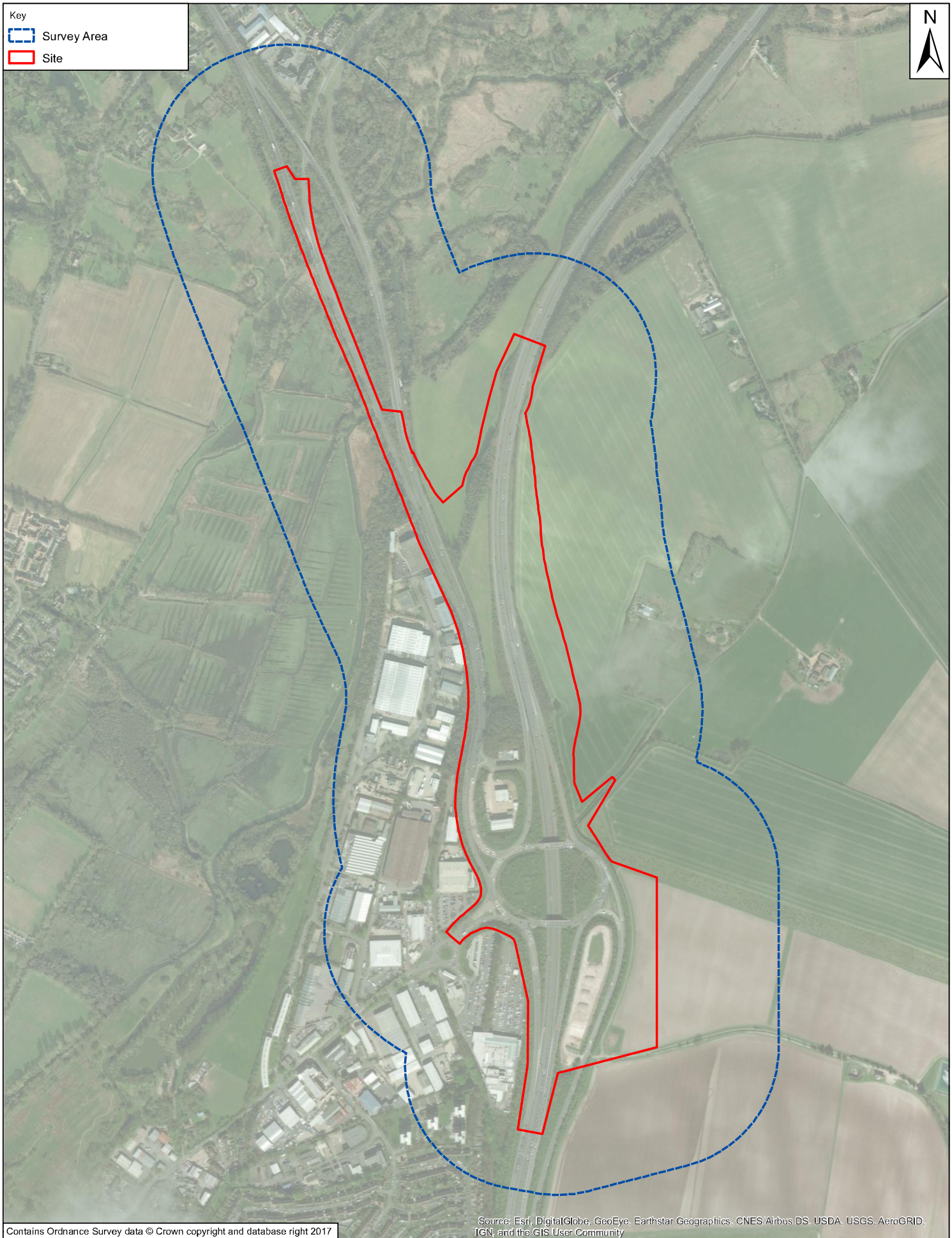
- WSP (2016). M3 Junction 9 Improvement PCF Stage 1. Ecological Desk Study
- WSP (2017). M3 Junction 9 Improvement PCF Stage 2. Phase 1 Habitat Survey

7.2 TECHNICAL REFERENCES

- Bat Conservation Trust (2012a). Encouraging Bat – A Guide for Bat-friendly Gardening and Living.
- Bat Conservation Trust (2014b). Artificial Lighting and Wildlife – Interim Guidance: Recommendations to help minimise the impact of artificial lighting
- Bat Conservation Trust, (2014a). The National Bat Monitoring Programme. Annual Report 2013. Bat Conservation Trust, London
- Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd Edition.* Bat Conservation Trust, London.
- Department for Communities and Local Government (2012). National Planning Policy Framework. Department for Communities and Local Government, London.
- Dietz et al. (2009). Bats of Britain Europe and Northern Africa. A&C Black.
- Harris, S. & Yalden, D. (2008). Mammals of the British Isles: Handbook, 4th edition. The Mammal Society. 328-331
- Her Majesty's Stationary Office (HMSO) (1981). Wildlife and Countryside Act (as amended by the Countryside and Rights of Way Act 2000)
- HMSO (2005). Biodiversity and Geological Conservation – Statutory Obligations and Their Impact Within the Planning System. Office of the Deputy Prime Minister (ODPM) Circular 06/2005 HMSO, Norwich.
- HMSO (2006). Natural Environment and Rural Communities Act.
- HMSO (2010). The Conservation of Habitats and Species Regulations 2010 as amended (the Habitat Regulations)
- Mitchell- Jones, A.J (2004). Bat Mitigation Guidelines. English Nature.
- Russ, J (1999). The Bats of Britain and Ireland: Echolocation Calls, Sound Analysis and Species Identification. Alana Ecology Ltd.
- Russ, J (2013). British Bat Calls a Guide to Species Identification. Pelagic Publishing.
- University of Bristol (2005). *Bats of Britain website*, available at http://www.bio.bris.ac.uk/research/bats/britishbats/index.htm and accessed on 25 November 2016.

8 FIGURES

8.1 FIGURE 1-1 SITE LOCATION PLAN



REV	DATE	BY	DESCRIPTION	CHK	APP

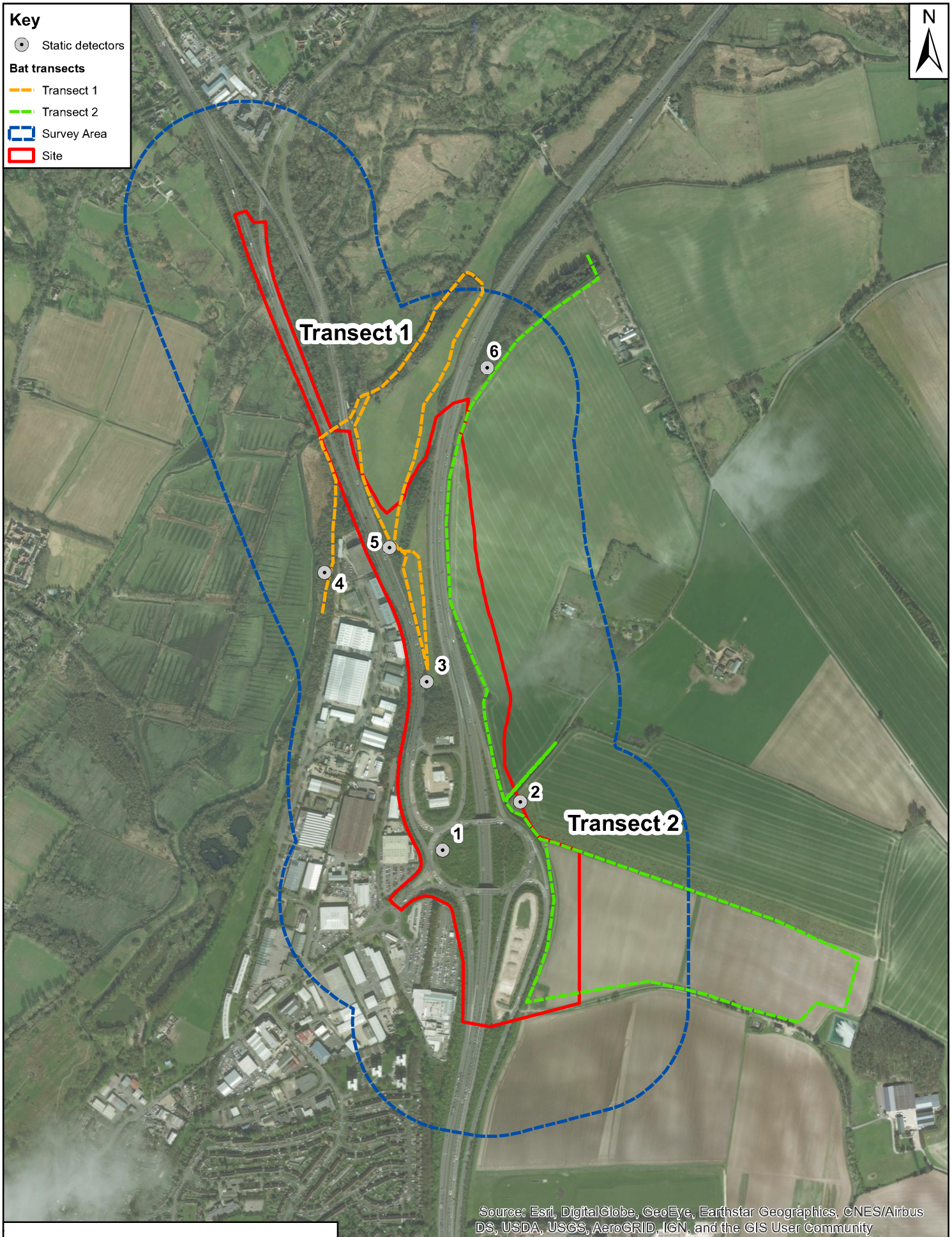
DRAWING STATUS: DRAWING STATUS

PROJECT: M3 Junction 9

TITLE: Site Location Plan

SCALE @A3:	CHECKED:	APPROVED:
7,000	LR	HS
FILE:	**DRAWN:**	**DATE:**
A3 Template	BW	August 2017
PROJECT No:	**DRAWING No:**	**REV:**
70016638	1.1	A

8.2 FIGURE 2-1 BAT ACTIVITY SURVEY RESULTS



REV	DATE	BY	DESCRIPTION	CHK	APP

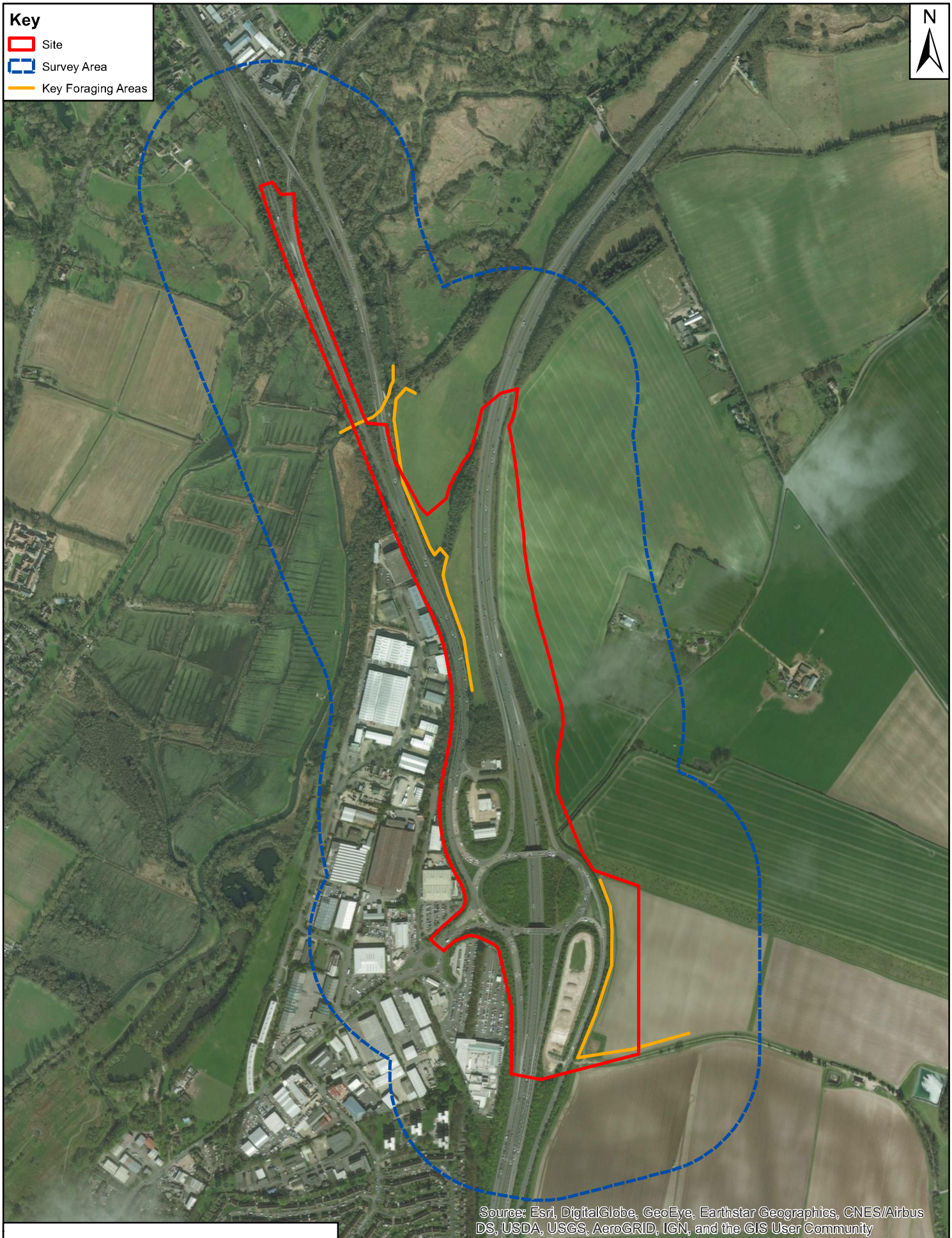
DRAWING STATUS: DRAWING STATUS

PROJECT: M3 Junction 9

TITLE: Bat Activity Survey Results

SCALE @ A3:	CHECKED:	APPROVED:
11,000	LR	AH
FILE:	DRAWN:	DATE:
Bat Results	SC	November 2017
PROJECT No:	DRAWING No:	REV:
70016638	2-1	A

8.3 FIGURE 4-1 KEY FORAGING AREAS



REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: DRAWING STATUS

wsp

highways england

PROJECT: M3 Junction 9

TITLE: Key Foraging Areas

SCALE @ A3:	CHECKED:	APPROVED:
10,000	LR	AH
FILE:	DRAWN:	DATE:
Bat Results	BW	November 2017

PROJECT No:	DRAWING No:	REV:
70016638	4-1	A

APPENDIX B8-6 PRELIMINARY BAT ROOST ASSESSMENT

M3

Junction 9 Improvement Scheme

Preliminary Bat Roost Assessment Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

PRELIMINARY BAT ROOST ASSESSMENT REPORT

Highways England

First Issue

Project no: 70016638
Date: January 2018

Mountbatten House
Basing View
Basingstoke
Hampshire
RG21 4HJ

Tel: +00 44(0) 1256 318 800
Fax: +00 44(0) 1256 318 700

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	P01			
Date	January 2018			
Prepared by	Rosie Pope			
Signature	 Digitally signed by Pope, Rosie DN: cn=Pope, Rosie, ou=Sodalming (Westbrook Mills), email=Rosie.Pope@wsp.com Date: 2018.01.15 09:06:42 Z			
Checked by	Luke Roberts			
Signature	 Roberts, Luke 2018.01.15 11:57:38 Z			
Authorised by	Adrian Hutchings			
Signature	 Hutchings, Adrian I am approving this document 2018.01.15 09:24:14 Z			
Project number	70016638			
Report number	P01			
File reference	HE-WSP-GEN-M3J9PCF3-RP-LE-00013			

PRODUCTION TEAM

CLIENT (HIGHWAYS ENGLAND)

Major Projects Senior Responsible Officer	Steve Hoesli
Major Projects Programme Manager	Neil Andrew
Major Projects Project Manager	Simon Hewett
Senior User Representative	Paul Benham

WSP

RIS Area 3 Programme Director	Steve O'Donnell	Tel: +44 (0)1684 851751
RIS Area 3 Programme Manager	Stuart Craig	Tel: +44 (0)1256 318 660
M3 Junction 9 Project Director	Roland Diffey	Tel: +44 (0) 1256 318 777
M3 Junction 9 Project Manager	Pradeep Agrawal	Tel: +44 (0)207 337 1700
RIS DCO Programme Lead	Amy Hallam	Tel: +44 (0)1392 229 700

TABLE OF CONTENTS

APPENDICES

EXECUTIVE SUMMARY

WSP is undertaking a suite of ecological surveys for Highways England on land around the M3 Junction 9 proposed improvement works. This report details the methods, results and recommendations resulting from a Preliminary Bat Roost Assessment (PBRA) undertaken on land within 50m of the maximum extent of works (which incorporates all options, hereafter referred to as the Site), hereafter referred to as the 'Survey Area'.

The Survey Area contains a range of habitats including woodland, scattered trees, hedgerows and scrub, as well as wetland, grassland and tall ruderal habitat which may support foraging, commuting and roosting bats. Nine concrete-based bridge structures are also present which traverse the River Itchen.

In order to obtain a detailed overview of the likely value of the site for roosting bats, all structures and trees (and mature scrub specimens) within the Survey Area were assessed from the ground for the presence of features (holes, cracks, crevices) capable of supporting individuals or groups of this order. Trees and structures within the Survey Area were classified as having negligible, low, moderate or high suitability for support bat roosts. Potential Roost Features (PRFs) were recorded in detail and photographed.

Results from the PBRA were as follows:

- One structure of high bat roost suitability
- Four structures of moderate bat roost suitability
- Eight groups of trees with moderate bat roost suitability
- Five groups of trees with low bat roost suitability
- One individual tree with high bat roost suitability
- 15 individual trees with moderate bat roost suitability
- 26 individual trees of low bat roost suitability.

The majority of the trees with roost suitability were identified in the north-west of the Survey Area, within woodland and wetland habitats. The bridge structures with high and moderate roost potential are located in the north of the Survey Area also. All results are shown at Figure 1-1.

Although the final designs of the road alignment are not currently available, some of the trees and structures with roost suitability within the Survey Area will likely be directly or indirectly affected by the Proposed Works. It is recommended that, where possible, trees and structures with roost suitability are retained and protected within the final design.

For trees and structures that will be affected, section 6 of this report gives recommendations for further survey work (for moderate-high suitability trees) and preliminary mitigation measures. Further surveys will include at height inspection of trees to confirm their potential to support bat roosts, as well as potential dusk emergence and/or dawn re-entry surveys.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.

1.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within the Environmental Assessment Report (EAR), namely:

- Option 14: Northbound and Southbound Free Flow Design
- Option 16B: Incremental Delivery – Northbound A34 Free Flow Link
- Option 16C: Incremental Delivery – Southbound A34 Free Flow Design

1.1.3 Further details of the Proposed Works are presented within the PCF Stage 2 EAR (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works for all options is shown on Figure 1-1, and is hereafter referred to as 'the Site.'

1.1.4 For the purposes of ecological assessment, in order to consider indirect effects on adjacent/nearby receptors in the form of potential bat roosts, a Survey Area of 50m around the Site was defined.

1.2 ECOLOGICAL BACKGROUND

1.2.1 An ecological desk study was carried out with respect to the Proposed Works by WSP in 2016 to gain an ecological background of the surrounding area using a 5km search radius (WSP, 2016). No records of bats were found from within the Site. A total of seven species were identified within a 5km radius: Daubenton's bat *Myotis daubentonii*; Natterer's bat *Myotis nattereri*; noctule bat *Nyctalus noctula*; brown long-eared bat *Plecotus auritus*; common pipistrelle *Pipistrellus pipistrellus*; soprano pipistrelle *Pipistrellus pygmaeus* and serotine *Eptesicus serotinus*. The closest bat record represents a soprano pipistrelle, located 20m south-east from the Site, with all other records located more than 350m away from Site.

1.2.2 A broad suite of baseline ecological surveys were undertaken by WSP during 2017, including a Phase 1 habitat survey (WSP, 2017a), which was used to identify areas of potential value to roosting bats.

1.2.3 Bat activity surveys undertaken (WSP, 2017b) concluded that, in general, the Survey Area supports a fairly typical assemblage of widespread bat species, with the exception of a small number of rarer species (such as greater horseshoe *Rhinolophus ferrumequinum* and barbastelle bats). However, high levels of *Myotis* activity were observed from an area which will be directly affected by the Proposed Works, namely along linear features (hedgerow and scrub) in the north-western and south-eastern sections of the Site.

1.2.4 The Survey Area, which is traversed by several roads, includes a range of habitats. East of the M3, the landscape is dominated by arable land, with associated hedgerows and parcels of broadleaved woodland. The central area between the three major roads (A34/A33 & M3) also contains a variety of habitats including grazed semi-improved pastures and several semi-natural and plantation broadleaved woodlands. The majority of woodland is located within the highways boundary. The River Itchen passes through the north and west of the Survey Area flowing in a south-westerly direction and is characterised by a number of interconnected channels with associated wetland and flood meadow grasslands.

1.3 BRIEF AND OBJECTIVES

1.3.1 Highways England commissioned WSP UK Ltd to complete a Preliminary Bat Roost Assessment (PBRA) of the 50m Survey Area in 2017. The brief and objectives were to:

- Complete a PBRA to determine the level of potential for bat roosts to be present within the trees and structures within the Survey Area and to search for evidence indicating current or historic use by bats using binoculars and following good practice guidelines (Collins, 2016).
- Record information regarding trees and structures with features that could be used by roosting bats, including a description of the feature(s), geographical co-ordinates (gathered using a handheld GPS unit), the tree species and its broad age category.
- Provide a technical report, including digitised, georeferenced maps, detailing the methods and results of the PBRA survey work, and any recommendations for avoidance, mitigation and enhancement, including any further survey (in line with good practice guidelines). All recommendations given are related to pertinent national and local legislation, planning and biodiversity policy.

2 METHODS

2.1 PRELIMINARY BAT ROOST ASSESSMENT

2.1.1 All trees and bridge structures within the Survey Area were inspected from ground-level to enable an assessment of their potential to support bat roosts and to search for evidence indicating the current or historic use by bat roosts.

2.1.2 Urban areas (and thereby all structures except bridges) were excluded from the assessment as they are unlikely to be significantly affected by the Proposed Works, as discussed in Section 3.3 below.

2.1.3 A visual inspection of the trees and bridge structures was completed using binoculars to search for potential roost features (PRFs) which may provide suitable roosting opportunities for bats in accordance with good practice guidelines (Collins, 2016), as summarised at Table 3.1 below.

2.1.4 Where suitable features were noted, their location and a brief description of their character were recorded. Additionally, each feature was visually inspected, where possible, for evidence indicating use by roosting bats such as droppings, urine staining and characteristic staining from fur oils. Inspected trees and bridges were categorised in line with descriptions in Table 3.1 as having negligible, low, moderate or high suitability for bat roosts. The location of trees and/ or bridges which were assessed to have bat roost suitability was recorded using a handheld GPS device and marked on a plan of the Survey Area.

2.1.5 Trees were grouped where they were identified to have similar potential roost features and were within close proximity to each other. Trees assessed to have negligible roosting potential were not recorded within the survey, although bridges of negligible suitability have been recorded for completeness.

Table 3.1 - Guidelines for assessing the potential suitability of proposed development sites for roosting bats (based on Table 4.1 in Collins, 2016).

SUITABILITY	DESCRIPTION OF ROOSTING HABITATS
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[a] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roost potential[b].
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[a], and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species

SUITABILITY	DESCRIPTION OF ROOSTING HABITATS
	conservation status, which is established after presence is confirmed).
High	A structure or tree with one or more potential roost roots that are obviously suitable for use by larger numbers of bats on a more regular basis and potential for longer periods of time due to their size, shelter, protection, conditions[a], and surrounding habitat.

[a] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.
[b] This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

2.2 DATES OF SURVEY

2.2.1 The first phase of assessments was undertaken of land within the Highways boundary on 24th April and 10th May 2017, under traffic management.

2.2.2 The second phase of assessments was undertaken of other land within the 50m Survey Area on 29th November – 1st December 2017.

2.2.3 Assessments were led by an Associate member of the Chartered Institute for Ecology and Environmental Management (ACIEEM) with over six years ecological consultancy experience. Survey work was assisted by a team of ecologists competent in carrying out PBRA.

2.2.4 Weather conditions during the surveys did not pose a constraint to the assessment.

2.3 NOTES AND LIMITATIONS

2.3.1 The surveys undertaken between the 8th and 10th of May 2017 were undertaken at night due to Traffic Management restrictions. This may have limited the visibility of PRFs, although high power torches were used as part of the assessment. Furthermore, this prevented the taking of photographs of these features. Due to this constraint, a precautionary approach was taken to tree assessments in these areas, comprising the A34 northbound, A34 southbound and habitat surrounding Junction 9 slip roads. For the surveys undertaken in April and May, many of the trees within the 50m Survey Area were in leaf. Potential obstruction of PRF identification within branches and or trunks may occur when a tree is in leaf, especially in large trees. As such, a precautionary approach was taken to these tree inspections when rating overall suitability.

2.3.2 During inspection of several of the bridge structures, namely those spanning a watercourse, a full inspection was not possible due to the inaccessibility of one or other sides of the watercourse (. B8 and B9, or due to the underside being too low to the water B4 and B5). As such, a precautionary approach was taken to these structure inspections when rating overall suitability.

2.3.3 The location of the trees within the Survey Area were recorded using a handheld GPS device. As such the spatial resolution of tree locations detailed within this report could potentially be limited, but by no more than several metres.

2.3.4 Urban areas (and thereby all structures except bridges) were excluded from the assessment as they are unlikely to be significantly affected by the Proposed Works. No buildings are scheduled for removal as part of the Proposed Works, and they are unlikely to be subject to significant increases in disturbance as they are already generally highly lit and subject to road disturbance, being industrial in nature.

3 RESULTS AND EVALUATION

3.1 OVERVIEW

3.1.1 Trees and structures with bat roosting suitability are located throughout the Survey Area, concentrated within the north-west of the Survey Area, on each side of the A34 running northwards (as shown at Figure 3-1). Within the whole Site, trees are located in a variety of habitats including wetland, scrub and woodland, and as isolated scattered trees in artificial environments (hardstanding).

3.1.2 The structures are all bridges, and are also distributed throughout the Survey Area, though mainly associated directly with the River Itchen in the north-west of the site and at the M3 roundabout.

3.1.3 Apart from the trees located in urban environments (namely commercial areas such as the Tesco car park), many of the trees and structures with roost suitability are also located near to suitable foraging and commuting habitats (see Figure 1-1 and Appendix B for details).

3.2 RESULTS

3.2.1 The results of the PBRA survey are summarised below, with a full table of results shown at Appendix B. Photographs, where applicable, are provided at Appendix A. In total 42 individual trees, 13 groups of trees and five structures were assessed as having low-high bat roosting suitability within the Survey Area. As shown in Figure 1-1, these comprise:

- One structure of high bat roost suitability
- Four structures of moderate bat roost suitability
- Eight groups of trees with moderate bat roost suitability
- Five groups of trees with low bat roost suitability
- One individual tree with high bat roost suitability
- 15 individual trees with moderate bat roost suitability
- 26 individual trees of low bat roost suitability.

3.2.2 Four of the bridge structures were assessed as having negligible suitability for roosting bats, due to the lack of cracks, holes, crevices or any other PRFs.

3.2.3 Of these all suitable features were assessed as likely summer/transitional roosts. In addition, four of the nine bridges were assessed as potentially being suitable for hibernating bats.

3.2.4 The trees with bat roost suitability are dominated by poplar species *Populus sp.* with many *Salix sp* and alder *Alnus glutinosa* also, ranging from semi-mature to mature and dead specimens, as detailed at Appendix A.

3.2.5 The structures (bridges) are all of concrete construction, with crevices formed by expansion gaps and associated cracks.

4 IMPLICATIONS FOR DEVELOPMENT

4.1 OVERVIEW

4.1.1 42 individual trees, 13 groups of trees and five structures (bridges) have been assessed as having low-high bat roosting potential. As three options for the route are currently being considered, the extent to which these features will be affected is not yet clear.

4.1.2 The following potential effects have been identified:

- Bat roosts could be destroyed, damaged or disturbed by the removal or pruning of trees identified as having potential to support roosting bats, if bats are present. Individual bats within these roosts could be affected.
- Removal of significant amounts of vegetation could indirectly affect bat roosts, if present, by removing key foraging resources, leading to changes in abiotic conditions (e.g. light, humidity) around roosts.
- Bats are known to avoid roosting in illuminated locations. The installation of new or modification of existing lighting could therefore negatively affect any bat roosts, should they occur within the Survey Area.
- Nearby roosts could be indirectly affected by lighting. Certain species of bat avoid foraging and commuting within the vicinity of artificial light, and artificial light may also negatively affect invertebrate assemblages upon which bats forage. The installation of additional lighting could therefore affect the viability of bat roosts occurring in the vicinity of the Proposed Works, even if they are not directly affected.

4.1.3 It is understood that the bridges within the Survey Area will not be altered/ directly affected by the Proposed Works. Nevertheless, should the proposals change to included alterations to these structures, then bat roosts could also be destroyed, damaged or disturbed by works (maintenance, refurbishment/restructuring, demolition). If bats are present. Individual bats within these roosts could be affected.

4.1.4 As all UK species of bats are protected under legislation and planning policy mechanisms, these effects are a material consideration for the scheme. The most pertinent legislation and policy is summarised below.

4.2 LEGISLATION

4.2.1 Bats and their roosts are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2010 (as amended) (the 'Habitat Regulations'), and as such it is an offence to:

- *deliberately capture, injure or kill a wild bat;*
- *deliberately disturb wild bats; 'disturbance of animals includes any particular disturbance which is likely:*
  - *(a) to impair their ability –*
    - *(i) to survive, breed or reproduce, or to nurture their young; or*
    - *(ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or*

- *(b) to affect significantly the local distribution or abundance of the species to which they belong' and*
- *damage or destroy a breeding site or resting place used by this species*.

4.2.2 Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of animals when using places of shelter, and obstruction of access to places of shelter.

4.2.3 Certain species of bat including the noctule bat, brown long-eared bat and soprano pipistrelle bat are also listed as Species of Principal Importance (SPI) for the Conservation of Biodiversity in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006), public bodies (including local planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

4.3 NATIONAL PLANNING POLICY

4.3.1 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport 2014). This states *inter alia* that the principals and objectives of the government's 2012 Natural Environment White Paper and Biodiversity 2020 Strategy should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures. The NPS also states that the likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats, on other species identified as being of principal importance for the conservation of biodiversity and that potential impacts on ecosystems should be clearly set out.

4.3.2 National Planning Policy Framework (NPPF) (2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including bats; the Office of the Deputy Prime Minister circular 06/2005 also provides supplementary guidance, including confirmation that 'the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.

4.3.3 The NPPF sets out, amongst other points, how at an overview level the '*planning system should contribute to and enhance the national and local environment by:*

- *…recognising the wider benefits of ecosystem services; and*
- *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, including by establishing coherent ecological networks that are more resilient to current and future pressures…'*

4.3.4 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:

- *'- if significant harm resulting from a development cannot be avoided…adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *- …opportunities to incorporate biodiversity in and around developments should be encouraged;*
- *- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland…unless the need for, and benefits of, the development in that location clearly outweigh the loss…'*

4.4 LOCAL PLANNING POLICY

4.4.1 Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled Biodiversity. This states '*The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:*

- *Protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development.*
- *Supporting habitats that are important to maintain the integrity of European sites.*
- *New development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.*
- *New development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort. Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.*
- *Maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.*
- *Supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.*
- *Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys.*

4.4.2 The Biodiversity Action Plan for Hampshire includes five bat species; barbastelle bat *Barbastella barbastellus*, serotine bat, Bechstein's bat *Myotis bechsteinii*, common pipistrelle and greater horseshoe bat *Rhinolophus ferrumequinum.* Four of these species (excluding Bechstein's bat) were recorded during bat activity surveys (WSP, 2017b).

5 RECOMMENDATIONS

5.1 OVERVIEW

5.1.1 This section provides recommendations for inspections at height and, where appropriate, further survey to be undertaken in accordance with good practice guidelines (Collins, 2016). The recommendations have been devised with the objective of making sure that the Proposed Works are compliant with relevant legislation and policy pertaining to bats, as summarised at Section 5. This will minimise the likelihood of delays being caused to the works programme.

5.1.2 Preliminary recommendations for mitigation measures are also provided, although it is recommended that a detailed Mitigation Strategy is produced following the results of further survey and preferred route selection.

5.2 FURTHER SURVEY

5.2.1 42 individual trees, 13 groups of trees and five structures (bridges) have been assessed from ground level as having potential to support roosting bats (low, moderate or high potential).

5.2.2 As, at this stage, it is understood that the bridges will remain unaffected by the Proposed Works, no further survey is recommended at this stage. However should the designs change to include alterations to the bridges with roost suitability (B1, B4, B5, B8, B9), then further survey should be considered.

5.2.3 Where potential impacts to trees (indirect or direct) upon trees with moderate-high roost suitability cannot be avoided through design, further survey should be undertaken. Initially, where possible an at-height inspection of PRFs should be undertaken.

5.2.4 At-height inspections of trees (and groups of trees) with moderate-high suitability ratings are undertaken to gather more information regarding the likely presence of roosting bats and inform the requirements of mitigation measures. At height inspections will further investigate the PRFs identified within the results of the preliminary bat roost assessment and confirm (or raise/lower) their assigned potential.

5.2.5 If potential roosting cannot be ruled out at this stage, additional survey effort may be appropriate such as additional at height inspections or bat emergence/ re-entry surveys.

5.2.6 As a precautionary approach has been used when classifying the suitability of the trees, it is considered reasonable that low-rated trees are not subject to further survey (though they will require mitigation measures). Trees with low potential will not require further survey but will require mitigation as detailed in Section 6.3.

5.3 PRELIMINARY MITIGATION MEASURES

5.3.1 The following section outlines preliminary mitigation measures which should be adopted and refined following the outcome of additional survey work outlined above.

ARBORICULTURAL GOOD PRACTICE MEASURES

5.3.2 Tree felling or pruning work should be done using good practice guidelines to further minimise the likelihood of causing disturbance or injury to bats, should they be present. Precautionary measures for tree felling and pruning required will likely include soft felling of trees and/or branches. Trees or branches with PRFs should be felled so as to avoid cross-cutting cavities or holes, and be left on the ground intact overnight to allow any bats present to disperse, in the unlikely event that they are present.

5.3.3 It is recommended that contractors undertaking tree works have basic bat awareness and adhere to guidance within British Standard BS8596:2015 *Surveying for bats in trees and woodland.*

SENSITIVE LIGHTING

5.3.4 Lighting during both the construction and operational phase of the Proposed Works could have a negative effect upon bat activity and roosting within the Survey Area.

5.3.5 It is recommended therefore that the lighting strategy for the Site seeks to:

- → Avoid, as far as possible, any additional lighting on trees with roosting suitability.
- → Use the minimum light levels necessary for the relevant task / function, this may equate to reducing light intensity, and/or using the minimum number of light sources or minimum column height.
- → Use hoods, louvres or other luminaire design features to avoid light spill onto retained and newly created areas of vegetation likely to be used by foraging and commuting bats.
- → Use narrow spectrum light sources where possible to lower the range of species affected by lighting, specifically avoiding shorter wave length blue light, using instead warm/neutral colour temperature <4,200 kelvin lighting (BCT, 2014).
- → Use light sources that emit minimal ultra-violet light to avoid attracting night-flying invertebrate species which in turn may attract bats to the light, or reduce food availability in the dark.

5.3.6 Where possible, consideration should also be given to varying the lighting levels in particularly ecologically valuable areas. These include river corridors, wetland and woodland areas, and the linear vegetated areas shown as most used by foraging bats in the north-west and south-east of the Site.

5.3.7 For example, it may be possible to reduce lighting levels or perhaps even switch installations off after certain times, e.g. between 00:00 and sunrise in the vicinity of tree lines of proposed landscaping. This use of “adaptive lighting” can tailor the installation to suit human health and safety as well as wildlife needs (BCT, 2014).

MITIGATION LICENCING

5.3.8 In the event that the presence of bat roosts is identified and impacts upon them cannot be avoided, it would be necessary to obtain a Natural England European Protected Species (EPS) Mitigation Licence to allow the Proposed Works to proceed legally.

5.3.9 The licence must be informed by an appropriate level of survey work and include a detailed mitigation strategy for the EPS in question. Mitigation licences are generally only granted once

planning permission is obtained, and the requisite mitigation strategy may include seasonal constraints to the works.

5.4 ECOLOGICAL ENHANCEMENT MEASURES

5.4.1 Planning policy promotes the inclusion of ecological enhancement so it is recommended that consideration is given to the following enhancement measures:

- Inclusion of nectar-rich plant species in soft landscaping areas, in suitable areas at sufficient distance from the new road, that are attractive to night-flying insects to enhance foraging opportunities for bats.
- Creation of linear vegetation (tree-lines and hedgerows) within the landscaping scheme to provide additional commuting corridors across the Site for bats.
- Provision of standing water-bodies to provide an additional foraging resource for bats using the site, which may benefit *Myotis* and *Nyctalus* bats in particular.
- Installation of additional bat boxes to suitable retained trees, at suitable positions, to increase the roosting opportunities for bats within the Survey Area.

6 CONCLUSION

6.1.1 The Proposed Works are likely to affect trees with suitability for roosting bats, although structures (bridges) with roost suitability will remain unaffected under the current proposals. Trees with potential suitability to support bat roosts could be affected directly through felling and pruning, and/or indirectly through nearby lighting and habitat loss/fragmentation.

6.1.2 At-height inspections of moderate to high suitability trees are recommended to gather information regarding the potential presence of roosting bats and inform the requirement for mitigation measures. Following this, further survey may be considered in the form of emergence/ re-entry surveys or further climbing survey.

6.1.3 Outline mitigation and enhancement recommendations are made which should be clarified within a Mitigation Strategy for the Site, and may be required to obtain a Natural England EPS Mitigation Licence for the Proposed Works.

7 REFERENCES

7.1 TECHNICAL REFERENCES

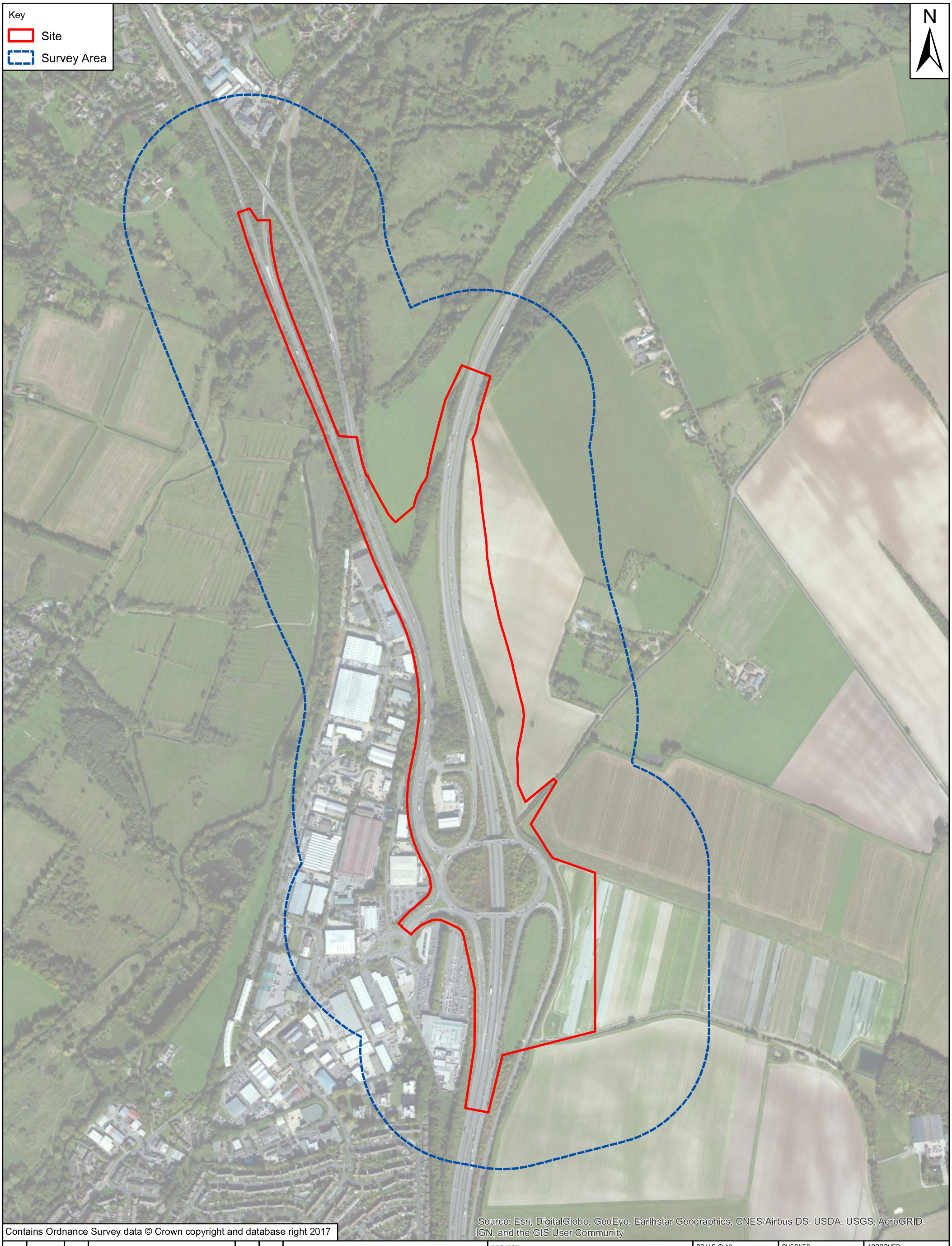
- Bat Conservation Trust (2012) *Encouraging Bats – A Guide for Bat-friendly Gardening and Living.*
- Bat Conservation Trust (2014) *Artificial Lighting and Wildlife – Interim Guidance: Recommendations to help minimise the impact of artificial lighting.*
- British Standards Institute (2015), *BS 8596:2015, Surveying for bats in trees and woodland. Guide.*
- Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines*, 3rd Edition. Bat Conservation Trust, London.
- Department for Communities and Local Government (2012), *National Planning Policy Framework.* Department for Communities and Local Government, London.
- Hampshire Biodiversity Partnership (2000) *Biodiversity Action Plan for Hampshire: Volumes 1 & 2.* Available at http://www.hampshirebiodiversity.org.uk/hampshire%20BAP.html [Accessed 06/12/17].
- Her Majesty's Stationary Office (HMSO) (1981). *Wildlife and Countryside Act* (as amended by the Countryside and Rights of Way Act 2000).
- HMSO (2005) *Biodiversity and Geological Conservation – Statutory Obligations and Their Impact Within the Planning System*. Office of the Deputy Prime Minister (ODPM) Circular 06/2005 HMSO, Norwich.
- HMSO (2006) *Natural Environment and Rural Communities Act*.
- HMSO (2010). *The Conservation of Habitats and Species Regulations 2010 as amended (the Habitat Regulations).*
- Mitchell- Jones, A.J (2004) *Bat Mitigation Guidelines*. English Nature.
- Winchester City Council & South Downs National Park Authority (2013), *Winchester District Local Plan, Joint Core Strategy.*

7.2 PROJECT REFERENCES

- WSP (2016). M3 Junction 9 Improvement PCF Stage 1. Ecological Desk Study
- WSP (2017a). M3 Junction 9 Improvement PCF Stage 2. Phase 1 Habitat Survey
- WSP (2017b). M3 Junction 9 Improvement PCF Stage 2. Bat Activity Survey Report

8 FIGURES

FIGURE 1-1 – SITE LOCATION



REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: DRAWING STATUS

PROJECT: M3 Junction 9

TITLE: Site Location Plan

SCALE @ A3:	CHECKED:	APPROVED:
7,500	LR	HS
FILE:	DRAWN:	DATE:
A3 Template	BW	August 2017

PROJECT No:	DRAWING No:	REV:
70016638	1	A

FIGURE 3-1 – PRELIMINARY BAT ROOST ASSESSMENT RESULTS

Key

Survey Area

Site Boundary

Bat Roost Potential

Trees / Structures

High

Low

Moderate

Negligible

Tree Groups

Low

Moderate

Hatchery

Ford

River Itchen

Easton Down

A34

A34

T1 G1 B3 T14 G5 G5 G6 B2 B1 T7 G2 T8 B5 T2 T9 G3 G12 B4 T6 T13 T10 G11 T3 G4 T24 T25 T26 T27 T4 T5 B9 G10 B8 T32 G9 T33 T34 T31 T30 T35 G8 T36 G13 G13 T16 T17 T18 T19 T20 T21 T22 T23 T42 T41 T40

REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: DRAWING STATUS

highways england

PROJECT: M3 Junction 9

TITLE: PBRA Results

SCALE @ A3:	CHECKED:	APPROVED:
2,948	LR	AH
FILE:	DRAWN: RP	DATE: December 2017

PROJECT No:	DRAWING No:	REV:
70016638	2-1 (North)	A

Key

Survey Area

Site Boundary

Bat Roost Potential

Trees / Structures

High

Low

Moderate

Negligible

Tree Groups

Low

Moderate

Industrial Estate

Winnall Cottage Farm

White Hill Cottage

EASTON LA

Easton Lane

Depot

A34

Junction 9

A272

M3

Superstore

Trad Est

F Sta

MOORSIDE ROAD

EASTON LANE

WINNALL MANOR RD

G7

T15

T39

T12

T38

T37

T11

B6

B7

T28

REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: DRAWING STATUS

highways england

PROJECT: M3 Junction 9

TITLE: PBRA Results

SCALE @ A3:	CHECKED:	APPROVED:
3,168	LR	AH
FILE:	DRAWN:	DATE:
	RP	December 2017

PROJECT No:	DRAWING No:	REV:
70016638	2-1 (South)	A

Appendix A

PBRA SURVEY DATA

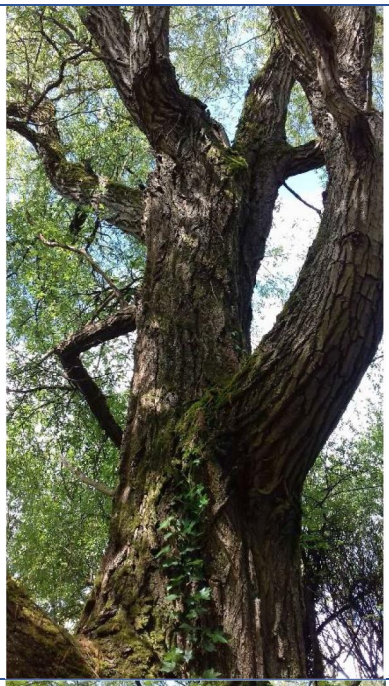
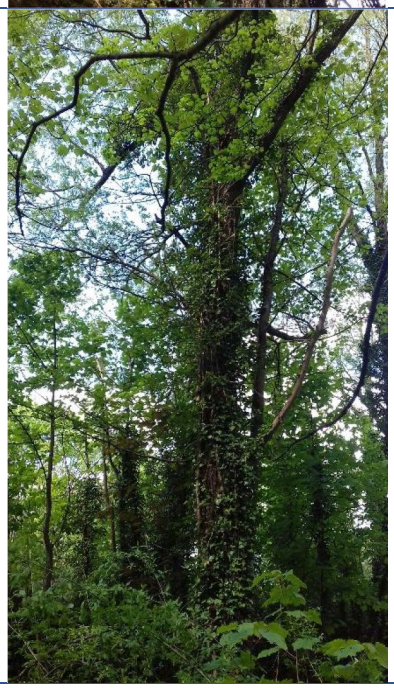
Identification No.	Tree/ Group/ Structure	Species	Approx. Height (m)	Age (OM/M/SM/I)	Description of features with potential to support bats	Brief description surrounding habitat	Overall Suitability Category
T1	**T**	Sycamore	20	SM	Dense ivy cover from ground to 12m. Multi stemmed	Woodland	Low
T2	**T**	Alder	22	SM	Dense ivy cover.	Woodland	Low
T3	**T**	Salix sp.	22	M	Crease on eastern side of trunk 4m high (crevice) Split in main trunk 4-5m high (cavity)	Woodland	Moderate
T4	**T**	Salix sp.	22-24	SM-M	Dense ivy all aspects	Woodland	Low
T5	**T**	Sycamore	20	SM	2 knot holes on eastern aspect 6m high. Large tree. Dense ivy all aspects.	Woodland	Low
T6	**T**	Dead tree	15	I	Loose peeling bark on dead tree, all aspects and heights	Woodland	Low
T7	**T**	Ash	22	SM	Dense thick ivy lattice. 2 x dead branches and broken limbs on east aspect 6-8m high. Knot holes on east aspect 10m high	Woodland	Moderate
T8	**T**	Sycamore	24	M	No features seen, but very large tree.	Woodland	Low
T9	**T**	Sycamore	22	M	Dense ivy cover all aspects. 1 x dead limb with flaking bark on south aspect 10-15m high	Woodland	Low
T10	**T**	Sycamore	18-20	M	Multi stemmed tree. Dense ivy cover all aspects	Woodland	Low
T11	**T**	Ash	20	M	Large mature tree with some ivy. Full inspection not possible due to night survey.	Woodland	Moderate
T12	**T**	Populus sp.	24	M	Large mature tree with some ivy. Full inspection not possible due to night survey.	Woodland	Moderate
T13	**T**	Salix sp.	10	M	Dense ivy cover. Full inspection not possible due to night survey.	Woodland	Moderate
T14	**T**	Populus sp.			Large Populus tree, no features seen. Full inspection not possible due to night survey.	Woodland	Moderate
T15	**T**	Populus sp.	20	SM	Large mature poplar. Woodpecker holes observed at 14m on southern aspect.	Woodland	High
T16	**T**	Ash	4	SM	Deformity scars (likely viral) all over trunk and branches creating 'burst' bark, some may be deep enough for a bat, but most are exposed and don't lead to a cavity.	Field edge with woodland parcel	Low
T17	**T**	Scot's pine	11	SM	Mature ivy growth, possibly affording shelter to a bat underneath thick stems. Leaning to east.	Plantation woodland	Low
T18	**T**	Scot's pine	12	SM	Mature ivy growth, possibly affording shelter to a bat underneath thick stems. No lean.	Plantation woodland	Low
T19	**T**	Scot's pine	12	SM	Mature ivy growth, possibly affording shelter to a bat underneath thick stems, though ivy leaves likely to obstruct flight lines. No lean.	Plantation woodland	Low
T20	**T**	Beech	10	SM	Kissing stems possibly creating a cavity.	Plantation woodland	Low
T21	**T**	Beech	11	SM	Small holes at ~4m and ~6m H.	Plantation woodland	Moderate
T22	**T**	Elder	4	SM	Rotten stem with holes leading to cavity but very low to ground ~1m H.	Mature scrub patch in field	Moderate
T23	**T**	Unknown (poss. hawthorn)	5	SM-M	Ivy cover and very gnarly with shallow hole ~1.5m H on west side.	Mature scrub patch in field	Low
T24	**T**	Salix sp.	5	M/Dead	Hole in trunk ~3m H on west, woodpecker enlarged and open at top, possibly leading to a crevice below, and generally rotten.	Marshy grassland	Moderate
T25	**T**	Salix sp.	6	M/Dead	Hole/crack at diverged trunk, possibly leading to crevice though likely exposed to rain.	Marshy grassland	Low
T26	**T**	Salix sp.	6	M/Dead	Lifted bark ~1m H, possibly creating good crevice, though low to ground.	Marshy grassland	Moderate
T27	**T**	Salix sp.	4.5	SM	Possible hole at joined limbs ~50cm H on south side, leads to cavity with some debris in it (leaves).	Marshy grassland	Moderate
T28	**T**	Beech	10	SM	Hole at ~4m H, possibility of cavity.	Tesco car park avenue	Low
T29	**T**	Populus sp.	20	M	Thick ivy cladding creating visible crevice underneath. Further features also possible.	Woodland	Moderate
T30	**T**	Populus sp.	20	M	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland	Low
T31	**T**	Populus sp.	10	M	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features. Lopped at top possibly meaning dead parts.	Woodland	Low
T32	**T**	Salix sp.	15	Dead	Some lifted bark and small holes.	Woodland	Moderate
T33	**T**	Ash	18	SM-M	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland	Low
T34	**T**	Salix sp.	10 (leaning	SM-M	Leaning willow with split branch possibly leading to a cavity ~1m on W.	Wet woodland edge	Moderate
T35	**T**	Unknown (poss ash)	9	SM	Leaning tree with heavy ivy cover and hanging ivy bunch, possibly crevices at the join.	Woodland	Low

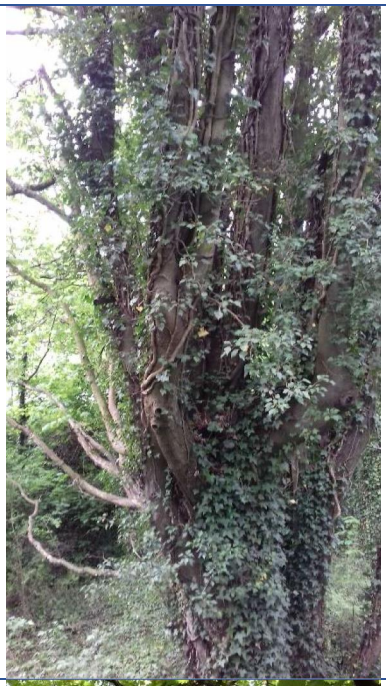
Identification No.	Tree/ Group/ Structure	Species	Approx. Height (m)	Age (OM/M/SM/I)	Description of features with potential to support bats	Brief description surrounding habitat	Overall Suitability Category
T36	**T**	Populus sp.	15	SM	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland	Low
T37	**T**	Unknown	20	M	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland	Low
T38	**T**	Ash	18	M	Thick ivy cladding creating visible crevice underneath. Further features also possible but obscured.	Woodland	Moderate
T39	**T**	Sycamore	20	SM	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland strip adjacent to field and road	Low
T40	**T**	Sycamore	18	SM	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland edge	Low
T41	**T**	Lime	20	M	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland edge	Low
T42	**T**	Lime	20	M	Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland edge	Low
G1	**G**	Sycamore	20	SM	5 x Sycamore with dense ivy cover.	Woodland	Low
G2	**G**	Alder	20	SM	Dense ivy cover.	Woodland	Low
G3	**G**	Salix sp.& alder	22	M	1 x willow sp. & 2 alder. Dense ivy cover	Woodland	Low
G4	**G**	Salix sp.	24	M	2 x willow sp. Dense ivy cover all aspects.	Woodland	Low
G5	**G**	Populus sp.	22-24	50-70	21 x Populus sp. Large trees with dense ivy cover. Lattice on all aspects.	Woodland	Moderate
G6	**G**	Sycamore & ash	16-18	M	Some dense ivy cover. Full inspection not possible due to night survey.	Woodland	Moderate
G7	**G**	Populus sp. & horse chestnut	20-24	M	Line of mature Populus and Horse Chestnut in leaf. Some ivy present, dense in places. Full inspection not possible due to night survey.	Woodland	Moderate
G8	**G**	Alder	24	M	Large mature Alder woodlands with some ivy. Full inspection not possible due to night survey.	Woodland	Moderate
G9	**G**	Sycamore	16-18	M	Multi stemmed trees. Dense ivy cover. Full inspection not possible due to night survey.	Woodland	Moderate
G10	**G**	Ash	16	M	5 x Ash. Dense ivy cover. Full inspection not possible due to night survey.	Woodland	Moderate
G11	**G**	Field Maple & ash	18	M	1 x F.Maple, 1 x Ash. Dense ivy cover. Full inspection not possible due to night survey.	Woodland	Moderate
G12	**G**	Populus sp.	24	M	Two large Ivy-clad Populus. Dense ivy cover on all aspects. Full inspection not possible due to night survey.	Woodland	Moderate
G13	**G**	Populus sp.	20	M	Line of 10 near-identical trees. Thick ivy cladding possibly creating feature in its own right, and obscuring much of them. Trees of size and nature possibly supporting other features.	Woodland	Low
B1	**S**	N/A	N/A	N/A	A34 southbound bridge. Concrete structure crossing the Itchen tributary. Expansion gaps either side. Gaps above the support columns. Expansion foam fills the concrete beam gaps. Some holes located within the expansion foam - may lead to cavity or crevice.	Woodland	High
B2	**S**	N/A	N/A	N/A	A33 southbound concrete bridge. No features noted. No expansion gaps with crevices. Fairly cold and damp.	Woodland	Negligible
B3	**S**	N/A	N/A	N/A	Concrete over-bridge, crossing the A33/A34. No significant gaps or crevices on the structures. Fairly cold and damp.	Woodland	Negligible
B4	**S**	N/A	N/A	N/A	Drainage tunnel under railway cutting around 1.5m high. Fairly cold and damp. Not fully visible so precautionary suitability rating given. Potentially suitable for hibernating bats.	Woodland	Moderate
B5	**S**	N/A	N/A	N/A	Concrete bridge, low to the water. Inspected from north. No features noted but cannot view underside so precautionary suitability rating given. Span ~1m above water. Fairly cold and damp. Potentially suitable for hibernating bats.	Woodland/ Wet Grassland	Moderate
B6	**S**	N/A	N/A	N/A	Northern concrete bridge associated with the Junction 9 M3 roundabout. No features noted. Fairly cold and damp.	Motorway/ Industrial/ Arable	Negligible
B7	**S**	N/A	N/A	N/A	Southern concrete bridge associated with the Junction 9 M3 roundabout. No features noted. Fairly cold and damp.	Motorway/ Industrial/ Arable	Negligible
B8	**S**	N/A	N/A	N/A	Concrete construction, 2-span bridge. Gaps at expension joint above central pillar. Over a river. Fairly cold and damp. Not fully visible so precautionary suitability rating given. Potentially suitable for hibernating bats.	River with trees	Moderate
B9	**S**	N/A	N/A	N/A	Concrete construction with brick upper sides. Arched twin-span constructions with 8 beams underneath. Crevice at expansion gaps adjacent to beams (all). Over a river. Fairly cold and damp. Not fully visible so precautionary suitability rating given. Potentially suitable for hibernating bats.	River with trees	Moderate

Appendix B

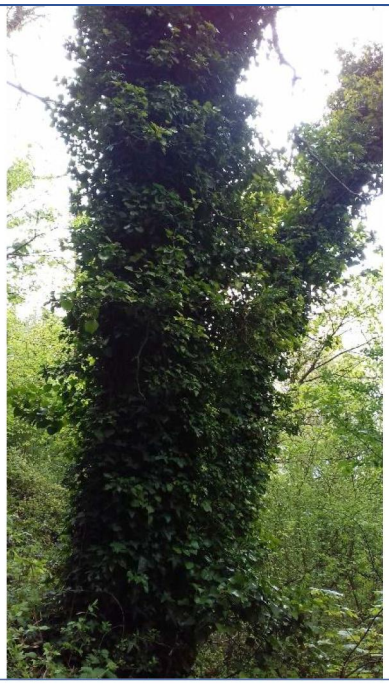
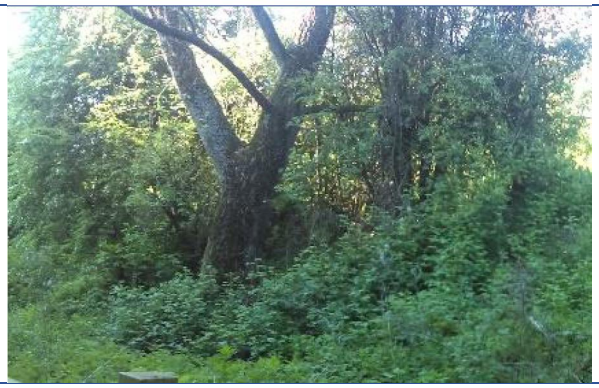
PHOTOGRAPHS

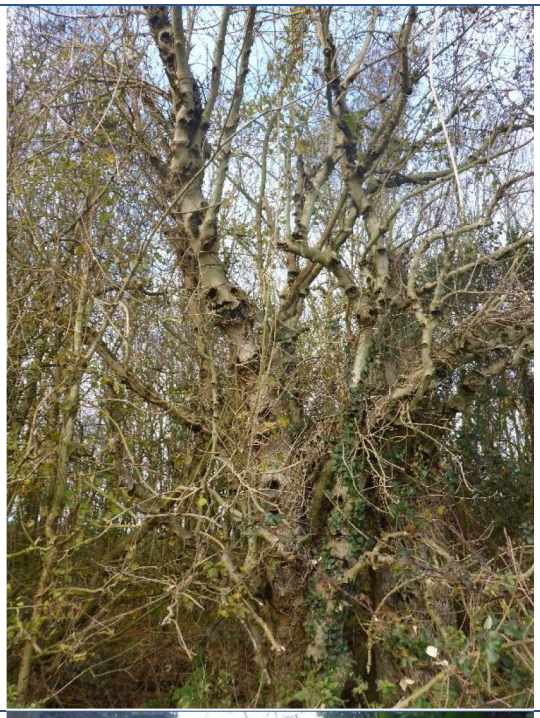
TREE/ TREE GROUP/ STRUCTURE NO.	PHOTOGRAPH
T1	
T2	

T3			
T4			

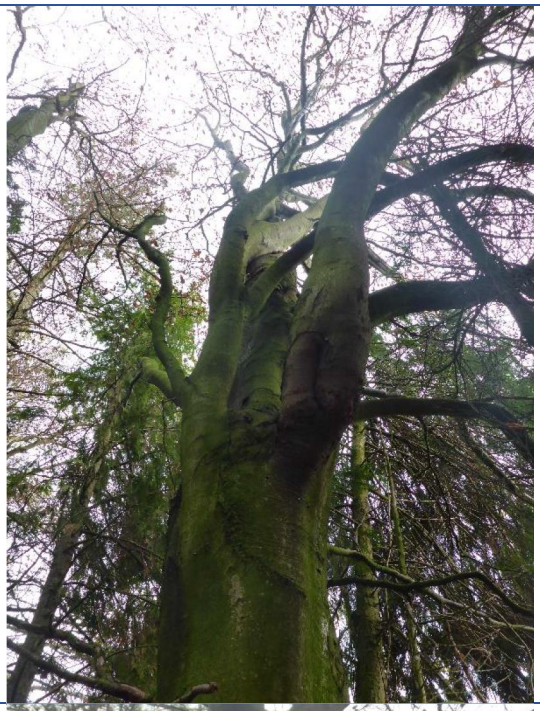
T5			
T6			

T7		
T8	-	
T9		

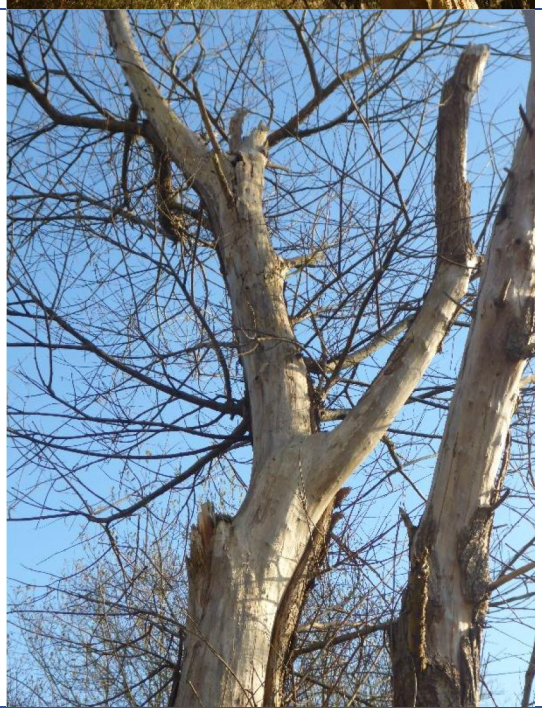
T10	
T11	-
T12	-
T13	-
T14	
T15	-

T16		
T17		

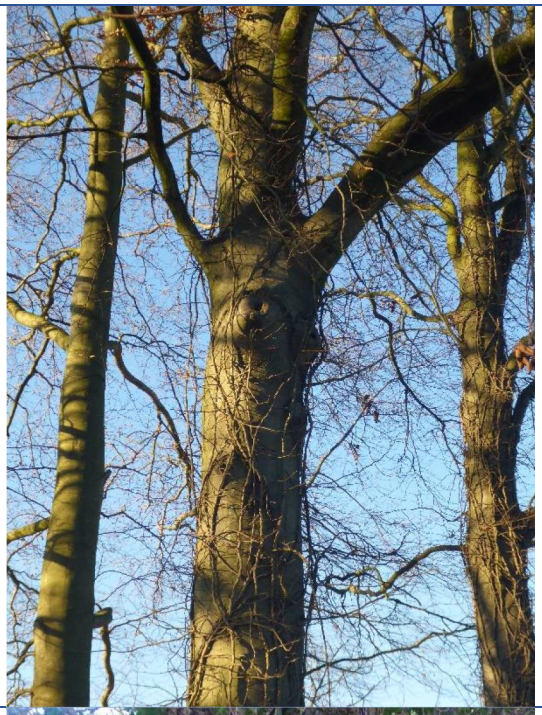
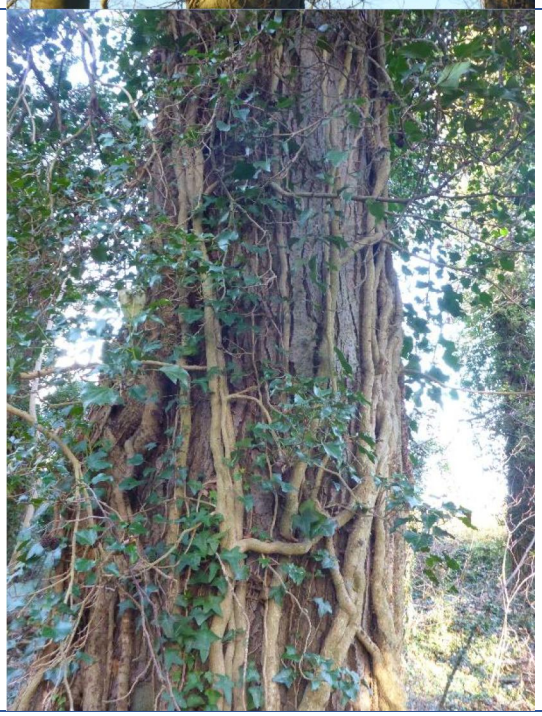
T18	
T19	

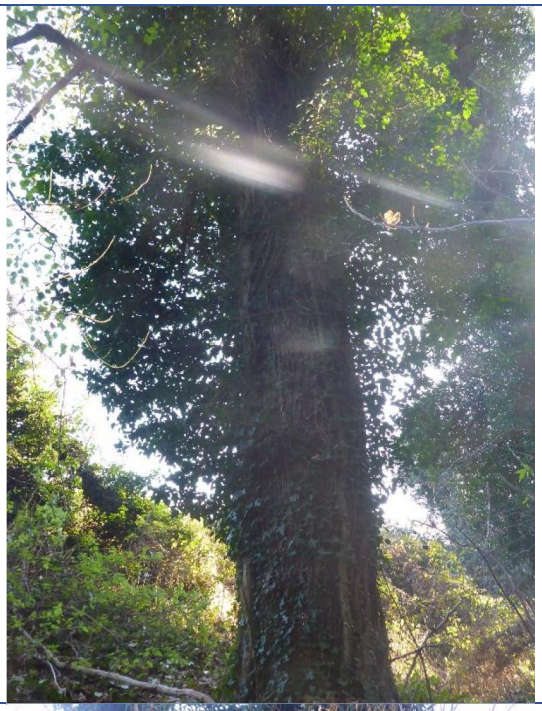
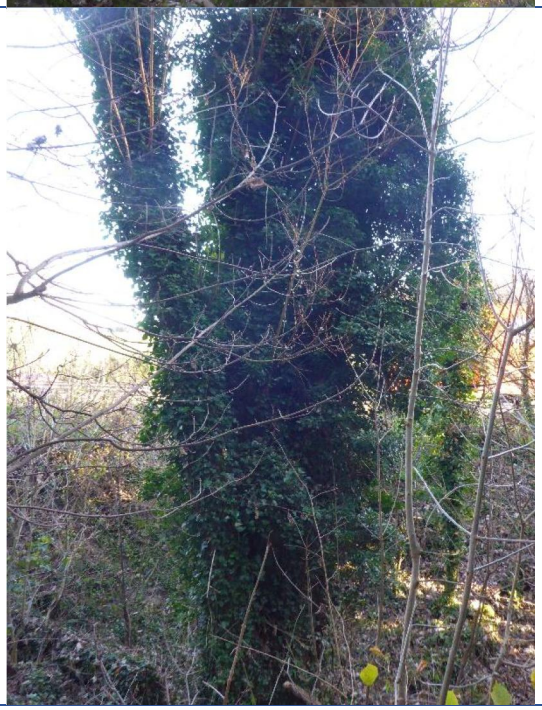
T20	
T21	

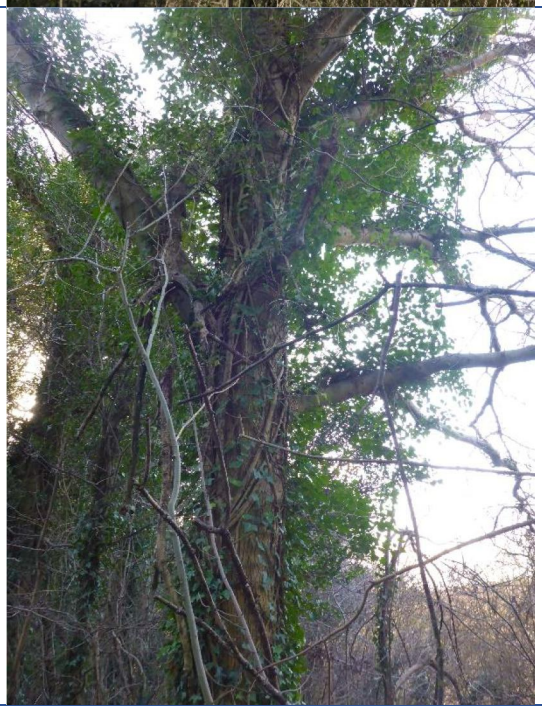
T22			
T23			

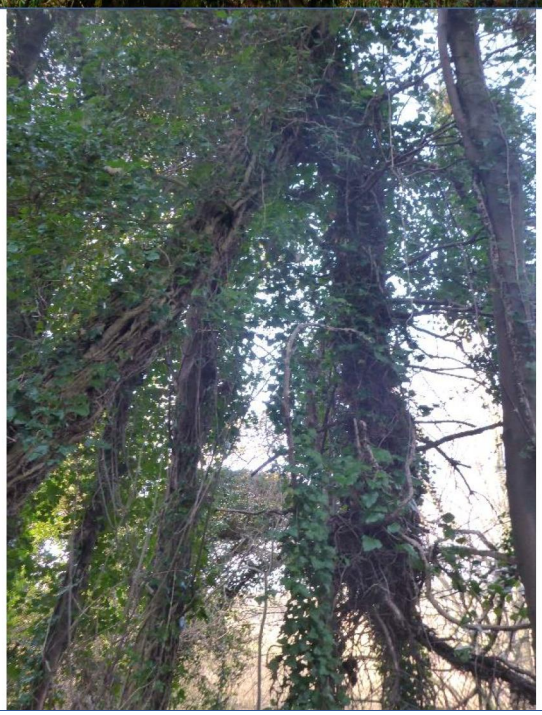
T24			
T25			

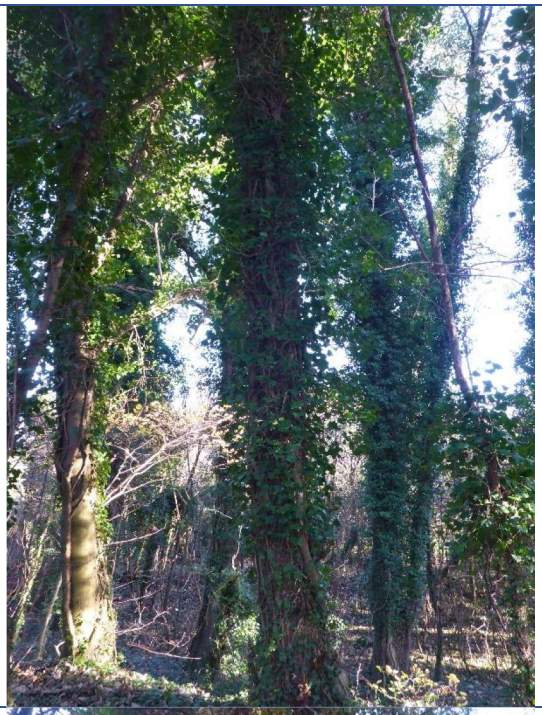
T26	
T27	

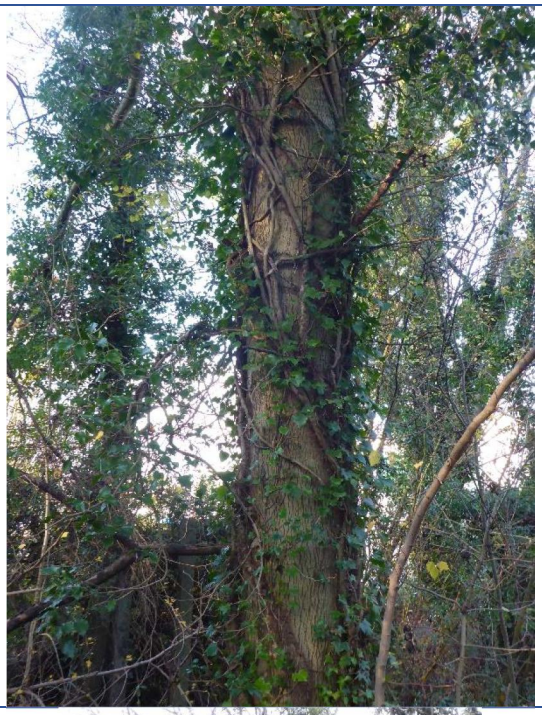
T28			
T29			

T30	
T31	

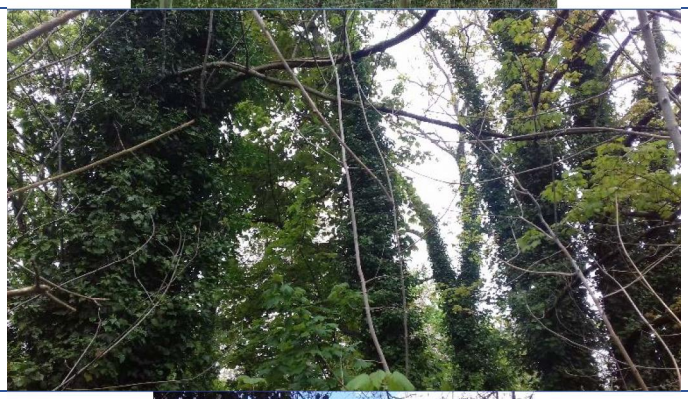
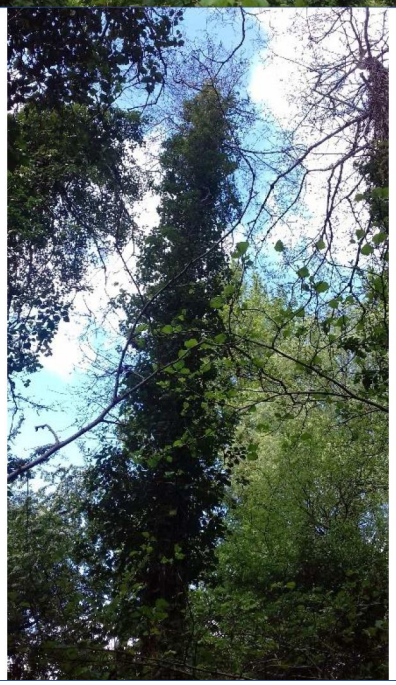
T32			
T33			

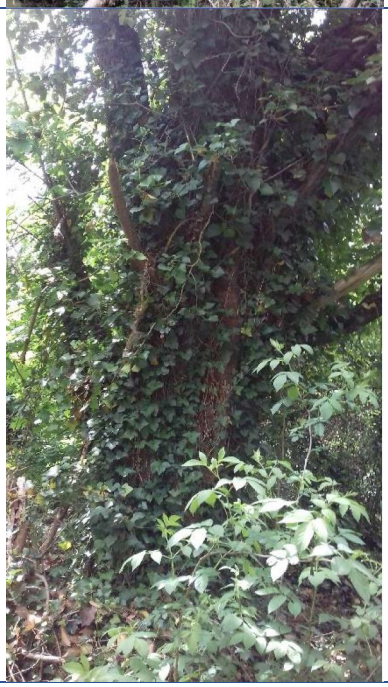
T34	
T35	

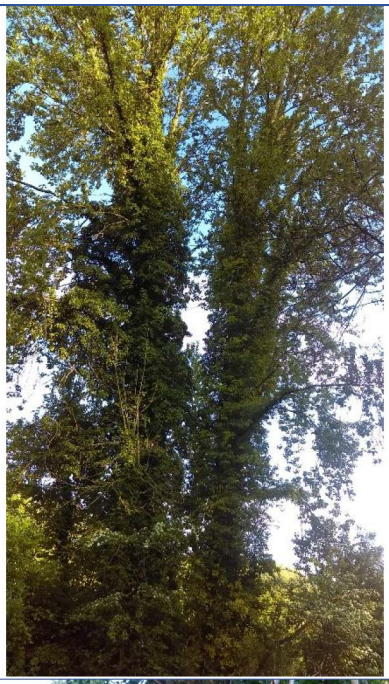
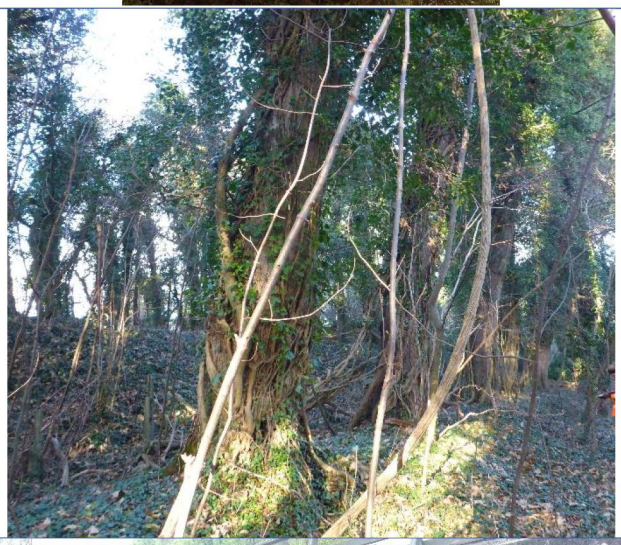
T36			
T37			

T38	
T39	

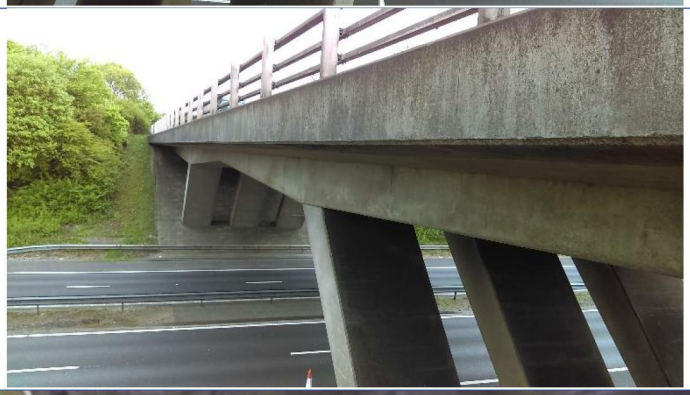
T40	
T41	

T42	
G1	
G2	

G3	
G4	
G5	-
G6	-
G7	-
G8	-
G9	-
G10	-
G11	-

G12	
G13	
B1	

B2	
B3	
B4	
B5	

B6	
B7	
B8	
B9	

APPENDIX B8-7
HAZEL DORMOUSE SURVEY REPORT

M3

Junction 9 Improvement Scheme

PCF Stage 3 – Hazel Dormouse Survey Report

Registered office Bridge House, 1 Walnut Tree Close, Guildford, GU1 4LZ
Highways England Company Limited registered in England and Wales number 09346363

M3 JUNCTION 9 IMPROVEMENT SCHEME

HAZEL DORMOUSE SURVEY REPORT

Highways England

First Issue

Project no: 70016638
Date: January 2018

Mountbatten House
Basing View
Basingstoke
Hampshire
RG21 4HJ

Tel: +00 44(0) 1256 318 800
Fax: +00 44(0) 1256 318 700

QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	P01			
Date	January 2018			
Prepared by	Bradley Williams			
Signature	B.Williams Williams, Bradley 2018.01.15 13:17:13 Z			
Checked by	Luke Roberts			
Signature	Roberts, Luke 2018.01.15 13:03:00 Z			
Authorised by	Adrian Hutchings			
Signature	Hutchings, Adrian I am approving this document 2018.01.15 13:36:13 Z			
Project number	70016638			
Report number	P01			
File reference	HE-WSP-GEN-M3J9PCF3-RP-LE-00012			

PRODUCTION TEAM

CLIENT (HIGHWAYS ENGLAND)

Major Projects Programme Lead	Steve Hoesli
Major Projects Senior Project Manager	Neil Andrew
Major Projects Project Manager	Simon Hewett
Senior User Representative	Paul Benham

WSP

RIS Area 3 Programme Director	Steve O'Donnell	Tel: +44 (0)1684 851751
RIS Area 3 Programme Manager	Stuart Craig	Tel: +44 (0)1256 318 660
M3 Junction 9 Project Director	Roland Diffey	Tel: +44 (0) 1256 318 777
M3 Junction 9 Project Manager	Pradeep Agrawal	Tel: +44 (0)207 337 1700
RIS DCO Programme Lead	Amy Hallam	Tel: +44 (0)1392 229 700

TABLE OF CONTENTS

TABLE OF TABLES

APPENDICES

1 EXECUTIVE SUMMARY

1.1.1 M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion associated with the junction by improving the flow of traffic. Three options hereafter referred to as the 'Proposed Works', have been taken forward and are assessed within this report.

1.1.2 WSP was commissioned by Highways England to complete a hazel dormouse *Muscardinus avellanarius* survey of a 250m buffer of the maximum extent of works ('the Site'), hereafter referred to as the 'Survey Area', to confirm presence or likely absence of dormouse.

1.1.3 The Survey Area is currently comprised of a variety of habitats including broadleaved semi-natural and plantation woodland, dense scrub and hedgerows, all of which are suitable habitat for hazel dormouse.

1.1.4 A dormouse survey, comprising a nest tube survey of suitable habitat (where access allowed) within the Survey Area, was completed in accordance with best practice guidance (English Nature 2006) between May and November 2017. This survey concluded dormice are present and breeding within the Survey Area.

1.1.5 In the first instance it is recommended that woodland, hedgerow and scrub habitat is retained within the Proposed Works designs as far as possible. Current design drawings indicate that some loss of dormouse habitat will be unavoidable. It will therefore be necessary to formulate an appropriate mitigation and compensation strategy, and to obtain a European Protected Species licence from Natural England prior to commencement of construction.

1.1.6 The final design of the Proposed Works should also seek to avoid the fragmentation of suitable dormouse habitat, to prevent isolation of dormouse populations. Recommendations to avoid habitat fragmentation are given in Section 6 of this report.

1.1.7 Mitigation and compensation should seek to ensure maintenance of dormouse populations within the Survey Area at favourable conservation status; the approach would be likely to include the retention of connectivity between suitable habitat, phased clearance methods, creation and long term maintenance of compensatory habitat and monitoring of dormouse populations following construction. Recommended measures are described in further detail in Section 6.

1.1.8 Given the complexity of the scheme and potential scale of impacts to dormice, it is advised that Natural England should be consulted with respect to detailed mitigation proposals as they emerge.

1.1.9 It should be noted that phased clearance requires partial removal of habitat whilst dormice are hibernating (December to March inclusive), followed by completion of habitat removal once dormice are active in Spring; and that the development of compensatory habitat can take several years and should be completed in advance of habitat loss.

1.1.10 In addition, recommendations have been made for woodland and hedgerow management to enhance the Survey Area for dormice, in accordance with the National Planning Policy Framework (NPPF) (2012).

2 INTRODUCTION

2.1 PROJECT BACKGROUND

2.1.1 Junction 9 of the M3 is a key transport interchange on the strategic road network which connects South Hampshire and the wider sub-region, with London via the M3 and the Midlands via the A34 (which also links to the principal east-west A303 corridor). A large volume of traffic currently uses the interchange (approximately 6,000 vehicles per hour during the peak periods), which acts as a bottleneck on the local and strategic highway network, causing significant delays. M3 Junction 9 has been proposed for redevelopment in order to help reduce congestion around this stretch of the road by improving the flow of traffic.

2.1.2 Three options have been taken forward to Project Control Framework (PCF) Stage 2 and assessed within this report, namely:

- Option 14: Northbound and Southbound A34 Free Flow Design
- Option 16B: Incremental Delivery – Northbound A34 Free Flow Link
- Option 16C: Incremental Delivery – Southbound A34 Free Flow Design

2.1.3 The works are hereafter referred to as the 'Proposed Works'. Further details of the Proposed Works are presented within the PCF Stage 2 Environmental Assessment Report (EAR) (HE551511-WSP-GEN-M3J9PCF2-RP-LE-00041). The anticipated maximum extent of the works is shown on Figure 2-1, and is hereafter referred to as 'the Site.' An ecological Survey Area has been defined comprising land within 250m of the Site, see Figure 2-1.

2.2 ECOLOGICAL BACKGROUND

2.2.1 A desk study undertaken for the M3J9 PCF Stage 1 identified 8 hazel dormouse *Muscardinus avellanarius* records within a 2km search area of the works extent, one of which was recorded within the same 1km grid square of the Proposed Works (WSP 2016).

2.2.2 An extended Phase 1 habitat survey was conducted during the spring of 2017 (WSP, 2017), which confirmed the presence of habitats suitable for hazel dormouse. These include hedgerows, scrub, semi-natural and plantation broadleaved woodland as well as hazel coppiced woodland. The M3, A34 and A33 pass through the Survey Area from north to south, fragmenting the suitable habitat for dormice and reducing connectivity between habitat east and west of the M3. The suitable habitat present on either side of the M3 and A34 is linked in a north-south direction through woodland and hedgerow connections. Suitable habitat was also identified within the Winnall Industrial Estate and land south of Tesco. Habitat south of Tesco has limited connectivity to the wider habitat within the Survey Area.

2.3 BRIEF AND OBJECTIVES

2.3.1 Highways England commissioned WSP to:

- Complete a hazel dormouse survey in accordance with good practice guidance (English Nature, now Natural England 2006) to establish whether hazel dormice are present or likely absent from the Survey Area.
- Provide a concise technical report setting out the survey methods used, reporting the survey results, and providing outline recommendations in relation to the project and hazel dormice (with reference to legislation and planning policy relevant to this species).

2.3.2 The results of this survey, and subsequent recommendations, are detailed within this report.

3 METHODS

3.1 OVERVIEW

3.1.1 To establish whether dormice are present or likely absent, dormouse tubes were installed within suitable habitat in the Survey Area in May 2017 and checked once a month from June to November 2017 (inclusive). The survey work was completed in accordance with current good practice guidance (English Nature (now Natural England), 2006).

3.2 DORMOUSE SURVEY

3.2.1 245 dormouse tubes were installed within the Survey Area in May 2017 over the period of a week, see Figure 3-1. Nest tubes were installed at 20m spacing in suitable habitat within the Survey Area (comprising woodland, woodland edge, scrub and hedgerows), attached to branches of a variety of native woody species. Species to which tubes were attached included hazel *Corylus avellana*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, field maple *Acer campestre* and dogwood *Cornus sanguinea*. The tube survey was designed to ensure effective coverage of the Survey Area as a whole.

3.2.2 Nest tubes within the Survey Area were surveyed once a month under suitable weather conditions between June and November 2017. Following the completion of survey work, nest tubes were taken down except where dormice were present. An additional visit was made in December 2017 to collect tubes in areas where dormouse presence had been confirmed. This duration of survey ensured sufficient points (>20) were achieved to demonstrate likely absence in accordance with best practice guidance (English Nature (EN), 2006). During each survey every tube was checked for presence of dormice or evidence of dormice, for example characteristic nests or opened nuts. When presence of hazel dormouse was confirmed, tubes within discrete land parcels were no longer surveyed on a monthly basis because nest tube surveys do not allow any inferences to be made on population status beyond presence or absence.

3.2.3 The Survey Area was divided into land parcels to aid the description of the Survey Area and provide habitat details. These parcels comprise:

- Land East of the M3
- M3 Junction 9 Roundabout
- Land North of the A34 and A33
- Pudding Lane Farm
- Easton Down Farm
- Winnall Industrial Estate
- Woodland East of the Itchen
- Land South of Tesco.

3.3 DATES OF SURVEY AND PERSONNEL

3.3.1 The dormouse survey was led and completed by an experienced surveyor (Natural England survey licence number: 2016-21700-CLS-CLS).

3.3.2 The surveyor has over 6 years' experience of ecological survey, including extensive dormouse survey experience and has held a Natural England dormouse survey licence since 2010.

3.3.3 The dates of the completed surveys are summarised in Table 3-1 below.

Table 3-1 - Dates of surveys

SURVEY NUMBER	1	2	3	4	5	6	7
Date	23rd-26th June	19th-21st July	23rd & 31st August	20th September	27th October	30th & 31st November	19th December
Locations surveyed	All Parcels	All Parcels	All Parcels	M3 J9 Roundabout Woodland East of the Itchen Pudding Lane Farm Winnall Industrial Estate Land South of Tesco	M3 J9 Roundabout Woodland East of the Itchen Pudding Lane Farm Land South of Tesco	All Parcels	Easton Down Farm

3.4 EVALUATION

3.4.1 The value of the Site for dormice was evaluated using guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM 2016). This guidance recommends that valuation of site importance is made with reference to a geographical framework (local, regional, national or international value). To inform the assessment in this report, the extent and quality of habitat present was considered in the context of the distribution and abundance of dormice locally and nationally.

3.5 NOTES AND LIMITATIONS

3.5.1 A small number of tubes were installed within Land South of Tesco and the M3 Junction 9 Roundabout due to limitations to safe access and the highways boundary:

- → Land South of Tesco is isolated from the rest of the Survey Area, but connected to the wider landscape. Whilst the survey was not sufficient to conclude presence or absence of hazel dormice, the habitat should not be directly affected by the Proposed Works.

- The habitat within the M3 Junction 9 Roundabout is sparse with much shrub and branch clearance for visibility. The habitat is isolated by major roads with no connectivity to the surrounding habitat. Overall this land parcel has low suitability for dormice. However, given their abundance in the surrounding area it is considered appropriate to assume presence on a precautionary basis.

3.5.2 One land parcel, within the north east of the Survey Area, was not accessible at the time of the survey set up. A second land parcel located between the A34 north and south bound carriageways was also not accessible for health and safety precautions. These parcels were not included within the survey. The land parcels are considered to contain suitable habitat for dormice and given dormice were recorded in adjacent habitats, it should be assumed that dormice are present in these locations.

3.5.3 Suitable habitat directly adjacent to the high speed roads (M3, A34 and A33) was not accessible for health and safety reasons during the surveys. However, it was possible in the majority of cases to survey suitable habitat from adjacent land parcels and this is not considered to be a limitation to the findings of this report, see Figure 3-1.

4 RESULTS AND EVALUATION

4.1 OVERVIEW

4.1.1 Hazel dormice were found to be present in suitable habitat across much of the Survey Area. Hazel dormouse evidence recorded included active, torpid and dead dormice as well as nests. Hazel dormice were recorded within hedgerows, broadleaved semi-natural and plantation deciduous woodland.

4.1.2 Hazel dormice were not recorded within two areas of suitable habitat, Land South of Tesco and the M3 Junction 9 Roundabout. Despite no dormouse evidence being recorded, these areas should be considered as likely supporting hazel dormice given their abundance throughout the Survey Area, see limitations in Section 3.5.

4.1.3 Suitable habitat parcels located within the north of the Survey Area which were not accessed should also be considered as likely supporting hazel dormice, given they contain suitable deciduous woodland habitat and are connected to habitat where dormice were found to be present.

4.2 RESULTS OF DORMOUSE SURVEY

4.2.1 The surveys confirmed dormouse presence within the Survey Area, see Figure 4-1. Details of dormouse evidence recorded are included in Appendix A and photographs in Appendix B.

4.2.2 Hazel dormice were recorded on all surveys between June and December 2017. They were recorded within the centre and east of the Survey Area (Easton Down Farm and Land East of the M3) during the first survey and within land parcels to the north and west of the Survey Area (Pudding Lane Farm, Winnall Industrial Estate and the Woodland East of the Itchen) during subsequent surveys. Dormice were not recorded in Land South of Tesco and the M3 Junction 9 Roundabout.

4.2.3 Hazel dormice were present within hedgerows, broadleaved semi-natural and plantation deciduous woodland. Dormouse tubes where presence was confirmed were attached to tree species including hazel *Corylus avellana*, hawthorn *Crataegus monogyna* and yew *Taxus baccata*.

4.2.4 Adult dormice were recorded in both active and torpid states. Dormouse breeding within the Survey Area was confirmed through presence of pinkies located in tube 86, a post-lactating female in tube 143, an eyes open (deceased) baby in tube 165 and juveniles in tubes 53, 103, 105 and 126. Dormouse breeding was identified within Land East of the M3, Land North of the A34/A33, Woodland East of the Itchen, Winnall Industrial Estate and Easton Down Farm.

4.3 OTHER SPECIES

4.3.1 *Apodemus* spp. (wood mouse *Apodemus sylvaticus* or yellow necked mouse *Apodemus flavicollis*) were recorded in a number of tubes across the Survey Area. A number of nests were also recorded and were also seen to replace dormouse nest in tubes 165 and 172.

4.4 EVALUATION OF THE SITE FOR DORMOUSE

4.4.1 Though dormice are considered declining at a national level (Joint Nature Conservation Committee (JNCC), 2010), Hampshire is a national stronghold for this species, supporting around 10% of the national population (Hampshire Biodiversity Partnership (HBP, undated)). The species is listed as scarce in the County in the Priority Species list (HBP, undated), but it is possible dormice are under recorded, and Ewald (2004) conclude the species is widespread in the county, though still considered relatively rare. Hampshire is an extensively wooded county; woodland comprises approximately 17.7% (Hampshire County Council (HCC), undated) or 20% (HCC, 2006) of Hampshire, of which 7.4% is classified as ancient woodland (HCC, undated). The desk study undertaken for the Proposed Works identified 8 records of hazel dormice within 2km (WSP 2016).

4.4.2 Considering the extent of habitat present and given that dormice are relatively widespread in the broad geographic area, the dormouse population within the Survey Area is preliminarily assessed to be of value at up to the District level.

5 IMPLICATIONS FOR DEVELOPMENT

5.1 OVERVIEW

5.1.1 In the absence of mitigation the Proposed Works has potential to affect dormice in the following ways:

- Through displacement of dormice where the development leads to the loss or degradation of occupied habitat and where habitat loss results in the fragmentation of habitat.
- Killing, injury or disturbance of individuals during the construction phase.
- Disturbance from artificial lighting during the operational phase.

5.1.2 Therefore, the following legislation and planning policy is relevant.

5.2 LEGAL COMPLIANCE

5.2.1 Dormice are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2017 (the 'Habitat Regulations'). The legislation means that it is an offence to:

- deliberately capture, injure or kill a wild dormouse
- deliberately disturb wild dormice; 'disturbance of animals includes in particular any disturbance which is likely:
- (a) to impair their ability —
- (i) to survive, to breed or reproduce, or to rear or nurture their young; or
- (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
- (b) to affect significantly the local distribution or abundance of the species to which they belong.'
- damage or destroy a breeding site or resting place used by this species.

5.2.2 Protection is also afforded under the Wildlife and Countryside Act 1981 (as amended) with respect to disturbance of animals when using places of shelter, and obstruction of access to places of shelter.

5.2.3 Due to the high level of protection afforded to dormice and their habitat, mitigation for this species is governed by a strict licensing procedure administered by Natural England (normally, planning permission must be obtained before a licence can be sought). Licencing is subject to three tests, as defined under the Habitats Regulations 2010, these must also be applied by the planning authority before granting permission for activities affecting dormice. For permission to be granted the following criteria must be satisfied:

- The proposal is necessary 'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'.
- 'There is no satisfactory alternative'.
- The proposals 'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'.

5.2.4 The dormouse is also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in England in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act (2006) public bodies (including local planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

5.3 PLANNING POLICY COMPLIANCE

5.3.1 As the project qualifies as a Nationally Significant Infrastructure Project (NSIP), it must adhere to the National Policy Statement (NPS) for National Networks (Department for Transport 2014). This states *inter alia* that the principles and objectives of the government's 2012 Natural Environment White Paper (NEWP) and Biodiversity 2020 Strategy should be adhered to. These promote moving progressively from net biodiversity loss to net gain by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures.

5.3.2 The NPS also states that the likely significant effects on internationally, nationally and locally designated sites of ecological conservation importance, on protected species and on habitats, on other species identified as being of principal importance for the conservation of biodiversity and that potential impacts on ecosystems should be clearly set out.

5.3.3 At the national level the National Planning Policy Framework (2012) forms the basis for planning system decisions with respect to conserving and enhancing the natural environment, including dormice; the ODPM circular 06/2005 also provides supplementary guidance, including confirmation that '*the presence of a protected species is a material consideration when a planning authority is considering a development proposal'.*

5.3.4 The NPPF sets out, amongst other points, how at an overview level the *'planning system should contribute to and enhance the national and local environment by:*

- …recognising the wider benefits of ecosystem services; and
- 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, including by establishing coherent ecological networks that are more resilient to current and future pressures…'

5.3.5 A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF, and includes the following:

- *'- if significant harm resulting from a development cannot be avoided…adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- *- …opportunities to incorporate biodiversity in and around developments should be encouraged;*
- *- planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland…unless the need for, and benefits of, the development in that location clearly outweigh the loss…'*

5.3.6 At a local level, Winchester City Council and the South Downs National Park have adopted the Winchester District Local Plan Part 1 (Adopted 2013). Chapter 9 is entitled 'High Quality Environment' with policy CP16 entitled Biodiversity. This states '*The Local Planning Authority will support development which maintains, protects and enhances biodiversity across the District, delivering a net gain in biodiversity, and has regard to the following:*

- *Protecting sites of international, European, and national importance, and local nature conservation sites, from inappropriate development.*

- *Supporting habitats that are important to maintain the integrity of European sites.*
- *New development will be required to show how biodiversity can be retained, protected and enhanced through its design and implementation, for example by designing for wildlife, delivering BAP targets and enhancing Biodiversity Opportunity Areas.*
- *New development will be required to avoid adverse impacts, or if unavoidable ensure that impacts are appropriately mitigated, with compensation measures used only as a last resort.*
- *Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.*
- *Maintaining a District wide network of local wildlife sites and corridors to support the integrity of the biodiversity network, prevent fragmentation, and enable biodiversity to respond and adapt to the impacts of climate change.*
- *Supporting and contributing to the targets set out in the District's Biodiversity Action Plan (BAP) for priority habitats and species.*
- *Planning proposals that have the potential to affect priority habitats and/or species or sites of geological importance will be required to take account of evidence and relevant assessments or surveys.'*

5.3.7 Mitigation, compensation and enhancement measures are recommended in Section 6 to enable the Proposed Works to be compliant with the above legislation and planning policy.

6 RECOMMENDATIONS

6.1 OVERVIEW

6.1.1 Dormice were confirmed present across the entire Survey Area. All road alignment options under consideration at present will affect dormice. A European Protected Species Licence (EPSL) informed by an appropriate mitigation strategy will be required from Natural England before construction takes place. Given the complexity of the scheme and potential scale of impacts to dormice, it is advised that Natural England should be consulted with respect to detailed mitigation proposals as they emerge.

6.2 AVOIDANCE AND DESIGN RECOMMENDATIONS

6.2.1 In the first instance it is recommended that detailed designs seek to retain woodland, hedgerow and scrub habitat as far as possible. Where it is not possible to retain woodland, hedgerow and scrub habitat, it is important that significant effort is made to avoid and minimiseifragmentation of habitat. Hazel dormice are an arboreal species that rarely descends to the ground and is therefore particularly vulnerable to the effects of habitat fragmentation.

6.2.2 Of particular concern is an area of plantation woodland totalling around 0.8ha located to north of the Highways depot adjacent to the M3J9 Roundabout. The presence of hazel dormice has been confirmed in this area, and based on preliminary designs; it will become isolated from the wider landscape by all of the options under consideration. Based on Table 2 of the Dormouse Conservation Handbook (English Nature, 2006), the pre-breeding carrying capacity of this woodland is approximately 1-2 adult dormice. If connectivity between this area and the wider landscape cannot be maintained, it is likely that dormouse presence within this area of woodland would not persist.

6.2.3 The following recommendations should be considered during the detailed design stage:

- Where loss of hedgerow, scrub or woodland habitat cannot be avoided it will be necessary to formulate an appropriate mitigation and compensation strategy. This strategy should describe both mitigation during the construction phase in the form of seasonal timing of clearance works and use of specific clearance methods, creation of new compensatory habitat and long term monitoring of dormouse populations on the Survey Area. The habitat retention and creation measures should be fully integrated into the Proposed Works designs and any associated phasing with new habitat creation completed in the earliest possible phase as it takes time for new habitat to develop to become suitable for dormice.
- Fragmentation of retained habitat should be avoided. Where possible, remnant woodlands should be linked by woodland strips or hedgerows to facilitate dispersal and effectively increase the continuous population of dormice. Likewise, newly created habitat should also be connected to suitable retained habitat to facilitate the dispersal, foraging and commuting of hazel dormice throughout the wider landscape.
- Effort should be made to maintain connectivity of woody habitat to any isolated areas of woodland, scrub or hedgerow. With particular regard to the plantation woodland mentioned within Section 6.2.2, consideration should be given as to whether detailed designs can facilitate contiguous woody habitat to this area such as by the use of green bridges or similar structures. If this is not possible, it may be appropriate to assume the loss of the dormouse population from that area and provide habitat compensation accordingly.

6.3 CONSTRUCTION MITIGATION MEASURES

6.3.1 Where the land to be cleared forms part of a larger continuous area of dormouse habitat, then persuading the animals to leave by progressively clearing narrow strips of habitat is recommended.

6.3.2 This would include seasonal timing of clearance works and appropriate phasing to reduce the risk of incidental killing and / or injury of dormice. This may be achieved by implementing a two stage process, with above ground vegetation cleared to approximately 200mm during the winter (December to March) and stumps grubbed out during the following Spring. This phased approach is recommended in order to avoid impacts upon breeding dormice which would result from habitat clearance during the dormouse active season (April to November), whilst also minimising the risk of impacts upon hibernating dormice (which hibernate at or below ground level). Clearance works should be completed using hand tools to avoid crushing of dormice in hibernation nests at ground level by machinery and in tandem with inspection of the vegetation by a suitably qualified ecologist, to identify any hibernation nests present and enable measures to be taken to ensure protection of these. Each strip should be narrower than the radius of a typical home range for that habitat (an average of 50 m) encouraging the dormice to leave the area as the habitat becomes unsuitable.

6.3.3 Smaller areas of dormouse habitat (indicatively less than 50m^2) may be undertaken in one stage during the active season (indicatively late April- early October but avoiding the breeding season June-late September).

6.3.4 Where persuading dormice to relocate from habitat parcels is inappropriate, then dormice should be translocated, following guidance provided in the Dormouse Conservation Handbook (EN, 2006). This is not a favoured option due to the difficulty of catching all individuals and establishing them at an appropriate site. Where translocation is to occur, a suitable recipient site must be identified in advance.

6.3.5 In addition, long term monitoring is recommended to measure the success of the mitigation and compensation measures described above. Monitoring of dormice using an array of at least 50 dormouse boxes, sited within suitable habitat and checked for five years following completion of development is recommended.

6.4 LANDSCAPE COMPENSATION MEASURES

6.4.1 To mitigate for potential effects upon hazel dormice within the Survey Area resulting from habitat loss and fragmentation, the following measures are recommended:

- An equivalent or greater area of new habitat should be created to compensate for any habitat loss. This should comprise species diverse woodland and hedgerow planting, with the species mix targeted to provide a variety of food sources for dormice (see indicative species list in Appendix C). A species-rich shrub layer is required to provide food sources which should include hazel, honeysuckle and bramble. This new habitat should be created far enough in advance of loss of existing habitat for it to be become established, and include more mature shrub specimens, to allow time for the shrubs and trees to mature and fruit and develop into suitable habitat. A commitment to retention and appropriate management[1] of newly created and retained habitat in the long term will also be necessary at the planning submission stage, the details of which would form part of a future EPSL application.

- Planting of species rich hedgerows to connect retained and newly planted woodland. Species-rich hedgerows offer good habitat and may be an essential means of dispersal between woodland sites, reducing the isolation effect of small woods, as well as providing suitable habitat for permanent occupation.
- Sensitive hedgerow management across the Proposed Works to ensure availability of fruits as a food source for dormice in the long term (as available in currently un-managed hedgerows). This should comprise a long rotation management regime, with hedgerows cut every 3-5 years, with only one side of any individual hedge trimmed in any one year (EN 2006). Space should be allowed within development designs to accommodate the resulting broad hedgerows.
- Avoidance of lighting of the woodland and any retained hedgerows, with hoods, shields or cowls used as appropriate to avoid light spill into retained habitat.

6.5 ECOLOGICAL ENHANCEMENT MEASURES

6.5.1 Biodiversity gain in association with development is encouraged by NPPF (2012). In accordance with this policy it is recommended the following opportunities for enhancing the Site for dormice should be considered:

- Gradual removal of conifer from the retained woodlands, with replacement of conifers with planting in keeping with existing native species within the woodland, to include oak and hazel (also see indicative list of species suitable for dormice included within Appendix C).
- Retention of brash piles within the woodland to form suitable hibernation habitat.
- Creation of new hedgerows in association with the Proposed Works.
- Use native broadleaf species listed within Appendix C within any woodland re-stocking or screening plantation and any hedgerow creation or augmentation.
- Retention of areas within the development designs in which scrub is allowed to develop; with long term management plans designed with regard for maintenance of areas of this habitat type. Maintenance of scrub should include edge management, cutting to encourage regrowth, sensitive timing of cutting to avoid berry yielding plants and rotational cutting to create a diverse structure. Habitat within the verges of the highways could be targeted for this enhancement.

7 CONCLUSIONS

7.1.1 Survey work completed in accordance with best practice guidance (EN, 2006) has concluded dormice are present within the Survey Area. Consequently dormice will need to be taken into consideration within all road alignment options under consideration, to enable compliance with the legislation and planning policy.

7.1.2 Mitigation and compensation should seek to ensure maintenance of dormouse populations within the Survey Area at favourable conservation status; the approach would be likely to include retention of the connectivity between suitable habitat, a phased clearance method, creation and long term maintenance of compensatory habitat and monitoring of dormouse populations following construction.

8 REFERENCES

8.1 PROJECT REFERENCES

- WSP (2016). M3 Junction 9 Improvement PCF Stage 1. Ecological Desk Study
- WSP (2017). M3 Junction 9 Improvement PCF Stage 2. Phase 1 Habitat Survey

8.2 TECHNICAL REFERENCES

- CIEEM (2016) Guidelines For Ecological Impact Assessment In the UK And Ireland. Available: https://www.cieem.net/data/files/Publications/EcIA_Guidelines_Terrestrial_Freshwater_and_Coastal_Jan_2016.pdf. Accessed 02/01/18.
- Department for Communities and Local Government (2012), National Planning Policy Framework. Department for Communities and Local Government, London.
- English Nature (Now Natural England) (2006) The Dormouse Conservation Handbook
- Ewald N (2004) Distribution and Status of the Dormouse *Muscardinus avallanarius* in Hampshire, Hampshire Wildlife Trust, available: http://hampshiredormousegroup.files.wordpress.com/2010/02/distribution-and-status-of-the-dormouse-in-hampshire.pdf; accessed 12/12/17.
- Hampshire Biodiversity Partnership. (Undated). Biodiversity Action Plan for Hampshire: Volume 2. Available: http://www.hampshirebiodiversity.org.uk/pdf/vol2/Vol2ActionPlansp1-13.pdf. Accessed 12/12/17.
- Hampshire Biodiversity Partnership (Undated). Biodiversity Action Plan for Hampshire, Priority Species in Hampshire. Available: http://www.hampshirebiodiversity.org.uk/pdf/vol2/Vol 2 Priority Species list.pdf. Accessed 12/12/17.
- Hampshire Biodiversity Partnership (Undated). Ancient and Semi-Natural Woodland Habitat Action Plan. http://www.hampshirebiodiversity.org.uk/pdf/PublishedPlans/ASNWoodHAPjjDTP2.pdf
- Hampshire County Council (2006), The State of Hampshire's Biodiversity.
- Hampshire County Council (undated), Woodland Cover in South East England. Available: http://www3.hants.gov.uk/woodlandcover.pdf. Accessed October 2012.
- Her Majesty's Stationary Office (HMSO) (1981). Wildlife and Countryside Act (as amended by the Countryside and Rights of Way Act 2000).
- HMSO (2005) Biodiversity and Geological Conservation – Statutory Obligations and Their Impact Within the Planning System. Office of the Deputy Prime Minister (ODPM) Circular 06/2005 HMSO, Norwich.
- HMSO (2006) Natural Environment and Rural Communities Act.
- HMSO (2010). The Conservation of Habitats and Species Regulations 2017 as amended (the Habitat Regulations).
- Joint Nature Conservation Committee (2010) UK priority species pages version 2 *Muscardinus avellanarius*. Available: http://jncc.defra.gov.uk/_speciespages/462.pdf. Accessed 12/12/17
- Natural England (2012) FAQ-HD 13/11/2012 Interim FAQs hazel or common dormouse. Available: http://www.naturalengland.org.uk/Images/faq-hd_tcm6-34296.pdf Accessed 12/12/17.

→ Winchester City Council (2013) Winchester District Local Plan Part 1 Chapter 9 High Quality Environment. Available: http://www.winchester.gov.uk/planning-policy/local-plan-part-1/adoption/. Accessed 02/01/18.

9 FIGURES

FIGURE 2-1 – SITE LOCATION PLAN