Gatwick Airport Northern Runway Project

Consultation Report Appendices – Part B – Volume 14

Book 6

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DATE: JULY 2023

Application Document Ref: 6.2

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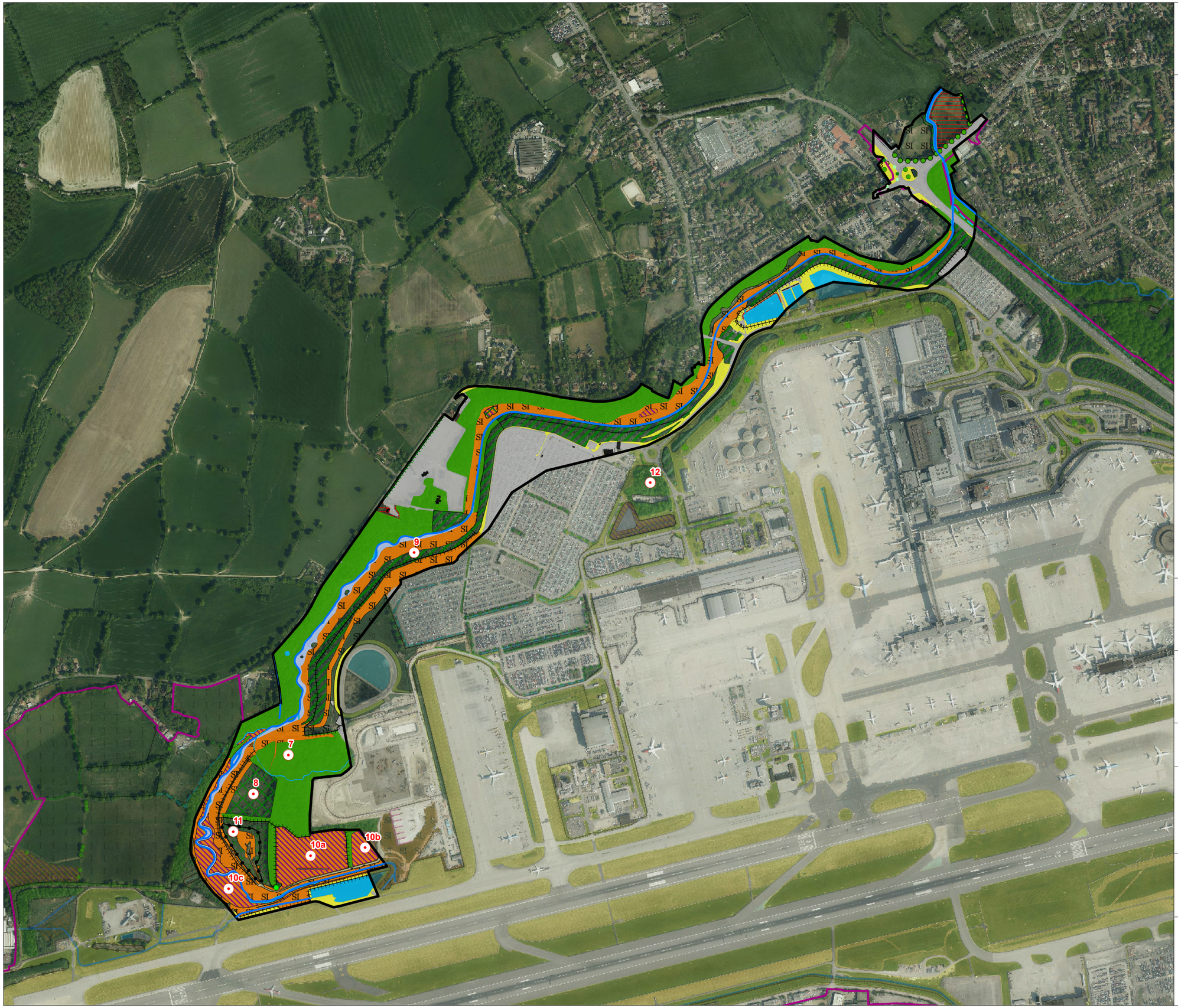
Contents – Part B – Volume 14



YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Ecology Parcel
- Phase 1 target notes
- Scattered tree - broadleaved
- Scattered tree - coniferous
- Line of trees
- Mixed Parkland/scattered trees
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - native species-rich
- Hedge with trees - species-poor
- Fence
- Dry ditch
- Earth bank
- Running water
- Wall
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- Broadleaved Parkland/scattered trees
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Tall ruderal
- Marginal vegetation
- Water body
- Amentiy grassland
- Ephemeral/short perennial
- Introduced shrub/ornamental planting
- Buildings
- Bare ground
- Other
- Hard standing
- No access

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Phase 1 Habitat Survey - A6
The North West Zone, Containing the River Mole Corridor and Brockley Wood

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.1.2i	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:10,000

0 25 50 100 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Ecology Parcel
- Phase 1 target notes
- Scattered tree - broadleaved
- Scattered tree - coniferous
- Line of trees
- Intact hedge - native species-rich
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Fence
- Dry ditch
- Earth bank
- Running water
- Wall
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- Broadleaved Parkland/scattered trees
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Marginal vegetation
- Water body
- Amentiy grassland
- Ephemeral/short perennial
- Introduced shrub/ornamental planting
- Buildings
- Bare ground
- Other
- Hard standing
- No access

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Phase 1 Habitat Survey - A7 Non-airside north

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.1.2j	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:6,000

0 25 50 100 m

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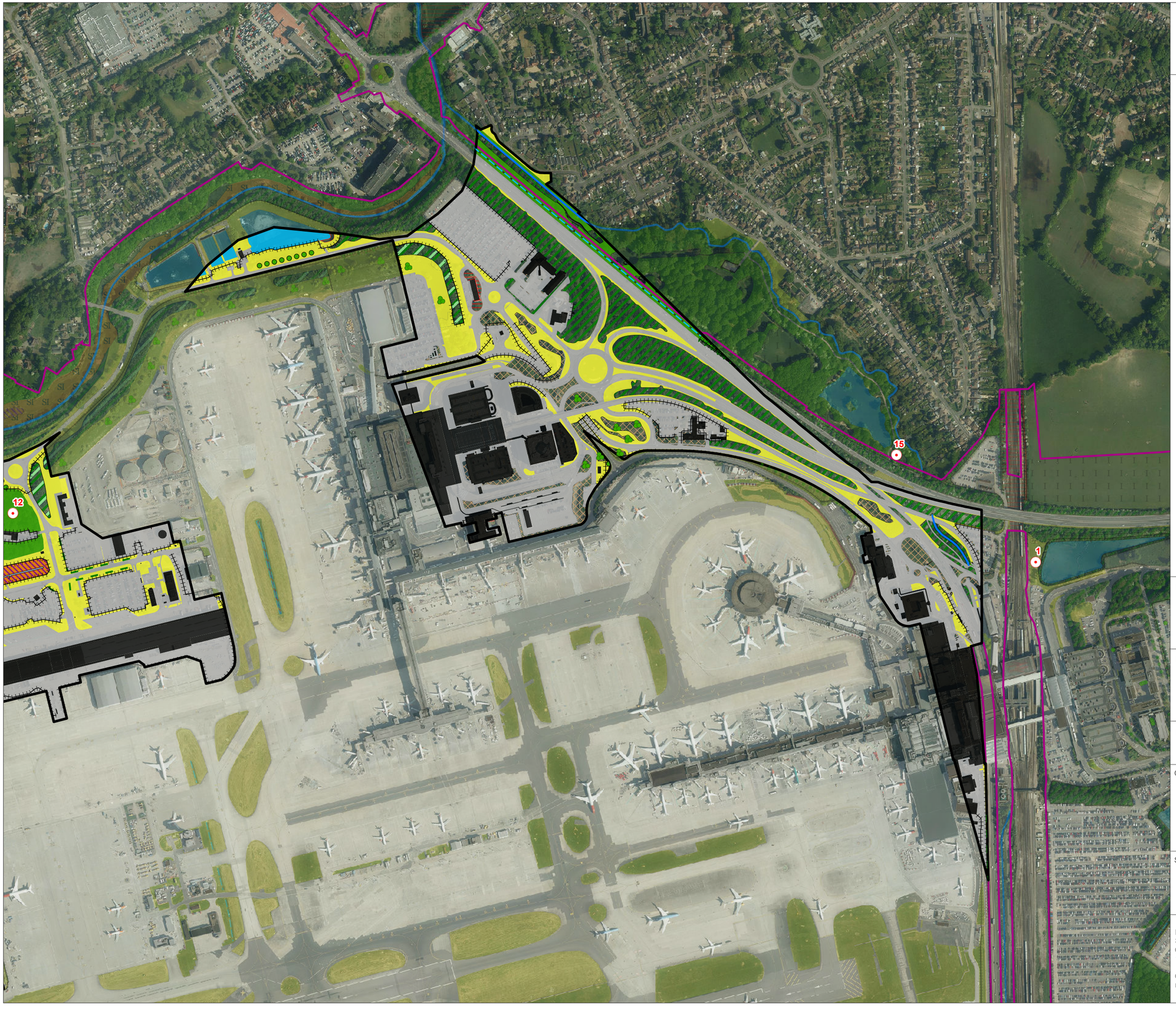

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Ecology Parcel
- Phase 1 target notes
- Scattered tree - broadleaved
- Line of trees
- Mixed Parkland/scattered trees
- Intact hedge - species-poor
- Defunct hedge - species-poor
- Hedge with trees - native species-rich
- Fence
- Dry ditch
- Earth bank
- Running water
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Mixed woodland - semi-natural
- Mixed woodland - plantation
- Scrub - dense/continuous
- Scrub - scattered
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Tall ruderal
- Marginal vegetation
- Water body
- Amentiy grassland
- Introduced shrub/ornamental planting
- Buildings
- Bare ground
- Other
- Hard standing
- No access

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Phase 1 Habitat Survey - A7 Non-airside north

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.1.2k	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:7,000

0 25 50 100 m

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YOUR LONDON AIRPORT
Gatwick

KEY

- Project Site Boundary (PEIR)
- Ecology Parcel
- Phase 1 target notes
- Scattered tree - broadleaved
- Line of trees
- Mixed Parkland/scattered trees
- Hedge with trees - native species-rich
- Fence
- Dry ditch
- Earth bank
- Running water
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Mixed woodland - semi-natural
- Scrub - dense/continuous
- Scrub - scattered
- Improved grassland
- Poor semi-improved grassland
- Tall ruderal
- Water body
- Amentiy grassland
- Introduced shrub/ornamental planting
- Buildings
- Bare ground
- Other
- Hard standing
- No access

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Phase 1 Habitat Survey - A8 Riverside Garden Park

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.1.2I	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 m

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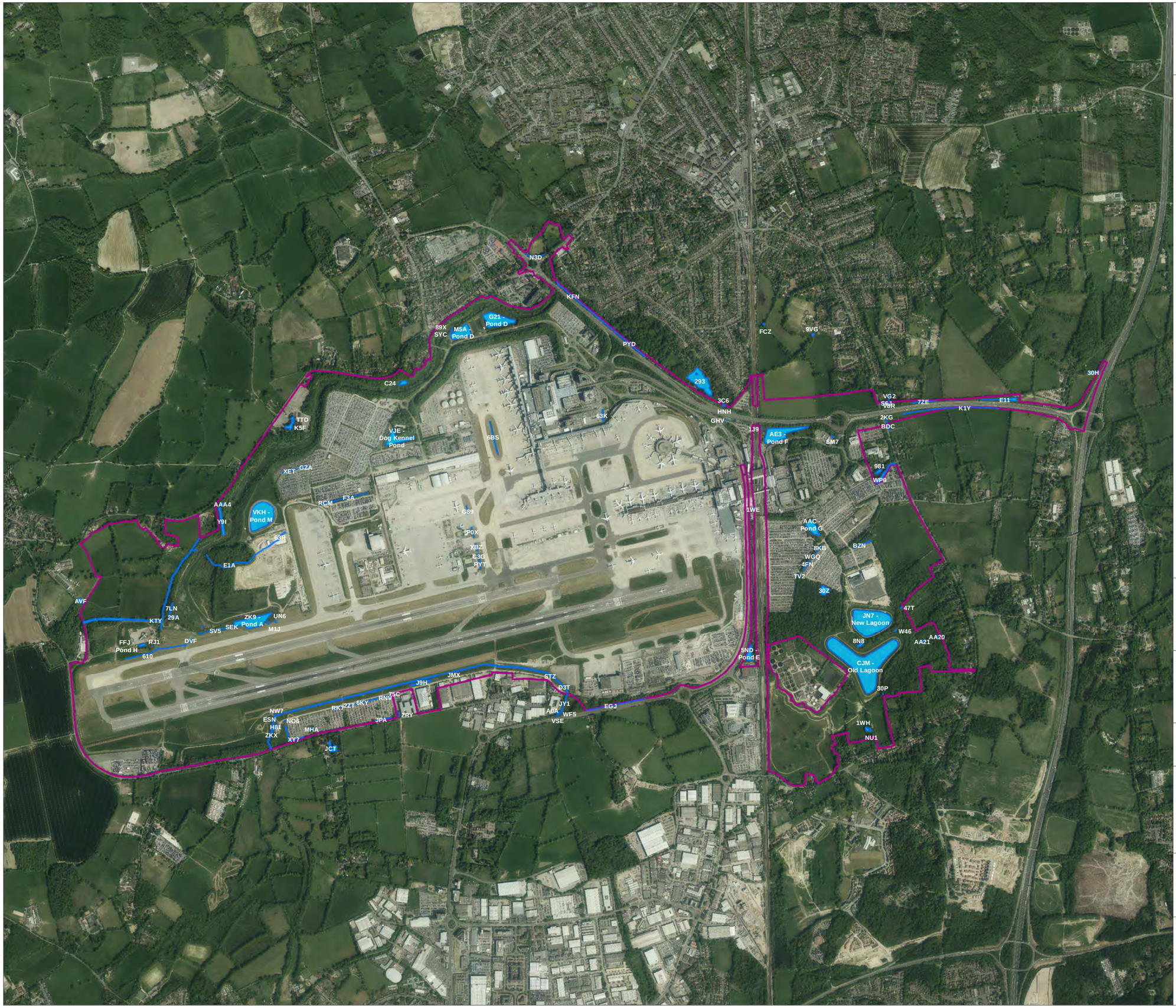

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond locations

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Pond Locations

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.1.3	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:20,000

0 250 500 1,000 m

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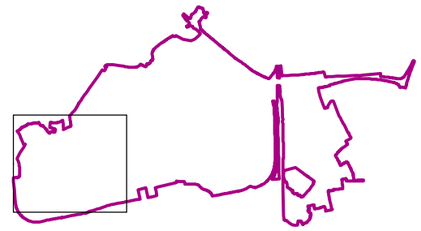
YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Calamagrostice epigejos Society
- M27c - filipendula ulmaria - Angelicasylvestris mire. Juncus effeuses - Holcus lanatus sub-community
- MG9b - Holcus Lantus - Deschampsia cespitosa grassland. Arrhenatherum elatior sub-community
- S4 - Phragmites australis swamp and reed-beds
- River Mole



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

National Vegetation Classification

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.2.1	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: AP

SCALE @ A3 1:2,500

0 25 50 100 m

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YOUR LONDON AIRPORT
Gatwick

KEY

- Project Site Boundary (PEIR)
- Ecology Parcels

Breeding Bird Territories

- GL Grey wagtail
- HS House sparrow
- LI Linnet
- MT Marsh tit
- M Mistle thrush
- S Skylark
- ST Song thrush
- SG Starling

DOCUMENT
Preliminary Environmental Information Report
Appendix 9.6.2

DRAWING TITLE
Territories of BoCC red listed breeding birds recorded in 2019

DATE
September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.4.1a	For PEIR Issue
	DRAWN BY: KM	PM / CHECKED BY: LM

SCALE @ A3 1:16,000

0 145 290 580 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Ecology Parcels

Breeding Bird Territories

- GL Bullfinch
- D Dunnock
- GJ Greylag goose
- K Kestrel
- MA Mallard
- RB Reed bunting
- SD Stock dove

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Territories of BoCC amber listed breeding birds recorded in 2019

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.4.1b	For PEIR Issue
	DRAWN BY: KM	PM / CHECKED BY: LM

SCALE @ A3 1:20,000

0 250 500 1,000 m

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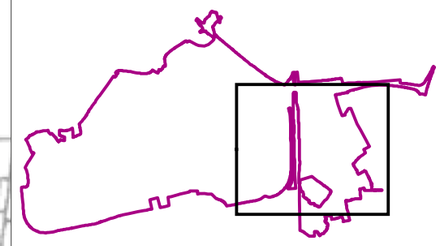
YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Ecology Parcels
- PE Peregrine
- FC Firecrest
- LP Little Ringed Plover



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Locations of Annex 1 and/or Schedule 1 species recorded in 2019

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.4.1c	For PEIR Issue
	DRAWN BY: KM	PM / CHECKED BY: LM

SCALE @ A3 1:6,500

0 50 100 200 m

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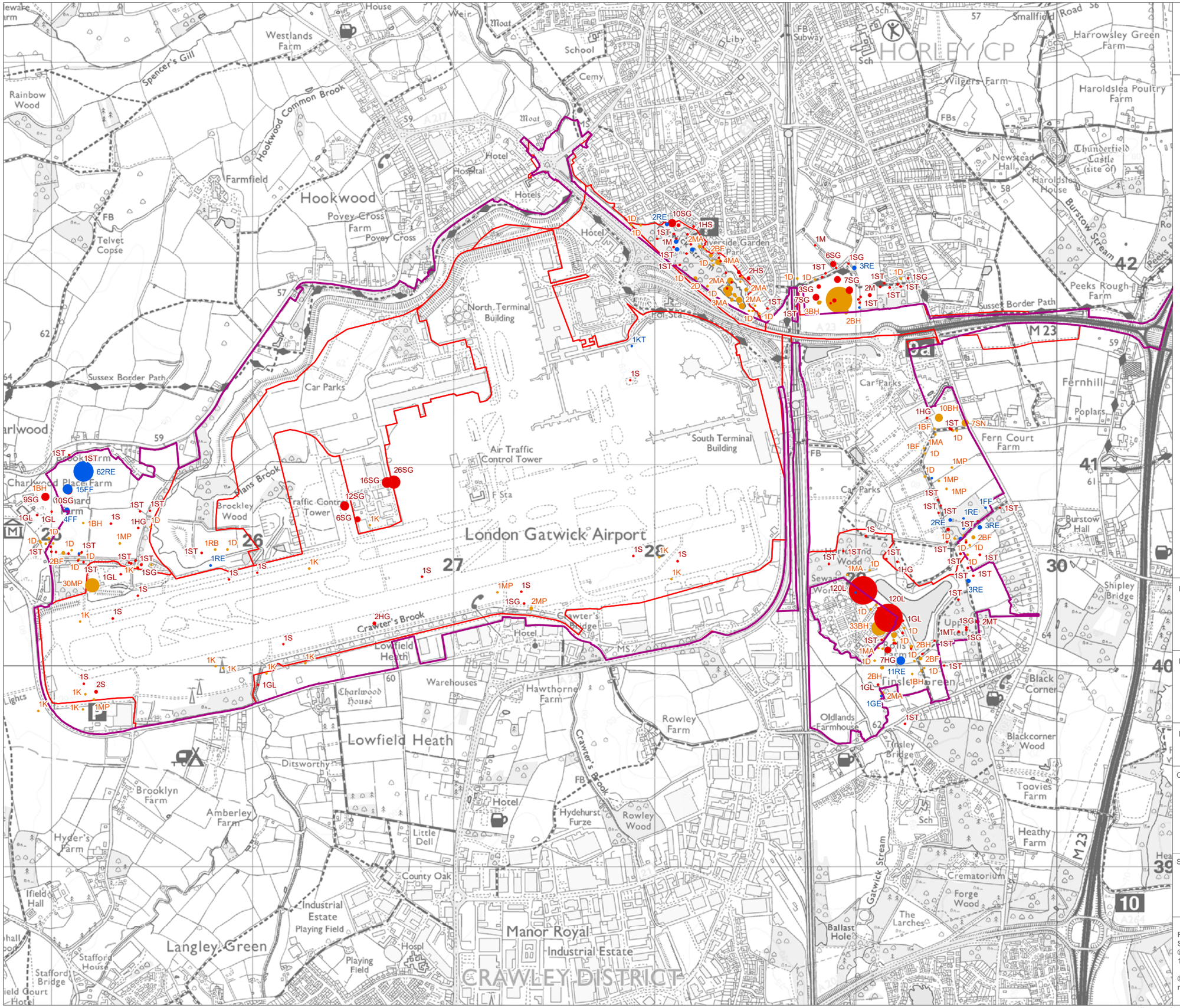

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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Distribution of Protected and Notable Bird Species Recorded During 2019 Winter Surveys

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
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	DRAWN BY: KM	PM / CHECKED BY: LM

SCALE @ A3 1:18,000

0 250 500 1,000 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Reptile Mat Location
- Grass Snake
- Grass Snake Slough

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Reptile Mat Locations + Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.6.1a	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 m

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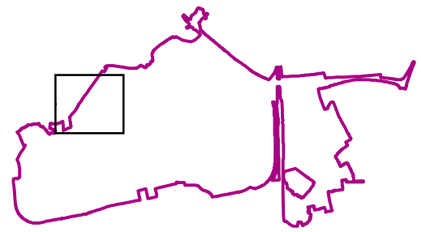
YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Reptile Mat Location
- Grass Snake
- Grass Snake Slough



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Reptile Mat Locations + Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.6.1b	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 m

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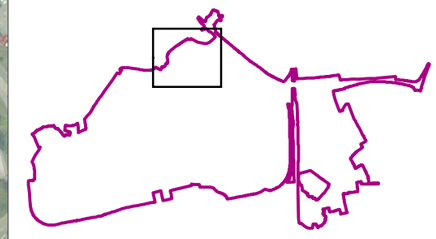
YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Reptile Mat Location
- Grass Snake
- Grass Snake Slough



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Reptile Mat Locations + Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.6.1c	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 m

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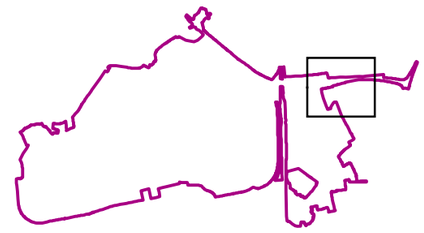
YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Reptile Mat Location
- Grass Snake
- Grass Snake Slough



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Reptile Mat Locations + Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.6.1d	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 m

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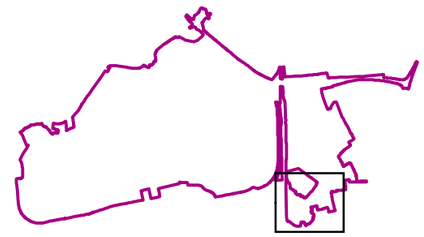
YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Reptile Mat Location
- Grass Snake
- Grass Snake Slough



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Reptile Mat Locations + Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.6.1e	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 m

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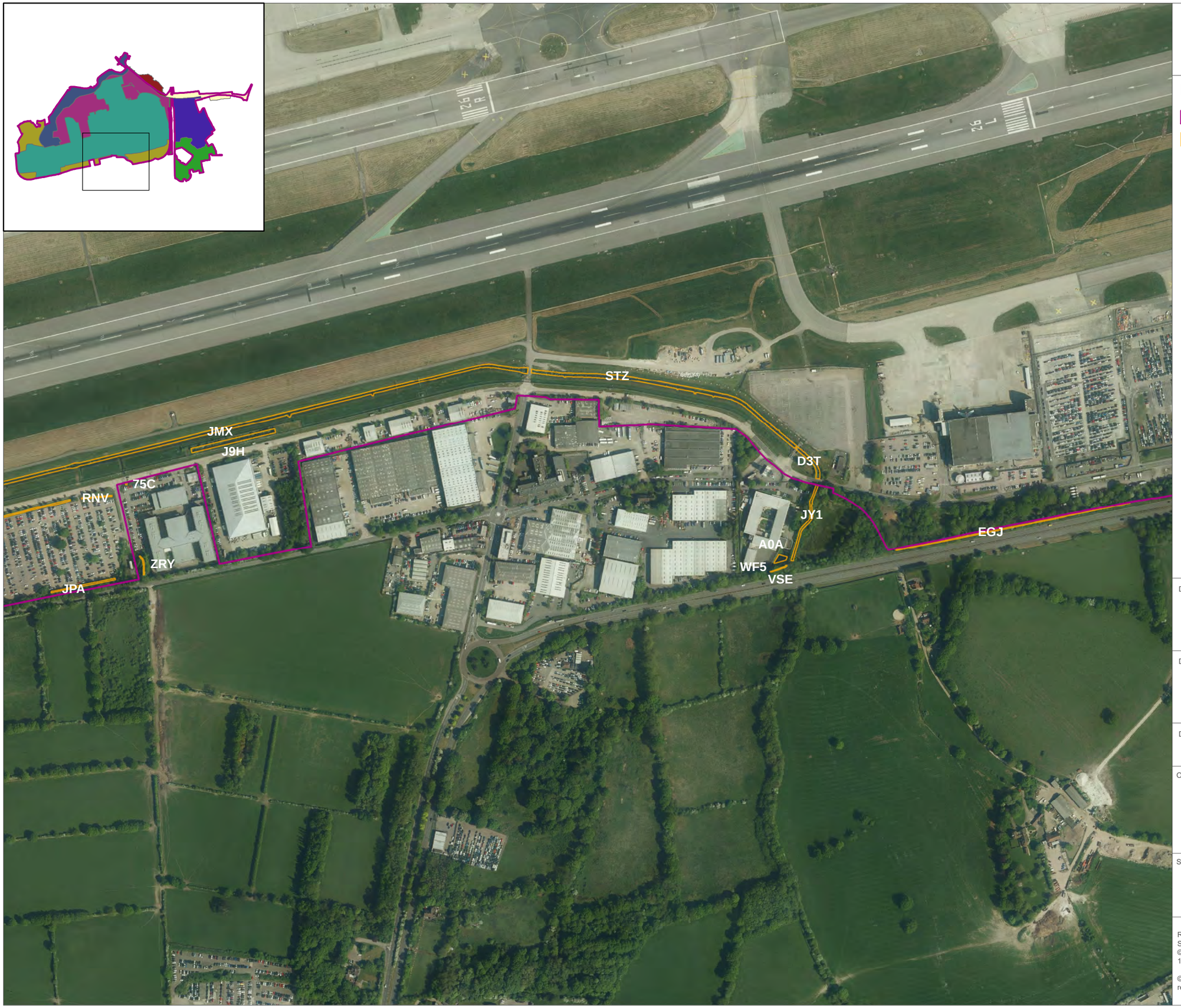

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Ponds not surveyed - Scoped out

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1a	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 50 100 200 m

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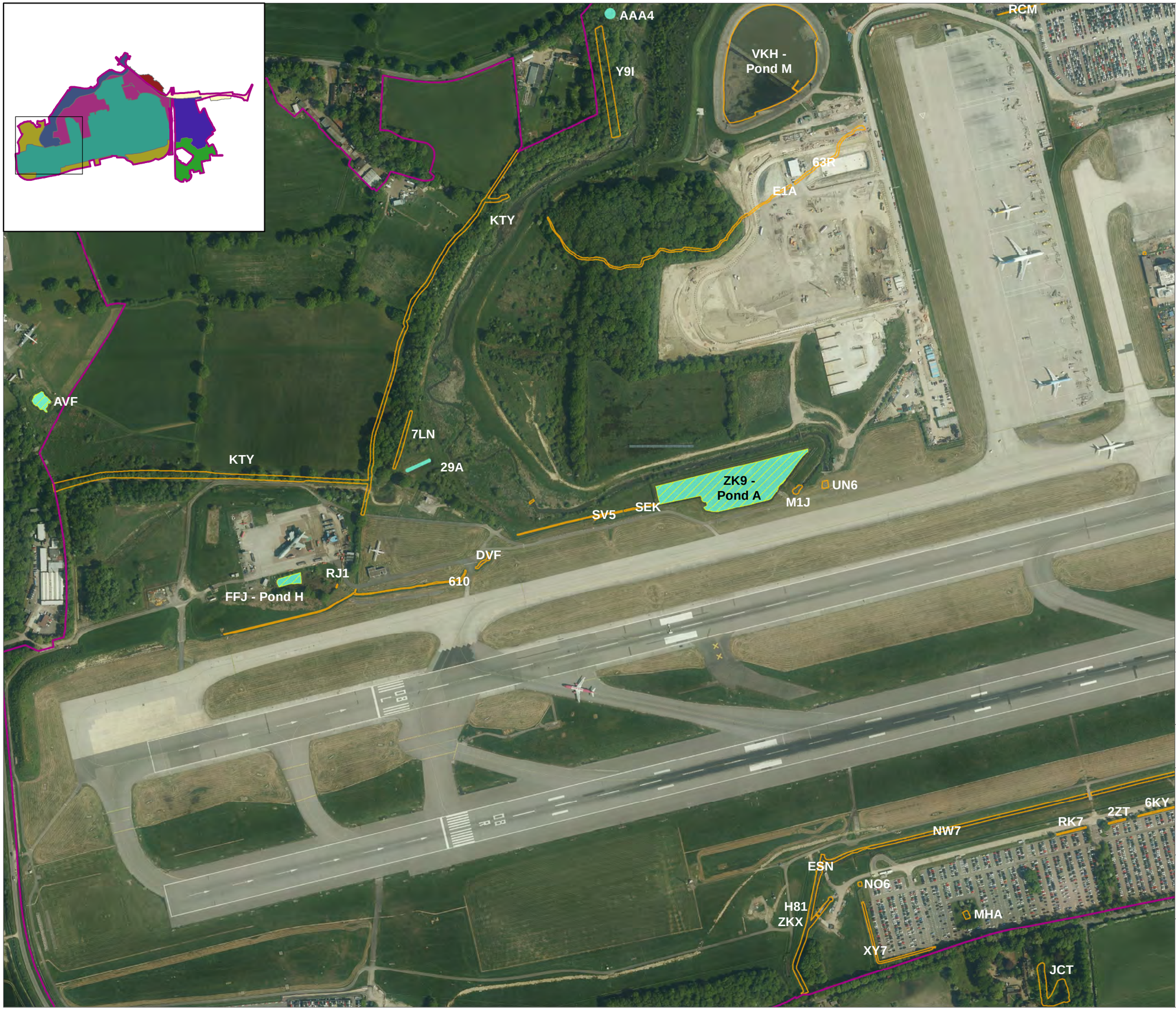

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN not present
- Ponds not surveyed - Scoped out
- HSI - Good

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1b	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 50 100 200 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN present
- Ponds not surveyed - Scoped out

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1c	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:2,500

0 25 50 100 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN not present
- Ponds not surveyed - Scoped out
- HSI - Average

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1d	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 50 100 200 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Ponds not surveyed - Scoped out

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1e	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:2,500

0 25 50 100 m

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YOUR LONDON AIRPORT
Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN not present
- Ponds not surveyed - Scoped out
- HSI - Below average
- HSI - Poor

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1f	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 50 100 200 m

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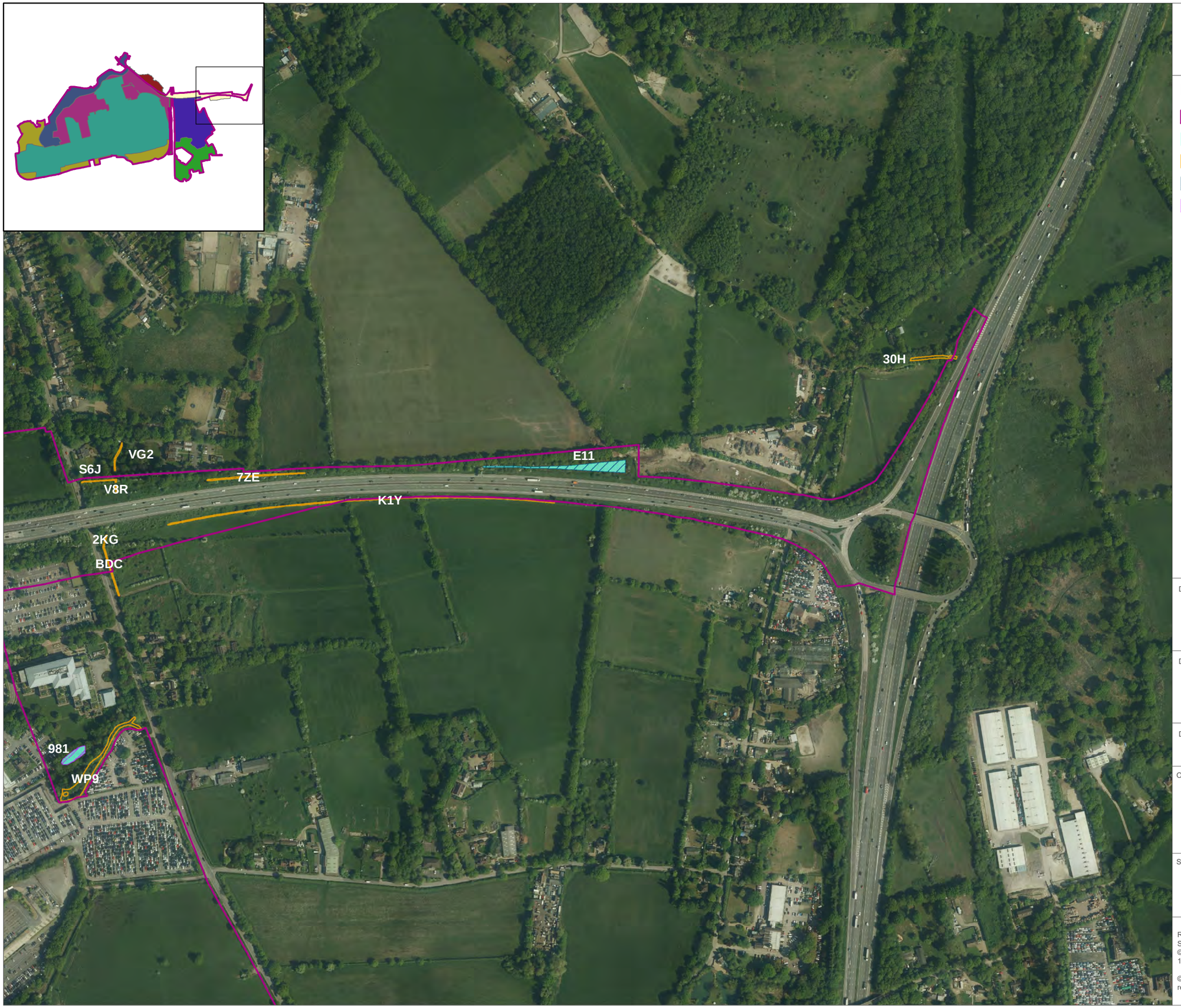

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN not present
- Ponds not surveyed - Scoped out
- HSI - Average
- HSI - Below average

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1g	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 50 100 200 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN present
- Pond Surveyed - GCN not present
- Ponds not surveyed - Scoped out
- HSI - Average
- HSI - Good

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1h	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:2,500

0 25 50 100 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN present
- Pond Surveyed - GCN not present
- Ponds not surveyed - Scoped out
- HSI - Average
- HSI - Poor

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1i	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:2,500

0 25 50 100 m

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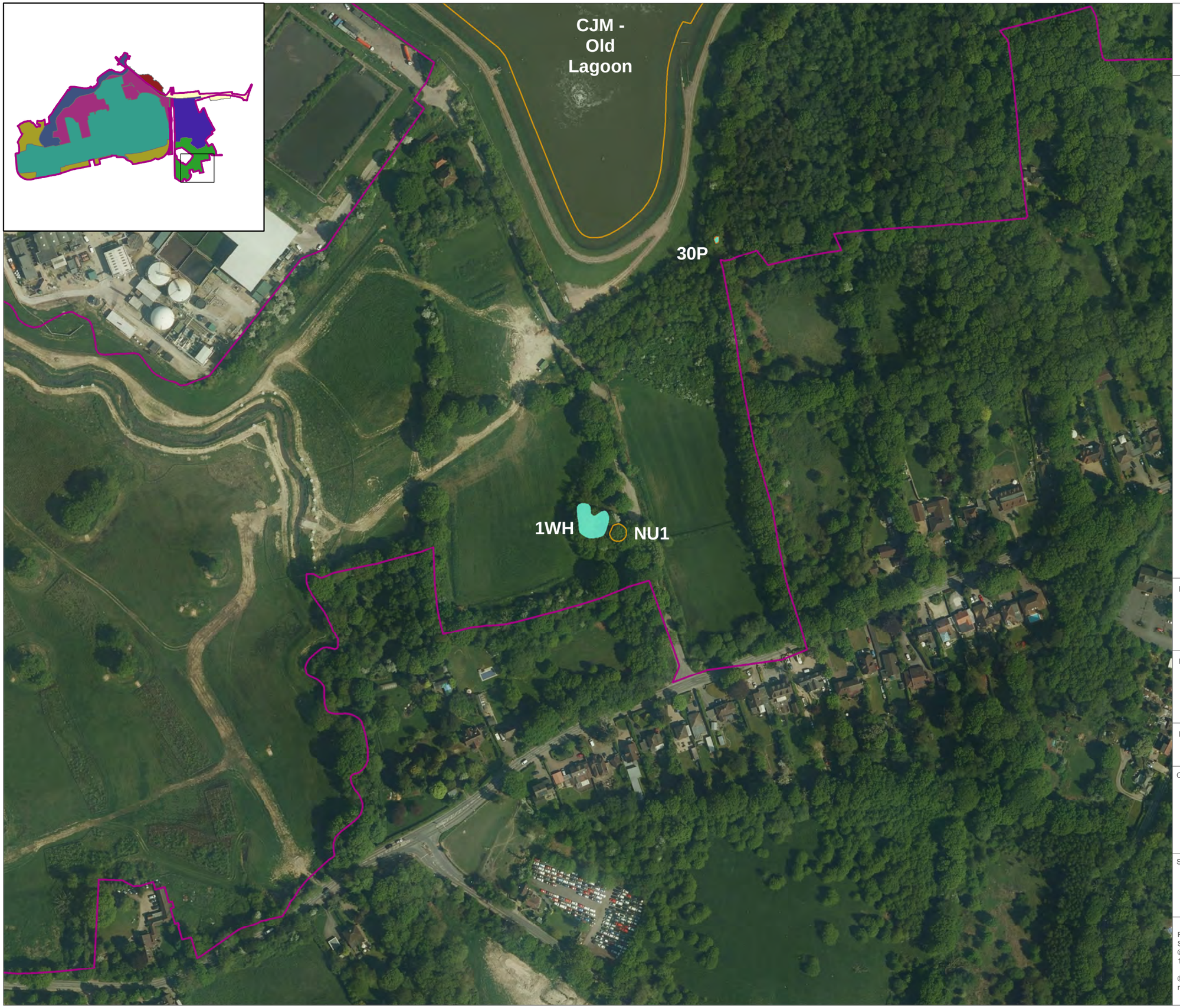

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Pond Surveyed - GCN not present
- Ponds not surveyed - Scoped out
- HSI - Poor

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Great Crested Newt Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.7.1j	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:2,500

0 25 50 100 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Dormouse Tube Location
- A1 - Fields north and south of M23 for construction laydown plus link to J9
- A2 - Eastern Carparking and Associated Surface Water Features
- A3 - Land East of the Railway Line
- A4 - Airside
- A5 - Non-Airside South and Land East of the Aviation Museum
- A6 - The North West Zone, Containing the River Mole Corridor and Brockley Wood Biodiversity Area
- A7 - Non-airside North
- Riverside Garden Park
- Dormouse Tube Location

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Dormouse Tube Locations

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.8.1	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:20,000

0 250 500 1,000 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- River Mole
- Photograph Location

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Aquatic Mammal Survey Results

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.9.1	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: SB

SCALE @ A3 1:35,000

0 500 1,000 2,000 m

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YOUR LONDON AIRPORT Gatwick

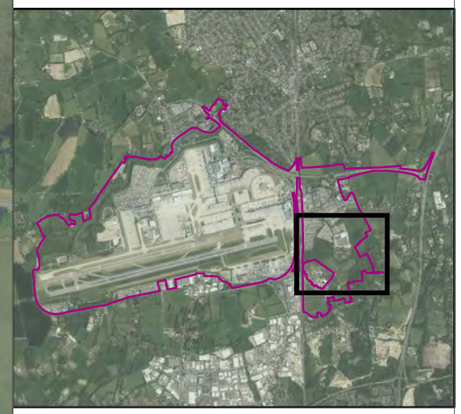
KEY

- Project Site Boundary (PEIR)
- Route 1 - 09/04/2019
- Route 1 - 24/04/2019, 08/05/2019, 21/05/2019
- Stop location

Bat density kernel output

High : 20

Low : 0



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Pre-Maternity (April, May) Results - Route 1

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.1a	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:4,000

0 25 50 100 150 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Route 2 - 09/04/2019, 08/05/2019, 21/05/2019
- Route 2 - 24/04/2019
- Stop location

Bat density kernel output

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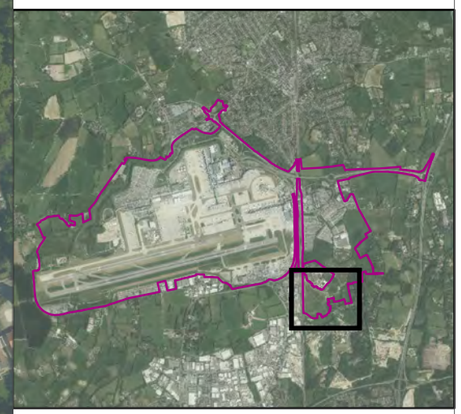
Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Pre-Maternity (April, May) Results - Route 2

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.1b	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

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O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0228-010.mxd

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Route 3 - 09/04/2019, 24/04/2019, 08/05/2019
- Route 3 - 21/05/2019
- Stop location

Bat density kernel output

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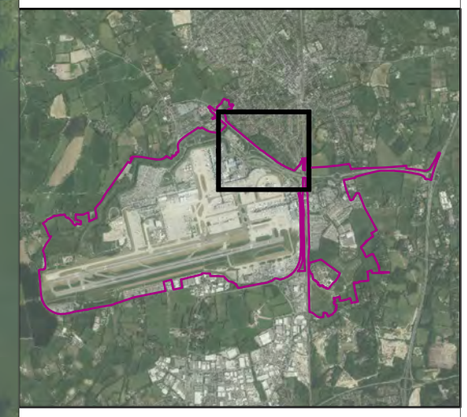
Low : 0



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Pre-Maternity (April, May) Results - Route 3

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.1c	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:4,000

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Route 3 - 09/04/2019, 24/04/2019, 08/05/2019
- Route 3 - 21/05/2019
- Stop location

Bat density kernel output

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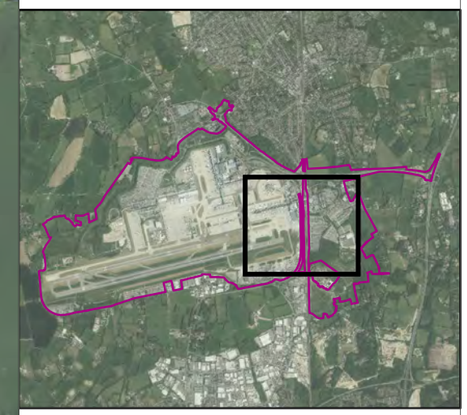
Low : 0



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Pre-Maternity (April, May) Results - Route 3

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.1d	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 25 50 100 150 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Route 4 - 25/04/2019, 10/04/2019, 22/05/2019
- Route 4 - 13/05/2019
- Stop location

Bat density kernel output

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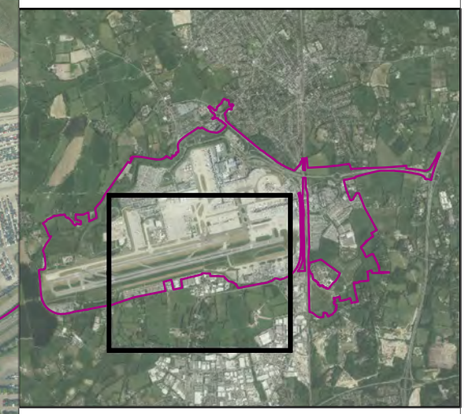
Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Pre-Maternity (April, May) Results - Route 4

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.1e	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:8,000

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Route 5 - 10/04/2019,
- Route 5 - 09/05/2019
- Route 5 - 22/05/2019
- Stop location

Bat density kernel output

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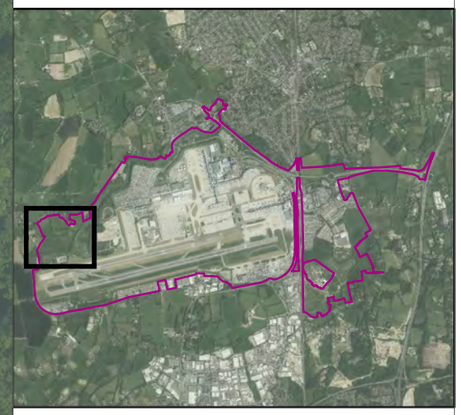
Low : 0



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Pre-Maternity (April, May) Results - Route 5

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.1f	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 150 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0228-010.mxd

YOUR LONDON AIRPORT Gatwick

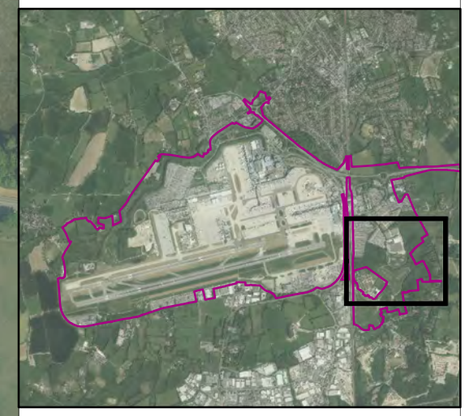
KEY

- Project Site Boundary (PEIR)
- Route 1 - 09/07/2019,12/06/2019, 23/07/2019, 25/06/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Maternity (June + July) - Route 1

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.2a	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:4,000

0 30 60 120 180 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Route 2 - 12/06/2019, 25/06/2019, 09/07/2019
- Route 2 - 23/07/2019
- Stop locations

Bat density kernel output

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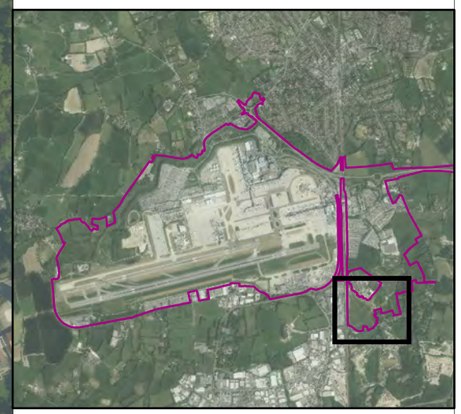
Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Maternity (June + July) - Route 2

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.2b	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 150 m

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YOUR LONDON AIRPORT Gatwick

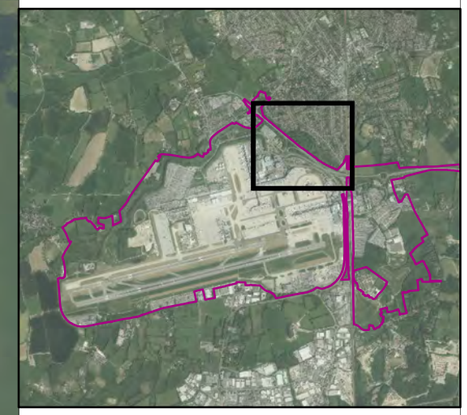
KEY

- Project Site Boundary (PEIR)
- Route 3 - 09/07/2019, 18/06/2019, 25/06/2019
- Route 3 -23/07/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Maternity (June + July) - Route 3

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.2c	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:4,000

0 30 60 120 180 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0242-010.mxd

YOUR LONDON AIRPORT Gatwick

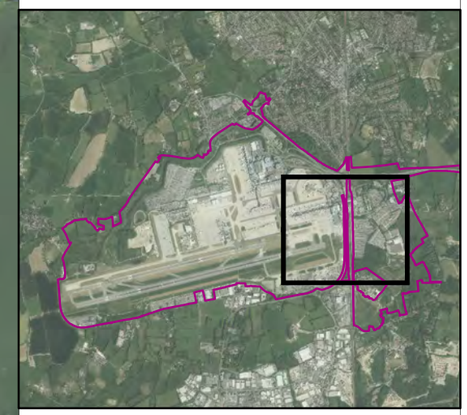
KEY

- Project Site Boundary (PEIR)
- Route 3 - 09/07/2019, 18/06/2019, 25/06/2019
- Route 3 -23/07/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Maternity (June + July) - Route 3

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.2d	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 40 80 160 240 m

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YOUR LONDON AIRPORT Gatwick

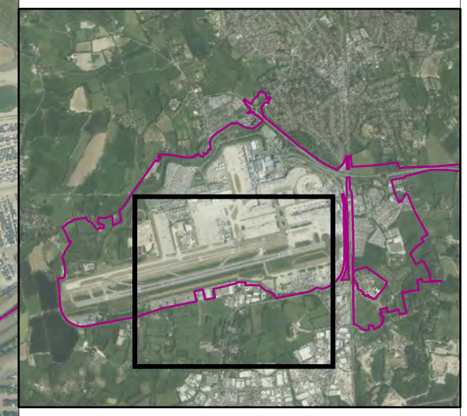
KEY

- Project Site Boundary (PEIR)
- Route 4 - 13/06/2019, 26/06/2019, 10/07/2019, 24/07/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Maternity (June + July) - Route 4

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.2e	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:8,000

0 65 130 260 390 m

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YOUR LONDON AIRPORT Gatwick

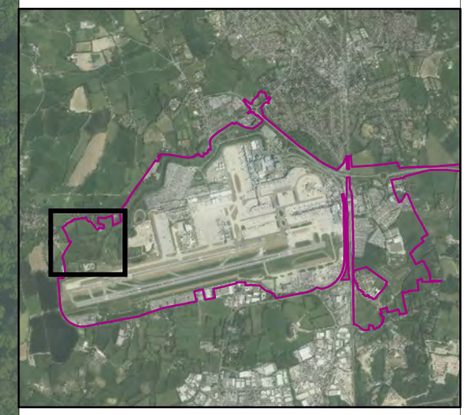
KEY

- Project Site Boundary (PEIR)
- Route 5, 10/07/2019, 13/06/2019, 24/07/2019, 26/06/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Maternity (June + July) - Route 5

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.2f	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 150 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0242-010.mxd

YOUR LONDON AIRPORT Gatwick

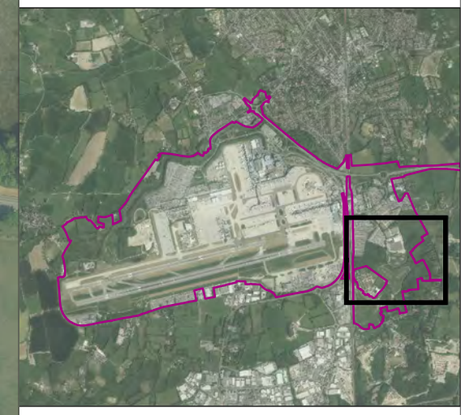
KEY

- Project Site Boundary (PEIR)
- Route 1 - 03/09/2019, 06/08/2019, 15/10/2019, 25/09/2019, 28/08/2019, 30/10/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Post Maternity (August, September, October) - Route 1

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.3a	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:4,000

0 30 60 120 180 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0338-006.mxd

YOUR LONDON AIRPORT Gatwick

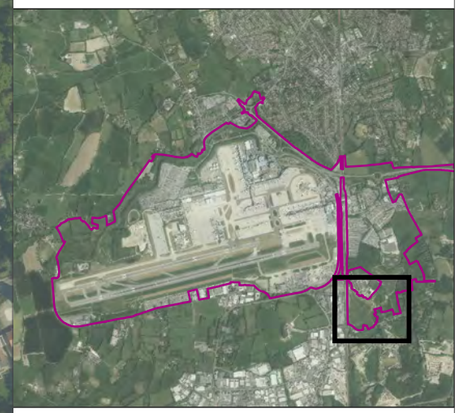
KEY

- Project Site Boundary (PEIR)
- Route 2 - 06/08/2019, 25/09/2019
- Route 2 - 28/08/2019
- Route 2 - 16/10/2019, 30/10/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Post Maternity (August, September, October) - Route 2

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.3b	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 150 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0338-006.mxd

YOUR LONDON AIRPORT Gatwick

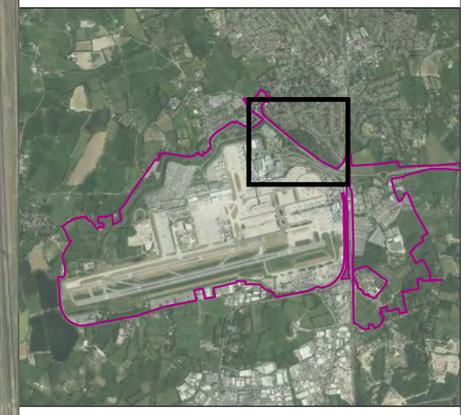
KEY

- Project Site Boundary (PEIR)
- Route 3 - 06/08/2019, 03/09/2019, 16/10/2019
- Route 3 - 29/08/2019, 25/09/2019, 30/10/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



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Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Post Maternity (August, September, October) - Route 3

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.3c	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:4,000

0 30 60 120 180 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0338-006.mxd

YOUR LONDON AIRPORT Gatwick

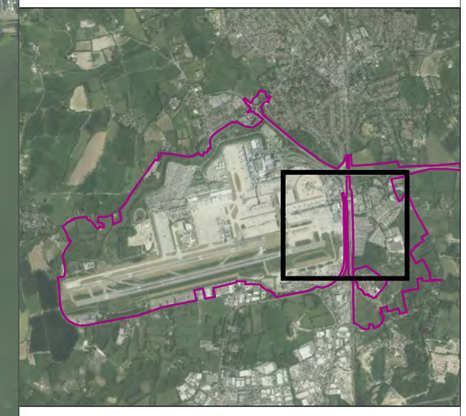
KEY

- Project Site Boundary (PEIR)
- Route 3 - 06/08/2019, 03/09/2019, 16/10/2019
- Route 3 - 29/08/2019, 25/09/2019, 30/10/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Post Maternity (August, September, October) - Route 3

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.3d	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:5,000

0 40 80 160 240 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Route 4 - 04/09/2019, 05/08/2019, 15/10/2019, 24/09/2019, 29/08/2019, 29/10/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Post Maternity (August, September, October) - Route 4

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.3e	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:8,000

0 65 130 260 390 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0338-006.mxd

YOUR LONDON AIRPORT Gatwick

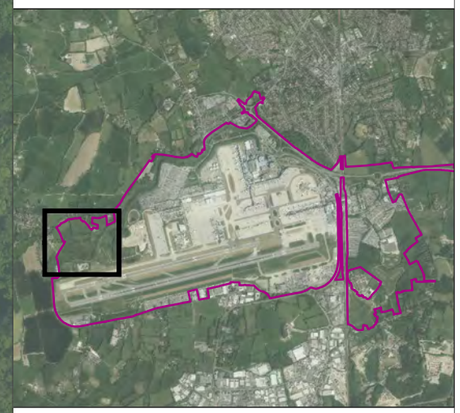
KEY

- Project Site Boundary (PEIR)
- Route 5 - 04/09/2019, 05/08/2019, 15/10/2019, 24/09/2019, 29/08/2019, 29/10/2019
- Stop locations

Bat density kernel output

High : 20

Low : 0



DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Post Maternity (August, September, October) - Route 5

DATE

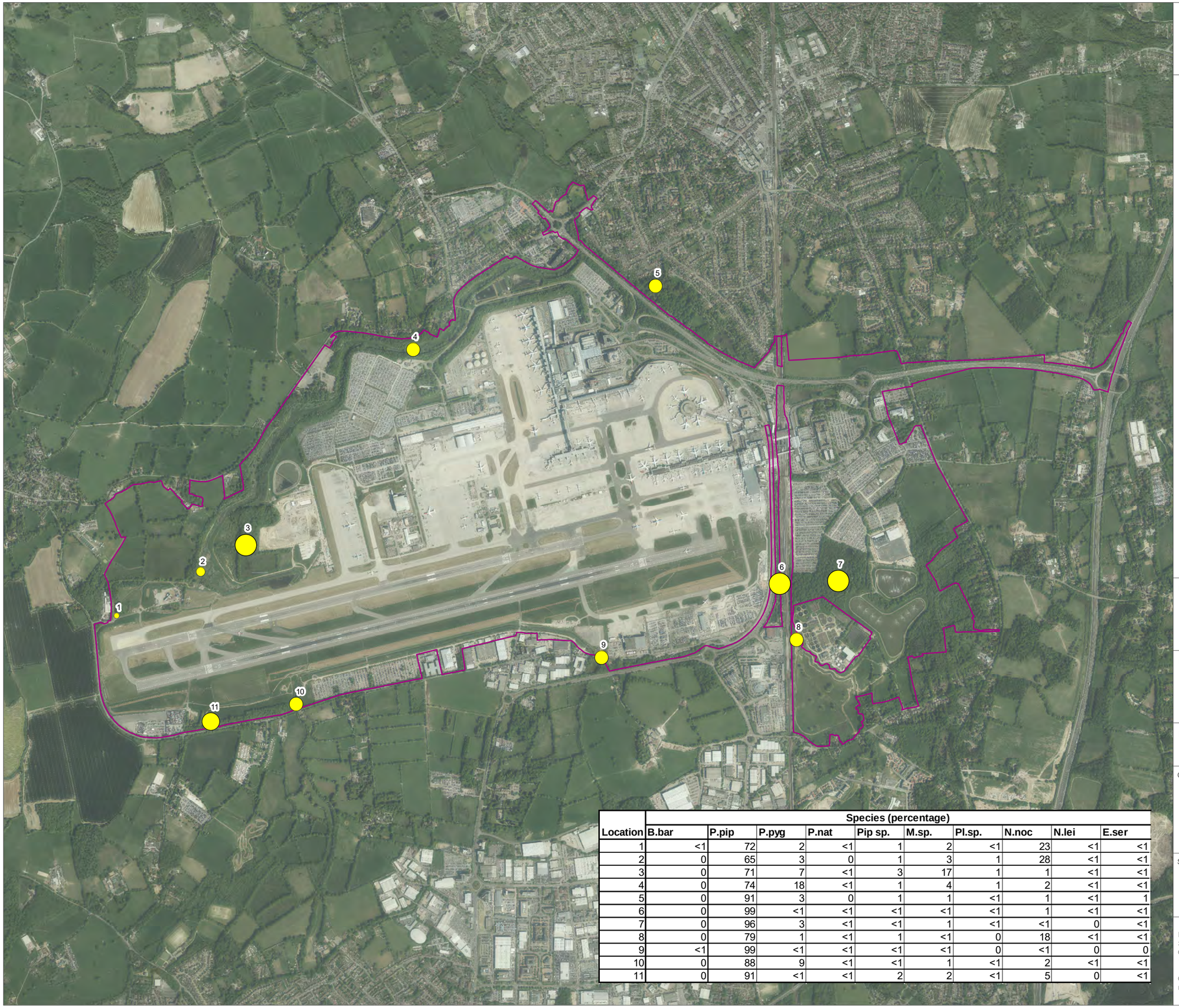
September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.13.3f	For PEIR Issue
	DRAWN BY: CR	PM / CHECKED BY: LM

SCALE @ A3 1:3,000

0 25 50 100 150 m

O:\11055 Gatwick - Genesis\Tech\Drawings\11055-0338-006.mxd



Location	Species (percentage)									
	B.bar	P.pip	P.pyg	P.nat	Pip sp.	M.sp.	Pl.sp.	N.noc	N.lei	E.ser
1	<1	72	2	<1	1	2	<1	23	<1	<1
2	0	65	3	0	1	3	1	28	<1	<1
3	0	71	7	<1	3	17	1	1	<1	<1
4	0	74	18	<1	1	4	1	2	<1	<1
5	0	91	3	0	1	1	<1	1	<1	1
6	0	99	<1	<1	<1	<1	<1	1	<1	<1
7	0	96	3	<1	<1	1	<1	<1	0	<1
8	0	79	1	<1	1	<1	0	18	<1	<1
9	<1	99	<1	<1	<1	<1	0	<1	0	0
10	0	88	9	<1	<1	1	<1	2	<1	<1
11	0	91	<1	<1	2	2	<1	5	0	<1

YOUR LONDON AIRPORT Gatwick

KEY

Project Site Boundary (PEIR)

Passes per location

- <2500
- 2500 - 5000
- 5000 - 10000
- 10000 - 20000
- >20000

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.2

DRAWING TITLE

Static Bat Survey

DATE

September 2021

ORIENTATION

N

DRAWING NO.

FIGURE 3.14.1

REVISION

For PEIR Issue

DRAWN BY

CR

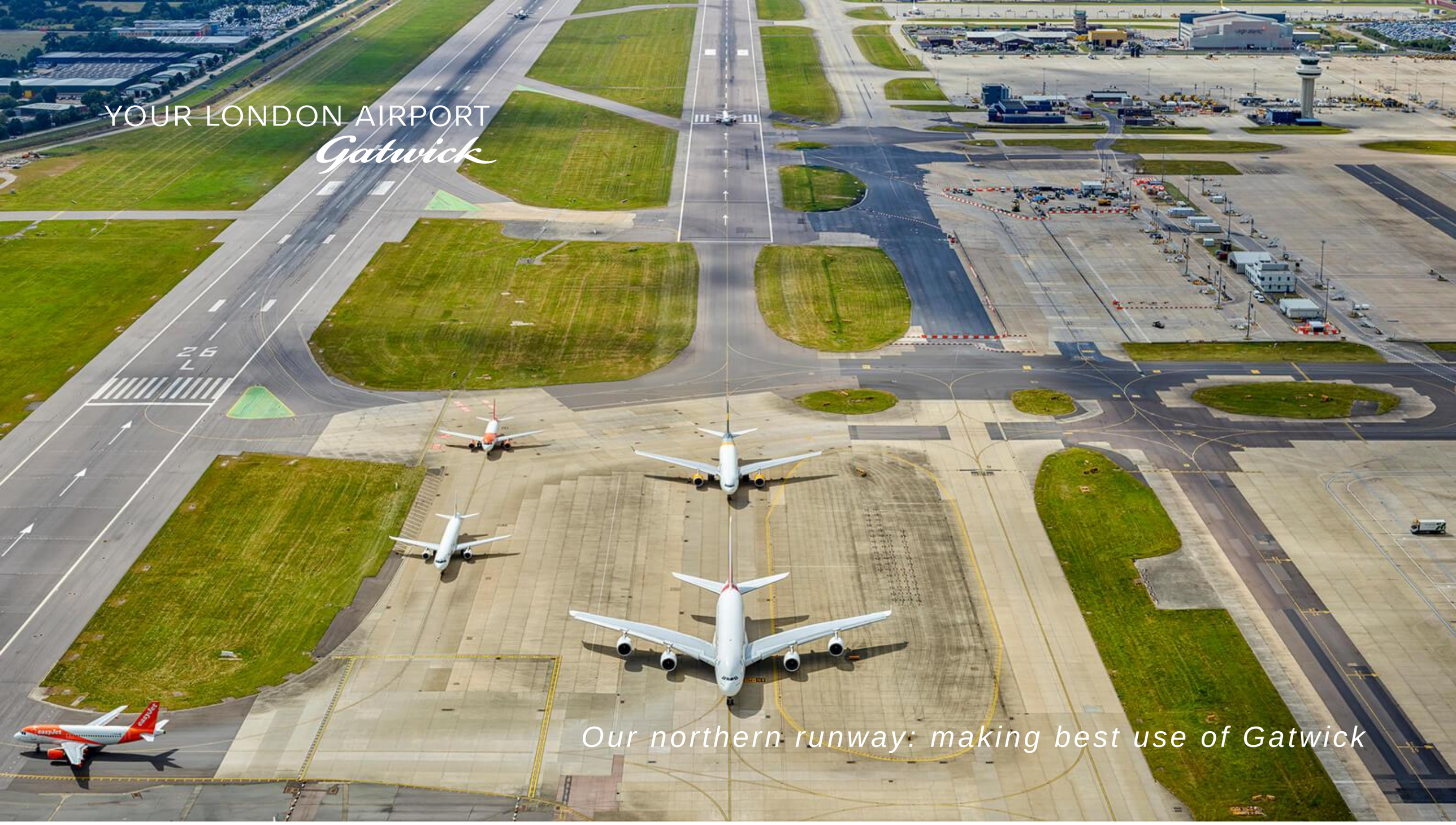
PM / CHECKED BY

LM

SCALE @ A3 1:20,000

0 250 500 1,000 m

\\eur-mpfs-02\projects\11055 Gatwick - Genesis\Tech\Drawings\11055-0334-009.mxd



Our northern runway: making best use of Gatwick

Preliminary Environmental Information Report
Appendix 9.6.3: Bat Trapping and Radio Tracking Surveys

September 2021

Table of Contents

1 Executive Summary

1.1.1 This document forms Appendix 9.6.3 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in Chapter 5: Project Description.

1.1.2 RPS were commissioned by Gatwick Airport to undertake advanced bat survey techniques in the form of bat trapping and a follow up radio-tracking survey, to inform the development of potential masterplan scenarios.

1.1.3 The purpose of the surveys was to determine the importance of the 'Project Area' for bat populations in relation to the wider landscape. The Project Area comprises land within the redline boundary of Gatwick Airport.

1.1.4 Trapping and radio-tracking surveys undertaken within the Project Area in 2019 identified the presence of a number of bat species including Annex II Bechstein's bat *Myotis bechsteinii* that utilise the project area, predominately male and juvenile bats. However, due to restrictions to access of the wider landscape in 2019, it was considered that the evaluation of the importance of the Project Area was constrained.

1.1.5 Trapping, and subsequent radio-tracking of target species from the woodland assemblage of bats, was undertaken across three locations within the Project Area and in five woodlands in the wider landscape over three survey periods in July 2020, September 2020 and May 2021 which were aligned with key stages of the annual bat life cycle.

1.1.6 A total of 98 bats from a minimum of nine species were captured over nine nights between 13th July 2020 and 7th May 2021. The species captured included barbastelle *Barbastellus barbastella* Bechstein's bat *Myotis bechsteinii,* whiskered/Brandt's/Alcathoe bat *Myotis mystacinus/brandtii/alcathoe,* brown long-eared bat *Plecotus auritus,* common pipistrelle *Pipistrellus,* Natterer's bat *Myotis nattereri,* noctule *Nyctalus noctula,* soprano pipistrelle *Pipistrellus pygmaeus,* and whiskered bat *Myotis mystacinus*.

1.1.7 Breeding females of a minimum of six species were trapped during the survey. These species comprised Bechstein's bat, brown long-eared, common pipistrelle, Natterer's bat, soprano pipistrelle and whiskered/Brandt's bat and whiskered bat. No female breeding Bechstein's were captured within the Project Area, but six breeding Bechstein's were captured in the wider landscape.

1.1.8 Radio-transmitter tags were fitted to 13 Bechstein's bats and one barbastelle bat. As a result, 19 roosting locations were subsequently identified; three of nineteen roosts were located within the Project Area, all within Brockley Wood.

1.1.9 Core foraging areas for Bechstein's bats were identified in Glover's Wood, Mountnoddy Wood, Edolphs Copse, woodlands around Toogoolawah and Beam Brook, woodlands and waterbodies adjacent to Biltam Farm Nurseries, with core foraging areas within the Project Area identified at Man's Brook and the River Mole.

1.1.10 Bechstein's bats were also recorded foraging around Beggars Gill, Pagewood, Charlwood, woodland blocks and hedgerows north east of Charlwood, Man's Brook and adjacent arable fields to the west of the Project Area. Peripheral foraging areas within the Project Area were recorded along Man's Brook and River Mole in the north west of the Project Area

1.1.11 Core foraging areas for barbastelles were identified to the south east of Glovers Wood, around Russ Hill Farm and adjacent to Man's Brook to the west of Prestwood Copse. No core foraging areas were recorded within the Project Area.

1.1.12 Barbastelles were also recorded foraging within Faygate Forest, Prestwood Copse and adjacent watercourses, and a block of woodland and Bewbush Brook in Bewbush, west of Crawley. No peripheral foraging areas were recorded within the Project Area.

1.1.13 Due to the lack of breeding females recorded with the Project Area over the surveys in 2019, 2020 and 2021, it is considered that the habitats within the Project Area provide resource primarily for foraging Bechstein's and roosting resource for predominantly male Bechsteins.

1.1.14 The Project has the potential to result in interactions with bat roosts, home ranges and foraging areas and therefore, in the absence of mitigation, the favourable conservation status of bats could be negatively impacted. Therefore, further assessment to inform appropriate mitigation and/or compensation measures will be required and will be reported in the ES.

2 Introduction

2.1 Overview

2.1.1 From 18th October 2018 to 10th January 2019 Gatwick Airport consulted on its Draft Masterplan. This consultation set out three scenarios for the airport's longer-term future which if either used separately, or in combination, could enable Gatwick to grow to meet the increasing demand for air travel.

2.1.2 In considering the potential masterplan scenarios where best to make use of existing airport capacity, Gatwick is now collating a range of environmental information within the airport estate and in areas adjacent to the airport.

2.1.3 Part of the scope of the data collection includes survey work for a range of protected/notable species and habitats, including bats. RPS contracted The Ecology Consultancy/Temple to provide specialist bat consultancy services, of which included Advanced Bat Survey Techniques for the project, including trapping and subsequent and radio-tracking of target bat species.

2.1.4 Surveys undertaken in 2019 identified individuals from a population of Bechstein's bats that utilise the Project Area. Due to restrictions to access within the wider landscape surrounding the Project Area during the surveys undertaken in 2019, it was considered likely that the evaluation of the importance of the site for bats was constrained by the lack of knowledge of the status of the Bechstein's bat population in the landscape surrounding the Project Area. Therefore, it was recommended that a landscape level population assessment of Bechstein's bats was undertaken in and adjacent to the Project Area to inform any mitigation proposals. The results of this assessment are detailed in this report.

2.2 The Project

2.2.1 The Project includes the following key components:

- alterations to the existing northern runway, including repositioning its centreline 12 metres further north to enable dual runway operations;
- reconfiguration of taxiways;

- pier and stand amendments (including a proposed new pier);
- reconfiguration of other airfield facilities;
- extensions to the North and South Terminals;
- provision of additional hotel and office space;
- provision of reconfigured car parking, including new surface and multi-storey car parks;
- surface access (highway) improvements;
- reconfiguration of existing utilities, including surface water, foul drainage and power; and
- landscape/ecological planting and environmental mitigation.

2.2.2 The redline boundary of Gatwick Airport is shown in Figure 2.2.1. Further details of the existing airport operation are provided in PEIR Chapter 4: Existing Site and Operation, while a description of the Project is provided in PEIR Chapter 5: Project Description.

2.3 Relevant legislation and planning policy

2.3.1 The following key pieces of nature conservation legislation are relevant to this assessment:

- The Conservation of Habitats and Species Regulations 2017 (as amended);
- The Wildlife and Countryside Act 1981 (as amended); and
- Natural Environment and Rural Communities Act 2006.

2.3.2 All native UK bat species are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). Under this combined legislation it is an offence to:

- deliberately capture, injure or kill a bat;
- intentionally or recklessly disturb a bat whilst occupying a place of shelter or protection;
- possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat;
- deliberately disturb a bat species;

2.3.3 Disturbance of the species includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate. Under the legislation it is therefore an offence to;

- damage or destroy a bat breeding site or resting place of a bat;
- intentionally or recklessly obstruct access to any structure or place used by a bat for shelter or protection.

2.3.4 In addition, certain rarer species of bat including Bechstein's bat *Myotis bechsteinii* and barbastelle *Barbastella barbastellus* are listed on Annex II of the EC Habitats Directive (Council Directive 92/43/EEC).

2.3.5 In accordance with Section 41 of the Natural Environment and Rural Communities Act (2006), several bat species are also identified on the England Biodiversity List as Species of Principal Importance. The presence of bats represents a material consideration in the planning process.

2.4 Biological records

2.4.1 Biological records were obtained from the Gatwick Biodiversity Action Plan Five Year Review 2012-2017 (Gatwick Airport, 2018b).

2.4.2 A total of 12 species of bat have been recorded within the Project Area including Bechstein's bats, Brandt's bat *Myotis brandtii*, brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus*, Daubenton's bat *Myotis daubentonii*, Leisler's bat *Nyctalus leislerii*, Nathusius' pipistrelle *Pipistrellus nathusii*, Natterer's bat *Myotis nattereri*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus*, soprano pipistrelle *Pipistrellus pygmaeus* and whiskered bats *Myotis mystacinus* (Gatwick Airport, 2018b).

2.4.3 During a five-year monitoring programme of bat boxes on site undertaken by Surrey Bat Group (2012-2017) the species recorded occupying boxes included Bechstein's bat, Natterer's bat, soprano pipistrelle and brown long-eared bat (Gatwick Airport, 2018b).

2.4.4 A whiskered bat maternity roost was recorded at [redacted] in 2016 and 2017. This building was also previously occupied by common and soprano pipistrelles (Gatwick Airport, 2018b).

2.4.5 A previous trapping and radio-tracking project undertaken in 2014 identified Bechstein's bat roosts in several dead trees in the northern part of Brockley Wood including ash *Fraxinus excelsior*, alder *Alnus glutinosa* and pedunculate oak *Quercus robur* (Gatwick Airport, 2018b).

Previous surveys undertaken in the Project Area

2.4.6 RPS were commissioned by Gatwick Airport to undertake advanced bat survey techniques in the form of bat trapping and a follow up radio-tracking survey in 2019, to inform the development of potential masterplan scenarios. Surveys were limited to land owned by GAL and within the Project Area and therefore not undertaken in the wider landscape. Trapping, and subsequent radio-tracking of target species from the woodland assemblage of bats (including Bechstein's bat, Brandt's bat, brown long-eared bat, Daubenton's bat, Natterer's bat and whiskered bat), was undertaken across 22 locations within the Project Area over three survey periods between May and September 2019 which were aligned with key stages of the annual bat life cycle.

2.4.7 A total of 154 bats of nine species were captured over nine nights between 28 May 2019 and 04 September 2019. The species captured included Bechstein's bat, Brandt's bat, brown long-eared bat, common pipistrelle, Daubenton's bat, Natterer's bat, noctule, soprano pipistrelle, and whiskered bat.

2.4.8 Breeding females of seven species were trapped during the survey. These species comprised Brandt's bat, brown long-eared bat, common pipistrelle, Daubenton's bat, Natterer's bat, soprano pipistrelle, and whiskered bat. No female breeding Bechstein's bats were captured within the Project Area, but the presence of juvenile males and females indicated there was likely to be a colony of breeding females in the wider landscape that was functionally connected to the Project Area.

2.4.9 Radio-tags were fitted to 20 bats of six species of woodland bat including Bechstein's bat, Brandt's bat, brown long-eared bat, Daubenton's bat, Natterer's bat and whiskered bat. The radio-tracking survey identified roosting locations for all species. As a result, 19 roosting locations were subsequently identified; nine of which were located within the Project Area.

2.4.10 Core foraging areas for Bechstein's bats were identified within and adjacent to the Project Area including the Aviation Museum, Charlwood Place Farm, woodland strip to the west of Brockley Wood, River Mole, woodland to the east of Shangri-La and south of Brook Farm, woodland strip to the south-west of the Project Area north of Charlwood Road, Riverside Park, Upper Pickett's Wood, and woodland to the north of sewage works.

2.4.11 Bechstein's bats were also recorded foraging in woodland to the east of Bonnett's Lane and Hyder's Farm, River Mole to the south of Charlwood Road, land to the east of Charlwood, Horleyland Wood, Lower Pickett's Wood, woodland strip to the south of Povey Cross Road and River Mole, Man's Brook, Great Burlands woodland, Prestwood Copse, and Gatwick Airport runway.

2.5 Requirement for surveys

2.5.1 Bat survey work is required within and adjacent to the Project Area to help inform any future changes to the airport. Surveys undertaken in the area include automated static bat detector surveys and walked activity surveys. However, advanced bat surveys were required because the data on woodland species including Bechstein's bats, which are a cryptic species, cannot be reliably obtained using standard survey techniques (such as activity surveys and/or automated surveys) alone due to overlapping call parameters within the genus *Myotis*. The advanced bat surveys detailed in this report were undertaken under Natural England Project Licence (Dr Stephanie Murphy: 2020-47826-SCI-SCI) and involved trapping, attaching radio-transmitter tags and ringing target species.

2.5.2 Surveys were required to develop a more comprehensive understanding of how Bechstein's bats are using the Project Area and surrounding landscape, and how they may be affected by the Project.

2.5.3 The surveys were required to provide information on roost locations, status of identified roosts (based on the number of bats in roost), flightlines and foraging areas for target species (Annex II Bechstein's and barbastelle bats).

2.6 Project purpose

2.6.1 The purpose of the surveys was to gather information on the bat assemblage in the area within and adjacent to the Project Area.

2.6.2 The surveys encompassed a range of techniques including:

- Trapping bats using harp traps with the assistance of an acoustic lure within area land permitted accessible by Gatwick Airport Limited (GAL), Woodland Trust and private landowners, and radio-tagging target species including barbastelle and Bechstein's bat;
- Non-invasive DNA analysis on small Myotis bats (Alcathoe/ /Brandt's bat/whiskered bat) in order to differentiate and confirm the presence of these species in and adjacent to the Project Area;
- Radio-tracking of barbastelle and Bechstein's bats to determine foraging areas, commuting routes and roost locations and counts;
- Emergence surveys and roost counts undertaken on roosts of all radio-tagged bats (access permitting).

2.6.3 It was proposed to radio-tag and radio-track up to a maximum of 30 barbastelle and Bechstein's bat over the survey period.

2.6.4 This comprised adult females (both parous and non-parous), males and juveniles (providing they are of an appropriate weight and in good health condition).

2.6.5 In order to obtain a robust assessment of the bats' movements and roosts during pre-maternity, post-maternity and autumnal dispersal seasons and across the Project Area it was considered necessary to radio-tag the numbers of bats prescribed above.

3 Methodology

3.1.1 The methods will generally follow the standard best practice (Collins, 2016 and Natural England, 2013). Any specific deviations due to objectives of the surveys will be detailed where necessary.

3.2 Trapping surveys

3.2.1 Trapping surveys were undertaken during three key periods which corresponded with key stages of the annual life cycle of a bat and included surveys between 13th 16th July 2020 (post-maternity), 7th and 10th September 2020 (autumnal dispersal) and 3rd and 6th May 2021 (maternity).

3.2.2 Trapping focused more on parts of the Project Area and adjacent wider landscape that may be of particular importance to bats, such as locations of known roosts and areas of high suitability foraging/commuting habitat. Trapping locations are shown in Figure 3.2.1 and Table 3.2.1.

3.2.3 Trapping surveys were carried out using a combination of triple and double bank harp traps including woodland habitat, hedgerows and watercourses, which are likely to be habitat features used by commuting and / or foraging bats.

3.2.4 At each of the locations, one harp trap (Austbat) was set up. Each trap was fitted with an acoustic lure (Model: Sussex Autobat) to increase the likelihood of catching bats present within the vicinity of the traps.

3.2.5 Trapping commenced at sunset and continued for a maximum of six to eight hours per night dependant on the conditions, weather, capture success and general bat activity. If the weather became unsuitable during a survey (ie temperatures fell below 8°C and/or heavy rain and/or strong wind), the survey was terminated to avoid captured bats becoming torpid. Where unseasonably cold or poor conditions completely curtailed a survey, the survey was rescheduled where possible.

3.2.6 When bats were captured in a harp trap they were removed by a suitably experienced and qualified person (under the direction of the licence holder or accredited agent) and transferred to a clean calico cloth bag. Biometric data was be recorded for each bat including weight, sex, breeding status and forearm measurements. Droppings from small Myotis species were collected and transferred to a sterile tube for possible DNA analysis. Bats not selected for radio-tracking were released at the site of capture immediately after biometric data was recorded.

Table 3.2.1: Trapping Locations

Trapping location[1]	Easting	Northing	Description
1	522591	140332	Glover's Wood south – Beside large oak. Hazel understory
2	522442	140472	Glover's Wood south – Beside large oak on narrow footpath
3	522522	140542	Glover's Wood south – Beside large oak, path overlooking small valley
4	522815	140731	Glover's Wood north – By pond
5	523077	141047	Glover's Wood north – Ancient deciduous woodland

[1] Trapping locations were surveyed during each session with the following exclusions; Orltons Copse was not surveyed in September 2020 or May 2021, Scragg Copse was not surveyed in July 2020, Mount Wood was not surveyed in July 2020 or September 2020. Trapping locations within woodlands varied slightly between sessions due to the condition of the woodland and suitability for trapping. More details are provided in Section 3.5.

Trapping location[1]	Easting	Northing	Description
6	523034	140711	Glover's Wood north – Ancient deciduous woodland
7	523544	142326	Edolphs Copse – Under large oak at pond edge
8	523461	142376	Edolphs Copse – Beside footpath next to large oak
9	523579	142520	Edolphs Copse – Woodland interior next to med/large oak
10	523713	142145	Edolphs Copse – Close to open meadow area
11	523754	142294	Edolphs Copse – Woodland interior next to med oak
12	525744	140813	Brockley Wood - Next to med/large oak
13	525776	140837	Brockley Wood - Next to med/large oak
14	525809	140892	Brockley Wood - Next to med/large oak
15	525457	140631	Strip west of Brockley Wood
16	525492	140681	Strip west of Brockley Wood
17	525600	139752	Strip of woodland to the south west of the Project Area, north of Charlwood Road – west
18	525862	139810	Strip of woodland to the south west of the Project Area, north of Charlwood Road – central
19	525928	139818	Strip of woodland to the south west of the Project Area, north of Charlwood Road – east
20	521870	138624	Orltons Copse - Gulley with some standing water
21	521898	138831	Orltons Copse - Woodland edge beside large oak
22	522184	138752	Orltons Copse - Beside med/large oak woodland interior
23	522673	138816	Scragg Copse
24	522610	139058	Scragg Copse
25	522716	138986	Scragg Copse
26	522669	138383	Mount Wood - Ancient deciduous woodland; located in uncluttered western section
27	522788	138370	Mount Wood - Ancient deciduous woodland; 6m mist net located in shrub-layer gap at boundary
28	522899	138298	Mount Wood - Ancient deciduous woodland; triple bank located in more cluttered southern section near mature oaks

3.3 Radio-tracking survey

3.3.1 Bechstein's bats were selected for radio-tagging on the basis of their species and apparent health and body condition. No underweight bats were selected for radio-tagging. The weight of the radio-tag was always less than 5% of the bat's weight. Female bats, and in particular reproductive females (avoiding heavily pregnant bats), were radio-tagged in preference to male bats to enable the location of breeding colonies.

3.3.2 Lotek radio-tags were attached to the focal bat using Skin-Bond® (Pfizer Inc) to the area between the shoulder blades from which fur has been clipped.

3.3.3 The bats that were fitted with radio-tags were released on the night of capture at the location of capture and held only for the minimum time necessary to obtain the required data and to be fitted with rings and radio-tags as necessary.

3.3.4 The roost locations of radio-tagged bats were located by teams of a minimum of two surveyors using radio-tracking equipment. The radio-tracking equipment comprised of a Biotrack Sika radio-receiver unit coupled with a Biotrack Yagi radio-antenna which allowed the surveyors to tune into the frequency of the radio-tag on each radio-tagged bat. Through moving through the landscape on foot or by vehicle, surveyors were able to locate radio-tagged bat roost locations by following the direction and strength of the radio signal emitted by the radio-tag.

3.3.5 The movements of active bats at dusk, night and at dawn, were ascertained by multiple teams of surveyors using the radio-tracking equipment described above. Each team was positioned in separate locations within the landscape with their exact location recorded (eastings, northings recorded with GPS unit). Each team was in constant communication with each other via handheld two-way radios or mobile telephones. When bats commenced emergence from their roost location and / or their radio-tag was picked up whilst in flight, the surveyor teams took close approach estimates of location (if the bat was in the immediate vicinity). If bats were located some distance between the surveyors and / or surveyors' access was not permitted to the area in which the bat was situated simultaneous compass bearings on the direction of the strongest radio signal were taken. Through triangulating simultaneous bearings (using LOAS software; version 2.12, Ecological Software Solutions), surveyor teams were able to record 'fixes' (the point at which two or more separate team's bearings cross) of the bats' locations within the landscape, (ie locations at which simultaneous bearings crossed)

3.3.6 The positions of the radio-tagged bats were received at intervals after leaving the roost and were used to identify flightlines, which are important connectivity features between the roosting locations and foraging areas and between separate foraging areas.

3.3.7 The cumulative home range size was plotted against the number of successive locations for all bats radio-tracked in order to determine the point at which the foraging area reached an asymptote, indicating that sufficient data has been gathered from each bat. Estimates of range size for this analysis will be based on 100% minimum convex polygons, 95% kernels and 50% kernels, obtained using BIOTAS software (version 2.0 Alpha, Ecological Software Solutions).

3.3.8 Each bat fitted with a radio-tag was followed for a minimum of three nights and a maximum of seven nights, depending on the results obtained from the estimates of home range analysis (ie whether sufficient data had been collected). Bats were radio-tracked concurrently.

3.4 Roost count surveys

3.4.1 Roosts were identified by locating the radio-tagged bats during the day (as detailed above) and subsequent counts of the number of bats emerging was carried out, where access was permitted by GAL.

3.4.2 The surveys were carried out in appropriate weather conditions following standard guidelines (Collins, 2016) and when bats are likely to be active. The dusk surveys commenced approximately

15 minutes before sunset and continued for a minimum of at least 90 minutes; the optimum time for bats to emerge from a roost.

3.4.3 An infra-red camera (such as the Canon XA-20) equipped with infra-red lamps (such as the IR Lab Outdoor IR Illuminator LIR-IC88) was used to aid accurate counts of bats emerging from the roost. Full spectrum bat detectors, such as Elekon Batlogger M were used to detect bat echolocation calls of any emerging bats and identify species where possible. Both video and ultrasonic audio recordings were subsequently analysed to ensure accurate species identification and roost count. Flightlines from roosts were determined by roost count survey teams taking bearings on emerging bats.

3.5 Data validity and limitations

3.5.1 It is important to note that even where data are held, a lack of records for a defined geographical area does not necessarily mean that there is a lack of ecological interest; the area may be simply under-recorded. Bats are highly mobile animals and can move roost sites both within and between years.

3.5.2 Data from bat surveys should be considered to be valid for a period of 18 months, unless there are any meaningful changes to the buildings or other habitats within the site.

Trapping surveys

3.5.3 Where identification to species level was not possible in the field, particularly for cryptic species such as the small Myotis genera, droppings of trapped bats were collected and sent for DNA analysis. As bats were captured for the minimum amount of time necessary, it was not always possible to collect a sample from each bat had they not provided a dropping in the calico cloth bag after one hour. Due to animal welfare priorities, bat droppings collected for DNA analysis was therefore not possible with all captured target species.

3.5.4 The species of three whiskered/Brandt's/Alcathoe bats were not confirmed in July 2020 and one in May 2021 due to lack of droppings.

3.5.5 Precise trapping locations varied slightly over the trapping survey period. The locations varied slightly as the condition of the woodland differed between seasons due to vegetation growth. This was not considered to be a significant limitation to the findings of the study as the woodland was thoroughly surveyed during each session.

3.5.6 Orltons Copse was not surveyed in September 2020 or May 2021. This was due to access restrictions in September 2020. The decision was made to not survey this area in May 2021 due to higher quality habitats for target species (Bechstein's bats and barbastelles) being available. Scragg Copse was not surveyed in July 2020 or May 2021 due to access restrictions. Mount Wood was not surveyed in July 2020 or September 2020 due to access restrictions. This was not considered to be a significant limitation to the findings of the study as the wider area around the Project Area was covered thoroughly.

3.5.7 Bechsteins radio-tagged in May 2021 were inactive for part of the radio-tracking study period due to sub-optimal temperatures after they were radio-tagged. The Surrey bat group continued to monitor these roosts after the radio-transmitters were no longer active and once the weather conditions improved and provided the data of emergence counts to the project.

Radio-tracking survey (including roost count and emergence surveys)

3.5.8 The positions of the radio-tagged bats are received at intervals after leaving the roost and used to identify flightlines between the roost and foraging areas. Therefore, flightlines are partially estimated based on best available data. This is considered as an acceptable limitation as assumptions on direction and use of landscape features can be made based on known bat behavioural ecology.

3.5.9 It was not GAL policy to obtain ad-hoc access for roost counts outside the Project Area or in private properties. Therefore, roost counts were not possible in these areas.

3.5.10 All radio-tracking was carried out from land where access was permitted, public roads and public rights of way. Restricted access to land affected the accuracy of the bearings taken during radio-tracking. If a radio-tagged bat was foraging in an area of land where the strength of the signal was weak (as a consequence of topography) and/or had disappeared, then it was not possible to ascertain the precise location of the bat. These constraints were overcome using the following methods:

- If the bat was likely to be roosting in land where access was prohibited, multiple bearings were taken from a variety of different locations to get a better estimate of likely roosting locations;
- Where radio-tracking data on bats was deficient, subsequent radio-tracking night(s) concentrated effort on those bats for which data was limited.

3.5.11 Fast moving traffic on roads within and adjacent to the Project Area meant that surveyors could not survey from the most appropriate areas due to health and safety concerns.

3.5.12 Surrey Bat Group were also involved in data collection as information was shared on radio-transmitter frequencies.

3.5.13 Due to the limited access to areas outside the Project Area, radio-tracking data was difficult to obtain. As mentioned above, multiple bearings were taken from a variety of different locations when bats were recorded in inaccessible land. However, when bats moved between locations, surveyors moved to locate the bat but due to the access restrictions, the signal was often lost by the time they had got to a suitable surveying location.

3.5.14 Radio-tracking data can include outliers, especially with fast moving animals such as bats.

3.5.15 Radio-tracking data on Bats 3J, 4J and 1S was obtained for two nights. Surveyors searched the Project Area for these bats over at least three nights, but the bats were not found, indicating that they were likely foraging outside the Project Area or the tag had failed.

3.5.16 Bat 5S was not found during the radio-tracking period. It is considered likely that the radio-tag failed on this bat or the bat were outside the Project Area. Bats are highly mobile species and consequently any bats trapped and tagged within the survey area may not always be identified roosting or in flight in the survey area on subsequent survey days.

4 Results

4.1 Trapping surveys

4.1.1 A total of 98 bats of nine species were captured over nine trapping nights between 13th July 2020 and 7th May 2021 in 28 different locations. Figure 3.2.1 shows the trapping locations, detailed trapping data is shown in Annex 1 and trapping results by species which is summarised in Table 4.1.1 below.

Table 4.1.1: Trapping results by species

Species	Number of bats
Barbastelle	1
Bechstein's bat	16
Daubenton's bat	1
Whiskered bat	10
Whiskered bat/Brandt's bat[2]	4
Natterer's bat	14
Noctule	1
Brown long-eared bat	45
Common pipistrelle	4
Soprano pipistrelle	2

4.1.2 The average number of bats caught across each trapping area is shown in Table 4.1.2 below.

Table 4.1.2: Trapping results by location

Location	Number of bats	Number of nights	Number of bats per night
Glovers Wood	32	4	8
Edolphs Copse	29	4	7.25
Brockley Wood	15	3	5
Strip west of Brockley Wood	5	3	1.67
Strip of woodland to the south west of the Project Area, north of Charlwood	0	3	0
Orltons Copse	10	1	10
Scraggs Copse	5	1	5
Mount Wood	2	1	2

DNA analysis

4.1.3 Droppings were obtained from three of the trapped small Myotis bats, which were all sent for DNA analysis. Results are pending and will be provided in the ES.

4.2 Radio-tracking

4.2.1 Fourteen of the sixteen trapped Bechstein's bats were selected for radio-tracking. The sex, breeding status and bat identification numbers are shown in and Table 4.2.1 below.

Table 4.2.1: Radio-tagged bats

Bat identification number[3]	Trapping location	Species	Sex	Breeding status
1J	1	Bechstein's bat	F	Lactating
2J	6	Bechstein's bat	F	Lactating
3J	7	Bechstein's bat	F	Lactating/post-lactating
4J	11	Bechstein's bat	F	Post-lactating
5J	10	Bechstein's bat	F	Post-lactating
6J	13	Bechstein's bat	M	Adult
7J	12	Bechstein's bat	M	Adult
8J	14	Bechstein's bat	M	Adult
1S	4	Bechstein's bat	M	N/A – Juvenile
2S	4	Bechstein's bat	F	N/A – Juvenile
3S	4	Barbastelle	M	N/A – Juvenile
4S	9	Bechstein's bat	F	N/A – Juvenile
5S	14	Bechstein's bat	F	N/A – Juvenile
1M	6	Bechstein's bat	F	Adult – Non-parous
2M	4	Bechstein's bat	F	Adult - Parous

Flightlines

4.2.2 No flightlines were recorded from bat roosts to foraging areas as the majority of bats were recorded close to their roosting locations.

Roosts, Home ranges and foraging areas

4.2.3 A total of 10 confirmed roosting locations were identified from nine radio-tagged bats. Additionally, nine estimated roosting locations were identified. Dusk emergence surveys were undertaken on seven of the confirmed roosts. The location of these roosts and counts of the roosts are shown in Table 4.2.2 and Figure 4.2.1. The emergence survey section below provides information on roost counts and characterisation.

4.2.4 The fixes obtained during the radio-tracking study bats were analysed with BIOTAS software to calculate the maximum home range (100% MCP), the peripheral foraging areas (95% KDE) and the core foraging areas (50% KDE) of each tracked Bechstein's bat. The calculated 100% MCP, 95% KDE and 50% KDE for each tracked bat are shown in Annex 2. Figures 4.2.2-

[2] DNA analysis not possible

[3] The letter after the number indicates month of capture; J=July 2020, S=September 2020, M=May2021

4.2.6 display visual representations of the home ranges and foraging areas for the radio-tracked bats.

Bechstein's bat

4.2.5 Figure 4.2.2 shows the Bechstein's bats that were recorded within and adjacent to the Project Area in July 2020. This only included bats tagged in the post-maternity session (Bats 3J, 4J, 6J, 7J and 8J). Two of the bats were post-lactating females (Bat 3J and 4J) and the remainder were adult males.

4.2.6 Bat 1J, a lactating female Bechstein's bat, was caught in Glovers Wood and recorded roosting in an inaccessible roost within the same woodland. This bat was radio-tracked for four nights. It was recorded foraging within Glovers Wood only. It was not recorded within the Project Area.

4.2.7 Bat 2J, a lactating female Bechstein's bat, was caught in Glovers Wood and recorded roosting in an inaccessible roost on a treeline [redacted]. This bat was radio-tracked for two nights. It was recorded foraging in Glovers Wood. It was not recorded within the Project Area.

4.2.8 Bat 3J, a lactating female Bechstein's bat, was caught in Edolphs Copse and was recorded roosting in two separate inaccessible roosts between [redacted]. The bat was radio-tracked for five nights. It was recorded foraging within Glovers Wood and Edolphs Copse, and the woodland blocks between the two, as well as within the Project Area along the River Mole north of Brockley Wood.

4.2.9 Bat 4J, a post-lactating female Bechstein's bat, was caught in Edolphs Copse. Three roosts were recorded for this bat; two in a [redacted] (one of which had 5J also roosting in it) and one in a [redacted] (peak count of six bats emerging from the roost). This bat was radio-tracked for two nights. It was recorded foraging within Edolphs Copse, the woodland blocks to the north east of Glover's Wood and the River Mole within the Project Area, northwest of Brockley Wood.

4.2.10 Bat 5J, a post-lactating female Bechstein's bat, was caught in Edolphs Copse. Two separate roosts were recorded for this bat; one in [redacted] and one in a [redacted] (peak count of six bats emerging from the roost). Bat 4J was also recorded roosting in both of these trees. This bat was radio-tracked for three nights. It was recorded foraging within Edolphs Copse and the woodland blocks to the north east of Glover's Wood. It was not recorded within the Project Area.

4.2.11 Bat 6J, an adult male Bechstein's bat, was caught in Brockley Wood and was recorded roosting in an estimated location within [redacted] This bat was radio-tracked for three nights. It was recorded foraging within the Project Area along Man's Brook to the northwest of Brockley Wood, as well as outside the project area in Edolphs Copse and the woodland blocks and hedgerows between Edolphs Copse and the northwest of the Project Area.

4.2.12 Bat 7J, an adult male Bechstein's bat, was caught in Brockley Wood and was recorded roosting in an estimated location within [redacted] as well as a confirmed [redacted] roost within [redacted] where it was the only bat recorded emerging from the tree during an emergence survey. This bat was radio-tracked for three nights. It was recorded foraging within the Project Area along Man's Brook, River Mole and woodland adjacent to the runway, as well as pockets of woodland between the Project Area and Glover's Wood to the west and north west.

4.2.13 Bat 8J, an adult male Bechstein's bat, was caught in Brockley Wood. Bat 8J was recorded roosting in an inaccessible roost within a woodland block to the [redacted]. This bat was radio-tracked for three nights. It was recorded foraging within Charlwood, along Man's Brook to the east of Charlwood and within woodland blocks between Glovers Wood and Edolphs Copse.

4.2.14 Figure 4.2.3 details the Bechstein's bats that were recorded within and adjacent to the Project area in September 2020. Bat 1S, a juvenile male Bechstein's bat, was caught in Glovers Wood and was recorded roosting within an [redacted]. A peak count of eight bats were recorded roosting within the roost. This bat was radio-tracked for two nights and was recorded foraging in Glovers Wood only. It was not recorded within the Project Area.

4.2.15 Bat 2S, a juvenile female Bechstein's bat, was caught in Glovers Wood and was recorded roosting within [redacted] Two emergence surveys were undertaken on the tree which recorded counts of 19 and 20 bats. This bat was radio-tracked for four nights and was recorded foraging in Glovers Wood, Edolphs Copse and nearby areas. It was not recorded within the Project Area.

4.2.16 Bat 4S, a juvenile male Bechstein's bat, was caught in Edolphs Copse and was recorded roosting in an inaccessible location, estimated to be off [redacted]. This bat was radio-tracked for three nights and was recorded foraging in Glovers Wood, Edolphs Copse, around Beam Brook in Toogoolawah, Cudworth, and pockets of woodland between Edolphs Copse and Toogoolawah. It was not recorded within the Project Area.

4.2.17 Bat 5S, a juvenile female Bechstein's bat, was caught in Brockley Wood but was not located by radio-telemetry following capture.

4.2.18 Figure 4.2.5 shows Bechstein's bats that were recorded in the project area in May 2021. Bat 1M, an adult non-breeding female Bechstein's bat, was caught in Glovers Wood. This bat, along with Bat 2M was recorded roosting in two roosts within [redacted] one of which had a peak count of three bats (including both Bat 1M and 2M) and the other had a peak count of 15 bats emerging from the roost. This bat was radio-tracked for five nights. This bat was recorded foraging exclusively in Glovers Wood during surveys. It was not recorded within the Project Area.

4.2.19 Bat 2M, an adult breeding female Bechstein's bat, was caught in Glovers Wood. The details of the Bat 2M roosts are shown in the paragraph above. This bat was radio-tracked for five nights. This bat was recorded foraging exclusively in Glovers Wood during surveys. It was not recorded within the Project Area.

Barbastelle bat

4.2.20 Figure 4.2.6 Bat 3S, shows an adult male barbastelle, was caught in Glovers Wood. This bat was radio-tracked for five nights. Core foraging areas for the one barbastelle (Bat 3S) were identified to the south east of Glovers Wood, around Russ Hill Farm and adjacent to Man's Brook to the west of Prestwood Copse. No core foraging areas were recorded within the Project Area for barbastelles.

4.2.21 The barbastelle bat was also recorded foraging within Faygate Forest, Prestwood Copse and adjacent watercourses, and a block of woodland and Bewbush Brook in Bewbush, west of Crawley. No peripheral foraging areas were recorded within the Project Area for this species.

Table 4.2.2: Roost Location, Count and Characterisation

Roost locations						Emergence surveys		Roost Characterisation
Bat identification number	Species	Estimated/confirmed roost	Easting	Northing	Description	Emergence date	Roost count	Likely roost type
1J	Bechstein's bat	[redacted]						Maternity[4]
2J	Bechstein's bat							Maternity[5]
3J	Bechstein's bat							Maternity[6]
3J	Bechstein's bat							Maternity[7]
4J	Bechstein's bat					17/07/2020	0	Day
4J and 5J	Bechstein's bat							Maternity[8]
4J and 5J	Bechstein's bat					15/07/2020	6	Maternity
6J	Bechstein's bat							Unknown
7J	Bechstein's bat							Unknown
7J	Bechstein's bat					17/07/2020	1	Day
8J	Bechstein's bat							
1S	Bechstein's bat					08/09/2020	8	Maternity
2S	Bechstein's bat					10/09/2020 11/09/2020	19 20	Maternity
3S	Barbastelle							Unknown
3S	Barbastelle							Unknown
4S	Bechstein's bat							Unknown
4S	Bechstein's bat							Unknown
1M and 2M	Bechstein's bat					07/05/2021	3	Satellite maternity
1M and 2M	Bechstein's bat					09/05/2021 14/05/2021[9]	14 15	Maternity

[4] Although a roost count was not undertaken, it is considered likely that this roost was a maternity roost due to the breeding status of the tagged bat within the roost
[5] Although a roost count was not undertaken, it is considered likely that this roost was a maternity roost due to the breeding status of the tagged bat within the roost
[6] Although a roost count was not undertaken, it is considered likely that this roost was a maternity roost due to the breeding status of the tagged bat within the roost
[7] Although a roost count was not undertaken, it is considered likely that this roost was a maternity roost due to the breeding status of the tagged bat within the roost
[8] Although a roost count was not undertaken, it is considered likely that this roost was a maternity roost due to the breeding status of the tagged bat within the roost
[9] Emergence survey undertaken by Martyn Cooke of Surrey Bat Group

Emergence surveys

4.2.22 A total of nine emergence surveys were undertaken on seven of the confirmed roosts for barbastelle and Bechstein's bat.

4.2.23 One emergence survey was undertaken within the Project Area for Bat 7J that was roosting within an [redacted] The tagged Bat 7J was the only bat to be recorded emerging from the tree. Due to the number of bats recorded emerging from this roost, this was considered to be a day roost for Bechstein's bats.

4.2.24 The other seven roosts were located outside the Project Area, within [redacted].

4.2.25 On 15th July 2020 an emergence survey was undertaken on the bat 4J and 5J roost in an [redacted]. Six bats were recorded emerging from the roost including the two tagged bats. Due to the number of bats recorded emerging from this roost, and the breeding status of the tagged bats, this was considered to be a small maternity roost for Bechstein's bats.

4.2.26 On 17th July 2020 an emergence survey was undertaken on the Bat 4J roost in the [redacted]. No bats were recorded emerging from the roost. As no bats were recorded emerging from this roost, this tree was considered to be a day roost for Bechstein's bats.

4.2.27 On 8th September 2020 an emergence survey was undertaken on the Bat 1S roost located in an [redacted] Eight bats were recorded emerging from the roost. Due to the number of bats recorded emerging from the roost this was considered to be a maternity roost for Bechstein's bats.

4.2.28 On 10th and 11th September 2020 an emergence survey was undertaken on the Bat 2S roost in [redacted] A total of 19 and 20 bats were recorded emerging respectively. Eight bats were recorded emerging from the roost. Due to the number of bats recorded emerging from the roost this was considered to be a maternity roost for Bechstein's bats.

4.2.29 On 7th May 2021 an emergence survey was undertaken on the Bat 1M and 2M roost in [redacted]. A total of three bats were recorded emerging from the roost, including the two tagged bats. Due to the breeding status of the bats this roost was considered to be a satellite maternity roost for Bechstein's bats.

4.2.30 On 9th May 2021 an emergence survey was undertaken on a separate roost for Bat 1M and 2M in [redacted] A total of 14 bats were recorded emerging from the roost, including the two tagged bats. A repeat emergence survey of this tree was undertaken on 10th May 2021 which recorded 15 bats emerging from the roost. Due to the number of bats recorded emerging from the roost this was considered to be a maternity roost for Bechstein's bats.

5 Discussion

5.1 Species

Bechstein's bat

5.1.1 This species is listed in Annex II of the EU Habitat Directive, categorised as Near Threatened on the IUCN Red List of Threatened Species (Hutson and Paunovic, 2016), is a Species of Principal Importance in England, and is considered to be very rare at a national (Bat Conservation Trust, 2010) and local level (Sussex Bat Group, 2019 and Surrey Bat Group, 2019). Although this species' range is considered to be stable, the future prospects for this species' habitat is considered to be in decline (Matthews *et al.,* 2018).

5.1.2 Trapping surveys in 2019 captured a total of seven Bechstein's bats within the Project Area within the woodland strip west of Brockley Wood/River Mole, Brockley Wood, the strip of woodland to the south west of the Project area north of Charlwood Road, Riverside Park and Horleyland Wood.

5.1.3 No breeding individuals were recorded for this species during surveys within the Project Area in 2019; captured bats were all male or non-breeding females. However, juvenile male and females were recorded present in September indicating that there is likely to be a breeding colony close to the Project Area.

Barbastelle bat

5.1.4 This species is listed in Annex II of the EU Habitat Directive, categorised as Near Threatened on the IUCN Red List of Threatened Species (Hutson and Paunovic, 2016), is a Species of Principal Importance in England, and is considered to be very rare at a national (Bat Conservation Trust, 2010) and local level (Sussex Bat Group, 2019 and Surrey Bat Group, 2019). Although this species' population and range is unknown its habitat status is considered to be in decline (Matthews *et al.,* 2018).

5.1.5 No barbastelle bats were captured within the Project Area during surveys in 2019.

5.1.6 The sections below summarise the results obtained for the trapping and radio-tracking surveys undertaken in 2020 and 2021.

5.2 Field survey

Trapping

5.2.1 A total of 98 bats from a minimum of nine species were captured over nine nights between 13th July 2020 and 7th May 2021. Species included barbastelle, Bechstein's bat, brown long-eared bat, common pipistrelle, Daubenton's bat, Natterer's bat, noctule, soprano pipistrelle, whiskered/Brandt's bat and whiskered bat.

5.2.2 The most commonly caught bat was brown long-eared bat with a total of 45 bats captured, followed by Bechstein's bats (16 bats). The least commonly caught bats were barbastelle, noctule and Daubenton's bats with just one of each species caught during the survey period.

5.2.3 Trapping locations were split into eight distinct areas across the Project Area; Glover's Wood, Edolphs Copse, Brockley Wood, strip west of Brockley Wood, strip of woodland to the south west of the Project Area, Orltons Copse, Scraggs Copse and Mount Wood. The highest number of average bats caught per night was 10 and this was recorded within Orltons Copse, however none of the target species were captured at this location. The location with the second highest number of bats caught per night was Glovers Wood, with an average of eight bats per night.

Radio-tracking

Roosts

5.2.4 Seventeen Bechstein's bat roosts and two barbastelle roosts were identified during the radio-tracking surveys. Emergence surveys were undertaken on seven of these roosts. Of these roosts, three were located within the Project Area. An emergence survey was undertaken on one of these roosts which identified one bat (Bat 7J) emerging from the roost. As the bats recorded roosting within the Project Area were all adult males it is considered unlikely that the roosts are roosts of high conservation significance for Bechstein's bats eg maternity roosts are likely to be present in the Project Area.

5.2.5 Of the remaining 14 Bechstein's bat roosts located outside the Project Area, four were confirmed as maternity roosts from roost counts, five were considered likely to be maternity roosts due to the breeding status of the females within the roost (lactating/post-lactating), one as a satellite maternity roost, one as a day roost, and three unknown roost types. Bechstein's bats are typically associated with fission fusion roost dynamics (Kerth *et al*, 2006, Kerth *et al* 2014), it is likely these use a number of trees in close proximity to one another throughout the pre & post breeding period.

Foraging areas

5.2.6 Core foraging areas for radio-tracked Bechstein's bats within the Project Area were identified within the following areas:

- Brockley Wood;
- Man's Brook; and
- River Mole.

5.2.7 Although two post-lactating female Bechstein's bats were recorded within the Project Area (Bats 3J and 4J), core foraging areas for these bats were not located within the Project Area. No core foraging areas were recorded within the Project Area for barbastelles.

5.2.8 Core foraging areas for radio-tracked Bechstein's bats outside the Project Area were identified within the following areas:

- Glover's Wood;
- Mountnoddy Wood;
- Edolphs Copse;
- woodlands around Toogoolawah and Beam Brook; and
- woodlands and waterbodies adjacent to Biltam Farm Nurseries.

5.2.9 Core foraging areas for the barbastelle were identified in the following areas:

- south east of Glovers Wood;
- around Russ Hill Farm;
- adjacent to Man's Brook to the west of Prestwood Copse.

5.2.10 Bechstein's bats were also recorded foraging around the following areas (peripheral foraging areas):

- Beggars Gill;
- Pagewood;
- Charlwood;
- woodland blocks and hedgerows north east of Charlwood; and
- Man's Brook and adjacent arable fields to the west of the Project Area.

5.2.11 Barbastelle bats were recorded foraging around the following areas (peripheral foraging areas):

- within Faygate Forest;
- Prestwood Copse and adjacent watercourses; and
- block of woodland and Bewbush Brook in Bewbush, west of Crawley.

5.2.12 The bats recorded foraging within the Project Area included two post-lactating females and three adult male Bechstein's bats. No core foraging areas for breeding females were identified within the Project Area, with data for these two bats limited to a relatively low number of fixes along the River Mole and Man's Brook, with the majority of their foraging (core foraging areas) recorded outside the Project Area in Edolphs Copse and woodland block to the north east of Glovers Wood.

Assessment of importance

5.2.13 This section aims to assess the importance of Bechstein's and barbastelle populations within and adjacent to the Project Area. The importance of the areas are assessed at a geographical level eg local, regional, national.

5.2.14 Paragraphs 5.1.1 and 5.1.4 above detail the protection afforded to Bechstein's and Barbastelle bats, rarity of the species within the UK, Sussex, and Surrey, and future prospects of the species.

5.2.15 The value of roosts and foraging areas for both Bechstein's bats and barbastelles have been calculated using Wray *et al.* (2010) for both within the Project Area and within the wider landscape, with calculations shown in Table 5.2.1-5.2.4 below.

Table 5.2.1: Importance of roosts within Project Area

Species	Rarity	Roost type present (highest conservation significance listed)	Geographic frame of reference
Barbastelle	Rarest	None	N/A
Bechstein's bat	Rarest	Day roost	County

Table 5.2.2: Importance of roosts outside Project Area

Species	Rarity	Roost type present (highest conservation significance listed)	Geographic frame of reference
Barbastelle	Rarest	Likely day roost	County
Bechstein's bat	Rarest	Maternity	National/UK

5.2.16 As barbastelle have not been recorded within the Project Area, this area is not considered to be of importance to this species. However, the areas in the wider landscape are considered to be of County/Regional importance for this species.

5.2.17 The population of Bechstein's bats is considered to be of County/Regional importance within the Project Area. However, the importance of the areas in the wider landscape are considered to be of Regional/National Importance.

Table 5.2.3: Importance of foraging areas within Project Area

Species	Species rarity	Number of bats	Roosts/potential roosts nearby	Type/Complexity of linear features	Total Score
Barbastelle	Rarest (20)	No bats	None	N/A	0 – Not important
Bechstein's bat	Rarest (20)	Individual bats (5)	Small number of roosts (3)	Isolated woodland patches, less intensive arable and/or small towns and villages (3)	31 – Regional importance

Table 5.2.4: Importance of foraging areas outside Project Area

Species	Species rarity	Number of bats	Roosts/potential roosts nearby	Type/Complexity of linear features	Total Score
Barbastelle	Rarest (20)	Individual bats (5)	Small number of roosts (3)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	32 – Regional importance
Bechstein's bat	Rarest (20)	Small number of bats (10)	Small number of roosts (3)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)	37 – Regional importance

6 Conclusions

6.1.1 The highest rate of bat captures were recorded outside the Project Area in Orltons Copse, Glovers Wood and Edolphs Copse.

6.1.2 Three roosts were identified within the Project Area, all for male Bechstein's bats. The roosts were considered to be day roosts, or of unknown status. Fourteen roosts for Bechstein's bats were recorded outside the Project Area. Four of these roosts were confirmed as maternity roosts from roost counts, five were considered likely to be maternity roosts due to the breeding status of the females within the roost (lactating/post-lactating), one as a satellite maternity roost, one as a day roost, and three unknown roost types. Two barbastelle roosts of unknown type were also recorded outside the Project Area.

6.1.3 Glovers Wood and Edolphs Copse were used as core foraging areas for multiple Bechstein's bats with the majority of activity recorded in these areas being from breeding female Bechstein's bats.

6.1.4 Core foraging areas identified for Bechstein's bats within the Project Area included Brockley Wood, the River Mole and Man's Brook. These core foraging areas were for male Bechstein's bats.

6.1.5 The Project Area is considered to not to be of importance for barbastelle bats due to the lack of records but is considered to be of County/Regional importance for Bechstein's bats.

6.1.6 The area outside the Project is considered to be of County/Regional importance for barbastelle bats and Regional/National importance for Bechstein's bats.

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8 Glossary

8.1 Glossary of Terms

Table 8.1.1: Glossary of Terms

Term	Description
EIA	Environmental Impact Assessment
ES	Environmental Statement
EU	European Union
GAL	Gatwick Airport Limited
IUCN	International Union for Conservation of Nature
PEIR	Preliminary Environmental Information Report

Annex 1

Trapping data

Bat No.	Date	Time (24hr)	Trap No.	Easting	Northing	Species	Extracted by	Measured by	Determined by	Sex - M/F	Age - Juv/ Imm/ Ad	Breeding status (male) - Testes size 0-2	Breeding status (female) - Par/ NP/ Preg/ Lact	Forearm (mm)	Total weight (g)	Bag weight(g)	Bat weight (g)	Tagged bat? Include bat number	Sample taken?	ID features, damage, parasites photos and samples collected
1	13/07/2020	22:16	1	522591	140332	*M.bec*	DH	DH	DH	F	Ad	N/A	Lact	39.7	25.9	17.1	8.7	1J	N	
2	13/07/2020	22:58	3	522522	140542	*M.mys*	DH	DH	DH	M	Ad	0	N/A	33.9	22.7	17.1	5.6	N/A	N	
3	13/07/2020	23:47	1	522591	140332	*M.mys*	DH	DH	DH	M	Ad	1	N/A	35.1	22.7	17.8	4.9	N/A	N	
4	13/07/2020	23:58	3	522522	140542	*P.pip*	DH	DH	DH	M	Ad	2	N/A	33	22.2	17.2	5	N/A	N	
5	13/07/2020	22:30	6	523034	140711	*M.bec*	KH	KH	RM	F	Ad	N/A	Lactating	39.3	44.5	35.5	9	2J	N	
6	13/07/2020	22:30	6	523034	140711	*M.mys*	KH	RM	RM	M	Juv	0	N/a	36	21.5	15.5	6	N/A	N	
7	13/07/2020	23:45	6	523034	140711	*P.aur*	KH	KH	KH	F	Ad	N/A	Lactating	35.8	46	38	8	N/A	N	
8	13/07/2020	00:00	5	523077	141047	*M.mys/bra*	KH	KH	KH	F	Ad	N/A	NP	31.4	24.5	19.5	5	N/A	Y	Straight tragus
9	14/07/2020	22:12	9	523579	142520	*M.nat*	DH	DH	DH	M	Ad	0	N/A	38.5	26.1	19.9	6.2	N/A	N	
10	14/07/2020	22:22	7	523544	142326	*P.aur*	DH	DH	DH	M	Ad	1	N/A	39	24.3	16.8	7.5	N/A	N	
11	14/07/2020	22:22	7	523544	142326	*P.aur*	DH	DH	DH	F	Ad	N/A	Lac/post	36.9	22.8	14.8	8	N/A	N	
12	14/07/2020	22:22	7	523544	142326	*M.bec*	DH	DH	DH	F	Ad	N/A	Lac/post	42.5	25.7	16.8	8.9	3J	N	
13	14/07/2020	23:09	8	523461	142376	*P.aur*	DH	DH	DH	M	Ad	0	N/A	37.1	26.4	19	7.4	N/A	N	
14	14/07/2020	23:12	7	523544	142326	*P.aur*	DH	DH	DH	F	Ad	N/A	Lac/post	39	25.7	17.5	8.2	N/A	N	
15	14/07/2020	23:47	9	523579	142520	*P.aur*	DH	DH	DH	F	Ad	N/A	NP	39.6	26.5	17.5	9	N/A	N	
16	14/07/2020	00:30	7	523544	142326	*P.aur*	DH	DH	DH	F	Ad	N/A	Lac/post	38	28.2	18.9	9.3	N/A	N	
17	14/07/2020	01:27	9	523579	142520	*P.aur*	DH	DH	DH	F	Ad	N/A	Post lact	39.9	24	16.3	7.7	N/A	N	
18	14/07/2020	01:31	8	523461	142376	*P.aur*	DH	DH	DH	F	Ad	N/A	Lac/post	39.6	25.7	17.7	8	N/A	N	
19	14/07/2020	01:31	8	523461	142376	*P.pip*	DH	DH	DH	F	Ad	N/A	NP	31.5	19.8	14.8	5	N/A	N	
20	14/07/2020	02:15	8	523461	142376	*M.mys*	DH	DH	DH	M	Ad	0	N/A	34.2	22.8	17.8	5	N/A	N	
21	14/07/2020	21:45	11	523754	142294	*P.aur*	SR	SR	RM	M	Ad	1	N/A	39	27	19.5	8.5	N/A	N	
22	14/07/2020	22:30	10	523713	142145	*P.aur*	SR	SR	SR	F	Ad	N/A	Post lact	38	26.5	18	8.5	N/A	N	
23	14/07/2020	22:30	10	523713	142145	*M.bec*	SR	SR	SR	M	Juv	0	N/A	41	27	18.5	8.5	N/A	N	
24	14/07/2020	22:40	11	523754	142294	*M.bec*	SR	SR	SR	F	Ad	N/A	Post lact	42	25.5	16	9.5	4J	N	
25	14/07/2020	23:55	11	523754	142294	*P.aur*	RM	RM	RM	F	Ad	N/A	NP	39	24	16.5	7.5	N/A	N	
26	14/07/2020	23:55	11	523754	142294	*P.aur*	RM	RM	RM	F	Ad	N/A	Post lact	39	26	19	7	N/A	N	
27	14/07/2020	00:10	10	523713	142145	*M.mys*	RM	RM	RM	M	Ad	1	N/A	38	20.5	15.5	5	N/A	N	
28	14/07/2020	00:10	10	523713	142145	*M.bec*	RM	RM	RM	F	Ad	N/A	Post lact	41	44	34.5	9.5	5J	N	
29	14/07/2020	00:10	10	523713	142145	*M.mys/bra*	RM	RM	RM	F	Juv	N/A	NP	40	50	44	6	N/A	N	No droppings left
30	14/07/2020	01:10	10	523713	142145	*M.bec*	SR	RM	RM	M	Juv	0	N/A	41	46	38.5	7.5	N/A	N	

Bat No.	Date	Time (24hr)	Trap No.	Easting	Northing	Species	Extracted by	Measured by	Determined by	Sex - M/F	Age - Juv/ Imm/ Ad	Breeding status (male) - Testes size 0-2	Breeding status (female) - Par/ NP/ Preg/ Lact	Forearm (mm)	Total weight (g)	Bag weight(g)	Bat weight (g)	Tagged bat? Include bat number	Sample taken?	ID features, damage, parasites photos and samples collected
31	14/07/2020	01:10	10	523713	142145	*P.aur*	SR	RM	RM	M	Juv	0	N/A	37	43.5	36.5	8	N/A	N	
32	15/07/2020	22:24	13	525776	140837	*M.bec*	DH	DH	DH	M	Ad	0	N/A	40	25	17.6	7.4	6J	N	
33	15/07/2020	23:45	12	525744	140813	*M.bec*	DH	DH	DH	M	Ad	0	N/A	42.1	25.8	16.8	9	7J	N	
34	15/07/2020	23:54	13	525776	140837	*M.nat*	DH	DH	DH	F	Juv	N/A	NP	39.5	21.6	14.7	6.9	N/A	N	
35	15/07/2020	01:20	14	525809	140892	*M.bec*	DH	DH	DH	M	Ad	0	N/A	41.5	25.4	16.8	8.6	8J	N	
36	15/07/2020	01:54	13	525776	140837	*M.nat*	DH	DH	DH	F	Juv	N/A	NP	N/A	N/A	N/A	N/A	N/A	N	Released at trap
37	15/07/2020	02:15	13	525776	140837	*P.aur*	DH	DH	DH	M	Ad	0	N/A	34.9	24.9	17.8	7.1	N/A	N	
38	15/07/2020	22:45	16	525492	140681	*M.mys*	TE	TE	TE	F	Ad	N/A	NP	34.6			5.48	N/A	Y	Likely young of last year. 2x ticks on face. Pale skin
39	15/07/2020	01:35	15	525457	140631	*M.mys*	TE	TE	TE	M	Juv	0	N/A	34.6			5.31	N/A	Y	Wing mite E = black
40	15/07/2020	01:40	16	525492	140681	*M.mys/bra*	TE	TE	TE	F	Ad	N/A	Lact	35.4			5.9	N/A	N	Likely whiskered
41	16/07/2020	23:34	20	521870	138624	*P.aur*	DH	DH	DH	F	Ad	N/A	Lac/post	40.7	25.4	16.6	8.8	N/A	N	
42	16/07/2020	23:43	21	521898	138831	*M.nat*	DH	DH	DH	F	Ad	N/A	NP	37.6	26.6	18.9	7.7	N/A	N	
43	16/07/2020	00:24	20	521870	138624	*N.noc*	DH	DH	DH	M	Ad	2	N/A	55.6	49.5	17.1	32.4	N/A	N	
44	16/07/2020	00:36	22	522184	138752	*P.aur*	DH	DH	DH	F	Ad	N/A	Lac/post	39.5	29.1	20	9.1	N/A	N	
45	16/07/2020	00:36	22	522184	138752	*P.aur*	DH	DH	DH	M	Ad	0	N/A	39.2	26.6	18.9	7.7	N/A	N	
46	16/07/2020	00:36	22	522184	138752	*P.aur*	DH	DH	DH	F	Ad	N/A	Lac/post	38.7	24.2	16.3	7.9	N/A	N	
47	16/07/2020	00:36	22	522184	138752	*P.aur*	DH	DH	DH	F	Ad	N/A	NP	40.3	23.3	14.9	8.4	N/A	N	
48	16/07/2020	02:10	21	521898	138831	*P.pip*	DH	DH	DH	F	Ad	N/A	Lac/post	32.4	23.2	17.8	5.4	N/A	N	
49	16/07/2020	02:10	21	521898	138831	*P.pyg*	DH	DH	DH	F	Ad	N/A	Lac/post	31.2	22.1	16.8	5.3	N/A	N	
50	16/07/2020	02:25	22	522184	138752	*P.aur*	DH	DH	DH	M	Ad	1	N/A	36.6	24.3	16.9	7.4	N/A	N	
51	07/09/2020	20:51	2	522442	140472	*P.aur*	DH	DH	DH	F	Ad	N/A	Post lact	39.5	24.1	16.4	7.7	N/A	N	
52	07/09/2020	22:21	2	522442	140472	*P.aur*	DH	DH	DH	F	Juv	N/A	NP	38	25.7	17.7	8	N/A	N	
53	07/09/2020	23:01	2	522442	140472	*M.nat*	DH	DH	DH	F	Ad	N/A	NP	40.9	24.3	17.3	7	N/A	N	
54	07/09/2020	00:14	2	522442	140472	*P.aur*	DH	DH	DH	F	Ad	N/A	NP	39.7	24.7	16.4	8.3	N/A	N	
55	07/09/2020	00:15	2	522442	140472	*P.aur*	DH	DH	DH	F	Juv	N/A	NP	40.2	26.2	16.8	9.4	N/A	N	
56	07/09/2020	00:51	2	522442	140472	*P.aur*	DH	DH	DH	F	Juv	N/A	NP	39.3	24.6	16.4	8.2	N/A	N	
57	07/09/2020	21:00	4	523053	140706	*P.aur*	KH	KH	KH	F	Ad	N/A	NP	37	28	19.5	8.5	N/A	N	
58	07/09/2020	21:00	4	523053	140706	*M.bec*	KH	KH	KH	M	Juv	0	N/A	37.1	24	15.5	9.5	1S	N	
59	07/09/2020	21:00	4	523053	140706	*M.bec*	KH	KH	KH	F	Juv	N/A	NP	38.2	25	19	6	2S	N	
60	07/09/2020	22:30	4	523053	140706	*M.nat*	KH	KH	KH	M	Juv	1	N/A	35.8	24	16.5	7.5	N/A	N	
61	07/09/2020	22:30	4	523053	140706	*P.aur*	RM	RM	RM	M	Juv	1	N/A	34.7	22.5	15.5	7	N/A	N	
62	07/09/2020	22:30	4	523053	140706	*B.bar*	KH	KH	RM	M	Juv	1	N/A	35.8	25.5	18.5	7	3S	N	Parasites
63	07/09/2020	22:45	6	523081	141049	*P.aur*	RM	RM	RM	M	Juv	1	N/A	35	42.5	36	6.5	N/A	N	
64	07/09/2020	22:45	6	523081	141049	*P.aur*	RM	RM	RM	F	Juv	N/A	NP	33.5	25.5	18.5	7	N/A	N	Parasites
65	07/09/2020	22:45	6	523081	141049	*P.aur*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Ecaped

Bat No.	Date	Time (24hr)	Trap No.	Easting	Northing	Species	Extracted by	Measured by	Determined by	Sex - M/F	Age - Juv/ Imm/ Ad	Breeding status (male) - Testes size 0-2	Breeding status (female) - Par/ NP/ Preg/ Lact	Forearm (mm)	Total weight (g)	Bag weight(g)	Bat weight (g)	Tagged bat? Include bat number	Sample taken?	ID features, damage, parasites photos and samples collected
66	07/09/2020	01:15	4	523053	140706	*P.aur*	KH	KH	KH	M	Juv	1	N/A	35	38	30.5	7.5	N/A	N	
67	07/09/2020	01:15	4	523053	140706	*M.nat*	KH	KH	KH	F	Ad	N/A	NP	36.5	26.5	18.5	8	N/A	N	Parasites
68	08/09/2020	21:32	7	523544	142326	*P.aur*	DH	DH	DH	M	Ad	0	N/A	37.4	23.1	14.7	8.4	N/A	N	
69	08/09/2020	21:32	7	523544	142326	*P.aur*	DH	DH	DH	F	Ad	N/A	NP	38.1	22.1	14.8	7.3	N/A	N	
70	08/09/2020	22:18	7	523544	142326	*P.aur*	DH	DH	DH	F	Juv	N/A	NP	36.3	22.1	14.6	7.5	N/A	N	
71	08/09/2020	00:00	7	523544	142326	*P.aur*	DH	DH	DH	M	Juv	N/A	N/A	36.1	21.7	14.8	6.9	N/A	N	
72	08/09/2020	00:37	9	523579	142520	*M.bec*	DH	DH	DH	F	Juv	N/A	NP	41.7	25.7	17.2	8.5	4S	N	
73	08/09/2020	22:55	10	523544	142326	*P.pyg*	KH	KH	KH	F	Juv	N/A	NP	28.5	24	19.5	4.5	N/A	N	
74	09/09/2020	20:57	13	525776	140837	*M.nat*	DH	DH	DH	F	Juv	N/A	NP	40.1	24	17.2	6.8	N/A	N	
75	09/09/2020	21:41	13	525776	140837	*P.pip*	DH	DH	DH	M	Juv	0	N/A	30.2	23.7	19.8	3.9	N/A	N	
76	09/09/2020	22:15	12	525744	140813	*M.nat*	DH	DH	DH	F	Ad	N/A	Post lact	37.6	23.7	16.9	6.8	N/A	N	
77	09/09/2020	22:15	12	525744	140813	*M.mys*	DH	DH	DH	M	Ad	1	N/A	34.5	25	19.8	5.2	N/A	N	
78	09/09/2020	22:52	12	525744	140813	*M.nat*	DH	DH	DH	F	Juv	N/A	NP	39.9	24.7	17.5	7.2	N/A	N	
79	09/09/2020	23:37	14	525809	140892	*M.bec*	DH	DH	DH	F	Juv	N/A	NP	40.3	25.7	17.6	8.1	5S	N	
80	09/09/2020	00:19	14	525809	140892	*M.mys*	DH	DH	DH	M	Juv	0	N/A	31.4	20.6	16.3	4.3	N/A	N	
81	09/09/2020	00:49	14	525809	140892	*M.nat*	DH	DH	DH	M	Ad	0	N/A	37.2	21.7	14.7	7	N/A	N	
82	09/09/2020	01:20	14	525744	140813	*P.aur*	DH	DH	DH	F	Ad	N/A	NP	40	25.3	17.5	7.8	N/A	N	
83	09/09/2020	23:20	16	525492	140681	*M.mys*	TE	TE	TE	F	Ad	N/A	Par	34.1	N/A	N/A	5.6	N/A	N	Small hole in right wing. No cusp on P4
84	09/09/2020	23:50	15	525457	140631	*P.aur*	TE	TE	TE	F	Ad	N/A	Par	40.3	N/A	N/A	9	N/A	N	No droppings
85	10/09/2020	22:05	24	522610	139058	*P.aur*	DH	DH	DH	M	Juv	N/A	N/A	36.1	27.6	19.8	7.8	N/A	N	
86	10/09/2020	22:05	24	522610	139058	*P.aur*	DH	DH	DH	F	Ad	N/A	Post lact	39.8	22.4	17.6	4.8	N/A	N	
87	10/09/2020	22:10	25	522716	138986	*P.aur*	DH	DH	DH	M	Ad	1	N/A	37.6	27.8	19.4	8.4	N/A	N	
88	10/09/2020	22:59	23	522673	138816	*M.nat*	DH	DH	DH	F	Ad	N/A	NP	38.2	26.4	19.4	7	N/A	N	
89	10/09/2020	01:28	25	522716	138986	*P.aur*	DH	DH	DH	F	Ad	N/A	NP	38.2	25.7	17.7	8	N/A	N	
90	04/05/2021	21:23	6	522543	140426	*M.bec*	DH	DH	DH	F	Ad	N/A	NP	42.9	25.1	17.2	7.9	1M	N	
91	04/05/2021	21:27	4	522458	140462	*P.aur*	DH	DH	DH	F	Ad	N/A	NP	39.5	27.8	21.1	6.7	N/A	N	
92	04/05/2021	22:17	6	522543	140426	*M.mys/bra*	DH	DH	DH	F	Ad	N/A	Par	33.5	20.8	17.1	3.7	N/A	N	
93	04/05/2021	22:20	4	522458	140462	*M.bec*	DH	DH	DH	F	Ad	N/A	Par	42.5	25.4	17.2	3.2	2M	N	
94	04/05/2021	22:20	4	522458	140462	*M.nat*	DH	DH	DH	F	Ad	N/A	Par	40.5	23.6	16.4	7.2	N/A	N	
95	06/05/2021	22:15	26	522669	138383	*M. nat*	TE	TE	TE	M	Imm	0	N/A	38.45	N/A	N/A	7.33	N/A	N	
96	06/05/2021	23:50	27	522788	138370	*M. dau*	TE	JL	TE	M	A	0	N/A	37.9	N/A	N/A	8.08	N/A	N	
97	07/05/2021	22:00	1	523034	140733	*P. aur*	TE	JL	TE	F	Ad	N/A	Par	39.2	N/A	N/A	6.57	N/A	N	Minor wing damage (hole with diameter <2mm), generally calm

Bat No.	Date	Time (24hr)	Trap No.	Easting	Northing	Species	Extracted by	Measured by	Determined by	Sex - M/F	Age - Juv/ Imm/ Ad	Breeding status (male) - Testes size 0-2	Breeding status (female) - Par/ NP/ Preg/ Lact	Forearm (mm)	Total weight (g)	Bag weight(g)	Bat weight (g)	Tagged bat? Include bat number	Sample taken?	ID features, damage, parasites photos and samples collected
98	07/05/2021	23:00	1	523034	140733	*P. aur*	TE	JL	TE	F	Ad	N/A	Par	40	N/A	N/A	7.59	N/A	N	Bald patch on abdomen indicative of mating, very active

Annex 2

Home Range Analysis

Table 8.1.2 Home Range Analysis

Bat number	50% KDE (ha)	95% KDE (ha)	100% MCP (ha)
1J	0.09	2.21	28.37
2J	4.47	36.35	32.71
3J	0.48	15.61	183.49
4J	0.22	17.12	507.07
5J	4.03	40.87	58.77
6J	0.82	37.74	289.73
7J	5.51	64.76	388.46
8J	2.40	51.93	262.23
1S	N/A	N/A	5.04
2S	2.64	36.74	286.85
3S	6.01	107.70	1470.98
4S	1.67	23.40	290.99
5S	N/A	N/A	N/A
1M	1.29	11.31	10.39
2M	0.87	9.44	11.09

Annex 3

Figures

YOUR LONDON AIRPORT Gatwick

KEY

Project Site Boundary (PEIR)

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Site Location

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 2.2.1	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:20,000

0 125 250 500 m

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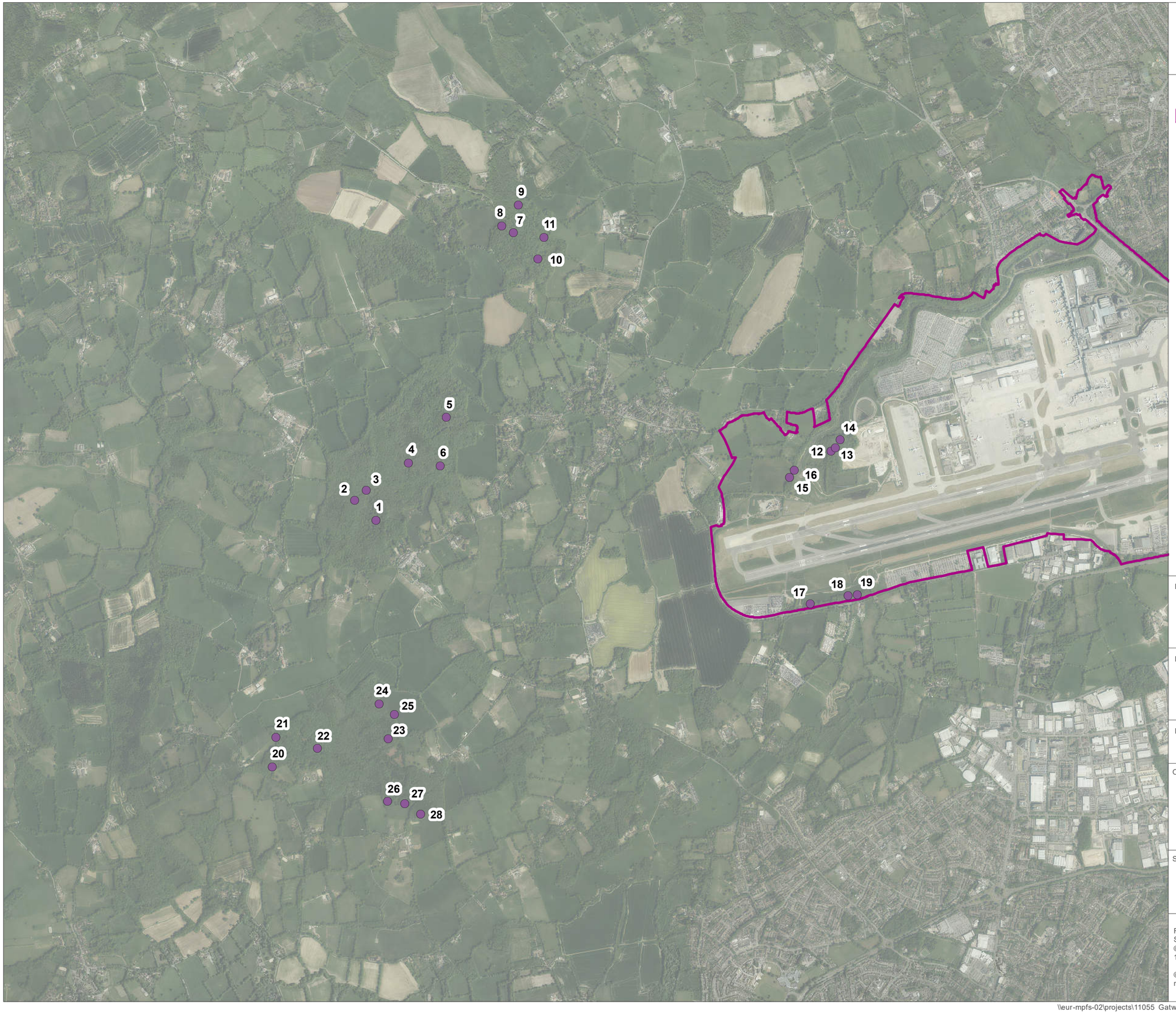

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Trapping Locations

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Trapping Locations

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 3.2.1	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:25,000

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YOUR LONDON AIRPORT Gatwick

KEY

Project Site Boundary (PEIR)

Estimated Roost Locations 2020 - 2021

- Bechstein's bat Estimated, Roost Characteristic - Maternity
- Bechstein's bat Estimated, Roost Characteristic - Unknown

Confirmed Roost Locations 2020 - 2021

- Barbastelle, Confirmed, Roost Characteristic - Unknown
- Bechstein's bat, Confirmed, Roost Characteristic - Day
- Bechstein's bat, Confirmed, Roost Characteristic - Maternity
- Bechstein's bat, Confirmed, Roost Characteristic - Satellite maternity

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Roost Locations

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 4.2.1	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:12,000

0 125 250 500 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Male Fixes
- Female Fixes
- 50% KDE - core foraging
- 95% KDE - peripheral
- 100% MCP

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Bechstein's bats recorded in Project Area

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 4.2.2	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:13,000

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Male fixes
- Female fixes
- 50% KDE - core foraging
- 95% KDE - peripheral
- 100% MCP

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Bechsteins Post-maternity foraging areas

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 4.2.3	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:15,000

0 125 250 500 m

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[redacted]

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Male fixes
- Female fixes
- 50% KDE - core foraging
- 95% KDE - peripheral
- 100% MCP

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Autumnal dispersal foraging areas - Bechstein's bats

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 4.2.4	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:13,000

0 125 250 500 m

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YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Female fixes
- 50% KDE - core foraging
- 95% KDE - peripheral
- 100% MCP

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Pre-maternity foraging areas - Bechstein's bats May 2021

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 4.2.5	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:10,000

0 125 250 500 m

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[redacted]

YOUR LONDON AIRPORT Gatwick

KEY

- Project Site Boundary (PEIR)
- Barbastelle fixes
- 50% KDE - core foraging
- 95% KDE - peripheral
- 100% MCP

DOCUMENT

Preliminary Environmental Information Report Appendix 9.6.3

DRAWING TITLE

Autumnal dispersal foraging areas - barbastelle

DATE

September 2021

ORIENTATION	DRAWING NO.	REVISION
N	FIGURE 4.2.6	For PEIR Issue
	DRAWN BY: BG	PM / CHECKED BY: RM

SCALE @ A3 1:35,000

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Preliminary Environmental Information Report
Appendix 9.9.1: Habitat Regulations Assessment Report

September 2021

Table of Contents

1 Introduction

1.1 General

1.1.1 This document forms Appendix 9.9.1 of the Preliminary Environmental Information Report (PEIR) prepared on behalf of Gatwick Airport Limited (GAL). The PEIR presents the preliminary findings of the Environmental Impact Assessment (EIA) process for the proposal to make best use of Gatwick Airport's existing runways (referred to within this report as 'the Project'). The Project proposes alterations to the existing northern runway which, together with the lifting of the current restrictions on its use, would enable dual runway operations. The Project includes the development of a range of infrastructure and facilities which, with the alterations to the northern runway, would enable the airport passenger and aircraft operations to increase. Further details regarding the components of the Project can be found in Chapter 5: Project Description.

1.1.2 This document provides the findings of the Habitat Regulations Assessment (HRA) process undertaken to date for the Project.

1.2 Purpose of this Report

1.2.1 The need for an appropriate assessment/HRA is set out in Regulation 63 of the Conservation of Habitats and Species Regulations 2017, as amended (the 'Habitats Regulations') (Table 1.2.1).

Table 1.2.1: Legislative Basis for a Habitats Regulations Assessment.

The Legislative Basis for Habitat Regulations Assessment	
Habitats Regulations, Regulation 63	A competent authority, before deciding to give any consent for a plan or project which is likely to have a significant effect on a European site shall make an appropriate assessment of the implications of the plan or project for the site in view of that site's conservation objectives

1.2.2 The Habitats Regulations apply the precautionary principle to relevant designated areas, in so much as plans and projects can only be permitted where it has been ascertained that there would be no adverse effect on the integrity of a Special Protection Area (SPA) or Special Area of Conservation (SAC), collectively termed Natura 2000 sites.

1.2.3 It is Government policy (as outlined in Section 181 of the National Planning Policy Framework (Ministry of Housing Communities and Local Government, 2021)) for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to Natura 2000 sites. As such, information to inform an appropriate assessment needs to cover features of any relevant Ramsar site. Similarly, in accordance with Government advice, proposed SPAs and SACs (pSPAs/pSACs) should be treated as having protection under the Habitats Regulations.

1.2.4 In undertaking an assessment, competent authorities (in this case the appropriate Secretary of State) must have regard to both direct and indirect effects on an interest feature of the Natura 2000 site, as well as cumulative effects. This may include consideration of features and issues outside the boundary of a Natura 2000 site.

1.2.5 Plans and projects for which it is not possible to conclude that there would be no adverse effect on the integrity of Natura 2000 sites may still be permitted if there are no alternatives and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, any compensation measures necessary to ensure the overall coherence of the site network is protected must also be secured.

1.2.6 Relevant case law on the HRA process includes Case C-323/17, known as People Over Wind; Case C-461/17 *Holohan v. An Bord Pleanála*; High Court judgement EWHC 351 (known as the Wealden Judgement); Case C-127/02 Waddenzee; Case C-258/11 Sweetman v An Bord Pleanála; and C293/17, C294/17 Cooperatie Mobilisation for the Environment and others v College van gedeputeerde staten van Limburg, known as the Dutch Nitrogen case.

1.3 Objectives

1.3.1 The objective of this report is to collate and provide an assessment of potential effects of the Project on the Natura 2000 network for the purposes of informing the PEIR for the Project. This assessment will be refined and updated where necessary to inform the shadow HRA presented as part of the ES. It draws upon information within the PEIR, notably Chapter 9: Ecology and Nature Conservation, but purposely does not repeat the detail contained in that chapter. Instead, it provides sufficient standalone information, with references to other more detailed sections where necessary to be able to make a preliminary decision on the potential effects of the Project on Natura 2000 sites.

1.4 Scope

1.4.1 Key activities in the Project programme that are considered within this report are:

- site preparation and enabling works;
- construction phase;
- commissioning; and
- operation.

1.4.2 No Natura 2000 sites or Ramsar sites lie wholly or partly within the Project site boundary.

1.4.3 The scope of sites included in the assessment is based on whether there is a known pathway for a potential effect. Such pathways are principally in relation to species the site is designated for or where the site is near to a road that may encounter increases in traffic flow as a result of the Project. The findings of the technical chapters of the PEIR (specifically Chapters 9 Ecology, 13 Air Quality and 12 Traffic and Transport) and consultation with Natural England have been taken into account. This includes with respect to designated sites that are within 200 metres of major roads and those designated for the presence of mobile species such as bats. Taking the above into account, the following seven Natura 2000 sites require consideration as to whether they could be affected (distance/direction from Project site boundary provided in parenthesis):

- Mole Gap to Reigate Escarpment SAC (9.22 km north west);
- Ashdown Forest SAC (11.96 km south west);
- Ashdown Forest SPA (11.96 km south west);
- The Mens SAC (25.09 km south west);
- Ebernoe Common SAC (29.00 km south west);
- Thames Basin Heaths SPA (Ockham and Wisley SSSI and Chobham Common SSSI components only) (23.6 km north west); and
- Thursley, Ash, Pirbright and Chobham SAC (Chobham Common SSSI component only) (33.8 km north west).

1.4.4 Citation details for the above sites are provided in Annex 1.

1.4.5 Note that where it passes by the M3, the Chobham Common SSSI is a component of both the Thursley, Ash, Pirbright and Chobham SAC and Thames Basin Heaths SPA.

1.4.6 There is no potential for transboundary effects (see Appendix 6.2.3 Transboundary Screening Matrix). The site does not support migratory bird species that may be associated with Natura 2000 sites in other EU States and whilst there is some evidence of bat migration to and from the UK for some species (Nathusius' pipistrelle, for example (PTES, 2020)), the presence of SACs in the surrounding landscape designated for bats are already in the scope of assessment.

2 Methodology

2.1 Key Principles

2.1.1 The key principles adopted during the collation and analysis of information are set out in Table 2.1.1.

Table 2.1.1: Key Principles Underpinning the Assessment Methodology.

Key Principles Underpinning the Assessment Methodology	
Principle	**Rationale**
Use of best available existing information	The best available existing information has been used to inform the assessment. This includes ecological information gathered on behalf of Gatwick Airport Limited (GAL) and information made available through production of the PEIR and information from other sources, including Natural England, British Trust for Ornithology, and others.
Proportionality	The level of detail provided in the assessment reflects the level of detail available, which may increase during the EIA process prior to the application for development consent (ie that the assessment is proportionate).
Consultation	Continued consultation with Natural England and other stakeholders during the ongoing EIA process will be undertaken including ensuring that their comments are taken on board.
Transparency in the assessment process	The process will be kept as open, transparent and simple as possible while ensuring an objective and rigorous assessment in compliance with the Habitats Directive, Habitats Regulations and emerging best practice.
Audit trail	The process will be followed, and the conclusions reached are clearly documented to ensure there is a clear audit trail.

2.2 Process

2.2.1 The stages of HRA are described below, adapted from Government guidance (MHCLG, 2021, PINS, 2017). The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations and any relevant changes to the plan until it is possible to conclude the Project will cause no adverse effect on the integrity of the protected site(s) in question.

Stage 1 – Qualifying Interest Features

2.2.2 Stage 1 is to collect information on identified Natura 2000 and Ramsar sites and their conservation objectives.

2.2.3 The qualifying interest features for the sites assessed in this report have been obtained via the citation details on the Joint Nature Conservation Committee (JNCC)/Natural England websites. The conservation objectives provide the basis for determining what is currently causing, or may cause, a significant effect, and for informing the scope of appropriate assessments.

2.2.4 In addition to qualifying interest features, it is necessary to explore the environmental features and conditions required to maintain the integrity of the Natura 2000 sites, as well as both current condition and trends in environmental processes.

Stage 2 – Likely Significant Effect

2.2.5 The second stage is to determine whether there are any Likely Significant Effects (LSEs) on Natura 2000 sites as a result of the Project in the absence of mitigation/avoidance measures. This is essentially a risk assessment to decide whether a more detailed assessment is required and, if so, the scope of the issues and features to be addressed. This involves identifying the potential pathways through which the Project could affect the interest features of relevant Natura 2000 sites and then assessing, in broad terms, the magnitude of each impact to determine whether a significant effect is likely. In making this determination, the risk of an effect has been taken into account, not just on those sites within the administrative boundary of Crawley Borough Council (within which the airport sits), but, in line with best practice, considering potential ways in which the Project could impact upon other relevant Natura 2000 or Ramsar sites.

2.2.6 The main purpose of this stage is to screen out those aspects of the Project which would not be likely to give rise to significant effects and to screen out features of each relevant Natura 2000 site that are not likely to be significantly affected. Judgements have been based on sound reasoning and within the context of best available knowledge of the various ways in which development of the nature proposed could impact on the interest features of the relevant Natura 2000 sites. Judgements are made in the absence of mitigation/avoidance measures. If likely significant effects cannot be excluded beyond reasonable scientific doubt under the precautionary principle then it is assumed that the issue requires more detailed consideration.

Stage 3 – Appropriate Assessment

2.2.7 The appropriate assessment stage assesses the likely significant effects of the Project on the conservation objectives of relevant Natura 2000 and Ramsar sites and determines whether a conclusion of no adverse effect can be reached for the Project alone and in-combination with other plans or projects.

2.2.8 When a plan or project cannot be 'screened out' as being unlikely to have a significant effect on a Natura 2000 site, it is necessary to explore whether there are any adverse effects and, if so, devise suitable avoidance and mitigation measures to be able to conclude no adverse effect. There is no formal screening stage under the Habitats Regulations, but for convenience the term is used here to refer to the consideration of whether the need for appropriate assessment under the Regulations has been triggered according to the application of the precautionary principle summarised above. Experience suggests that the best approach to addressing this is on a site by site basis, with avoidance/mitigation measures focused on the environmental conditions needed to maintain site integrity.

2.2.9 Government guidance (MHCLG, 2019b) defines integrity as '…*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was designated*'.

Stage 4 – In-combination Assessment

2.2.10 The Habitats Regulations require that a decision to grant permission can only be made once the Competent Authority is satisfied that no adverse effects on the integrity of the Natura 2000 sites in question are likely, either alone and in-combination

with other plans and projects. Therefore, Stage 4 of the HRA process requires the identification of other plans and projects that might affect the interest features of the relevant Natura 2000 sites in combination with the Project and a decision as to whether there any adverse effects that might occur in-combination (collectively) that would not occur when considered alone.

3 Stage 1 – Qualifying Interest Features

3.1 Mole Gap to Reigate Escarpment Special Area of Conservation

3.1.1 SACs are protected sites designated under the European Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (known as the Habitats Directive). The Habitats Directive is implemented into UK law through the Habitats Regulations, which refer to the Annexes of the Habitats Directive.

3.1.2 Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the habitat types and species identified in Annexes I and II of the Habitats Directive.

3.1.3 A sub-set of the Annex I habitat types are defined as being 'priority' because they are considered to be particularly vulnerable.

3.1.4 The Mole Gap to Reigate Escarpment (MGRE) SAC stretches for eight miles between Leatherhead and Reigate and includes land in the district of Mole Valley. It covers approximately 892 hectares.

3.1.5 The citation for the site provides the following description of the SAC (Natural England, 2014a):

'Woodland, chalk grassland, chalk scrub and heathland form an interrelated mosaic at this site on the North Downs.

On the generally acidic plateau deposits of the crest of the Downs, the woodland is dominated by beech Fagus sylvatica, pedunculate oak Quercus robur, ash Fraxinus excelsior and yew Taxus baccata. On the lime-rich chalk slopes, the dominant trees are beech, ash and yew, together with field maple Acer campestre and common whitebeam Sorbus aria agg. and occasional large-leaved lime Tilia platyphyllos. Yew woodland has been formed both by invasion of chalk grassland and from development within beech woodland following destruction of the beech over-storey. Yew occurs in extensive stands, with, in places, an understorey of box Buxus sempervirens. This site supports the only area of stable box scrub in the UK, on steep chalk slopes where the River Mole has cut into the North Downs Escarpment, creating the Mole Gap. Here natural erosion maintains the open conditions required for the survival of this habitat type.

The site supports a range of species-rich chalk grassland types on steep slopes, dominated by red fescue Festuca rubra, sheep's-fescue F. ovina, quaking-grass Briza media and, in taller areas, upright brome Bromopsis erecta, tor-grass Brachypodium pinnatum and slender falsebrome grass Brachypodium sylvaticum. Typical herbs include salad burnet Sanguisorba minor, yellow-wort Blackstonia perfoliata and field scabious Knautia arvensis. The site supports important populations of the nationally scarce musk orchid Herminium monorchis and man orchid Aceras anthropophorum, the former occurring in areas of shorter turf. A range of more widespread but local orchids are also present, including autumn lady's-tresses Spiranthes spiralis and green-winged orchid Orchis morio, as well as commoner species, such as pyramidal orchid Anacamptis pyramidalis, fragrant orchid Gymnadenia conopsea and bee orchid Ophrys apifera.

The acidic plateau deposits on Headley Heath support acidic heathland, dominated by heather Calluna vulgaris, bell heather Erica cinerea and dwarf gorse Ulex minor, often mixed with grasses such as wavy hair-grass Deschampsia flexuosa and common bent Agrostis capillaris. Chalk heath occurs on a small area of Headley Heath where the special conditions allow both acid and lime-loving plants to grow side by side.

An old chalk mine is used as a winter roost by several species of bats.'

3.1.6 Qualifying features include a range of both habitats and species. Habitats include:

- *Taxus baccata* woods of the British Isles (Yew-dominated woodland)*;
- *Asperulo-Fagetum* beech forests (Beech forests on neutral to rich soils);
- European dry heaths;
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (Dry grasslands and scrublands on chalk or limestone);
- Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites). (Dry grasslands and scrublands on chalk or limestone, including important orchid sites); and
- Stable xerothermophilous formations with *Buxus sempervirens* on rock slopes (*Berberidion* p.p.) (Natural box scrub).

3.1.7 The natural habitats and species denoted with an asterisk (*) above are 'priority habitats' in Annex I of the Directive as described above. The term 'priority' is also used in other contexts, for example with reference to particular habitats or species that are prioritised in UK Biodiversity Action Plans. It is important to note, however, that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Directive or the Habitats Regulations.

3.1.8 The site is also designated for qualifying species, which include:

- Bechstein's bat *Myotis bechsteinii*; and
- great crested newt *Triturus cristatus*.

European Site Conservation Objectives for Mole Gap to Reigate Escarpment Special Area of Conservation (Natural England, 2014a)

3.1.9 The Conservation Objectives for a designated site set out the goals that are considered necessary to maintain or restore the qualifying features of a site to Favourable Conservation Status. Subject to natural change, the Conservation Objectives for the MGRE, are to maintain or restore:

- the extent and distribution of qualifying natural habitats and habitats of qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of qualifying species;
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- the populations of qualifying species; and
- the distribution of qualifying species within the site.

Site Improvement Plan – Mole Gap to Reigate Escarpment (Natural England, 2014b)

3.1.10 The Site Improvement Plan (SIP) is drafted by Natural England and provides a high-level overview of the issues (both current and predicted) affecting the condition of the Natura 2000 features on the site and outlines the priority measures required to maintain/improve the condition of the features.

3.1.11 The current priority issues for the MGRE SAC are:

- disease of natural box scrub;
- inappropriate scrub control;
- change in land management;
- public access/disturbance; and
- air pollution: risk of atmospheric nitrogen deposition.

3.1.12 There are several proposed actions to address the above priority issues.

3.1.13 The current position on site with regard to this is as follows (as described in the SIP with respect to these issues):

'The current situation for the SAC is that nitrogen deposition currently exceeds the site relevant critical load for ecosystem protection and therefore is a risk of harmful effects. However, the sensitive features are currently considered to be in a favourable condition on the site.'

3.1.14 The following actions are proposed in the SIP to address this issue:

- further investigation of the potential atmospheric impacts on the site; and
- monitoring the indicators of increased nitrogen deposition, such as increased vigorous grass growth, increase in tor-grass and other grasses and a decrease in orchid species through the use of fixed-point quadrat surveys over five years.

3.2 Ashdown Forest Special Area of Conservation

3.2.1 The Ashdown Forest SAC was designated in 2005 and covers approximately 2,700 hectares.

3.2.2 The SAC is one of the largest single continuous blocks of lowland heath in the south east of England. The site supports important assemblages of invertebrates, including nationally rare species and birds of European importance. The qualifying habitats for the Ashdown Forest SAC include:

- Northern Atlantic wet heaths with *Erica tetralix*; and
- European dry heaths.

3.2.3 This site is not designated for any Annex 1 priority habitats.

European Site Conservation Objectives for Ashdown Forest Special Area of Conservation (Natural England, 2018a)

3.2.4 Subject to natural change, the Conservation Objectives for Ashdown Forest SAC are, to maintain or restore:

- the extent and distribution of qualifying natural habitats and habitats of qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of qualifying species;
- the supporting processes on which qualifying natural habitats and habitats of qualifying species rely;
- the populations of qualifying species; and
- the distribution of qualifying species within the SAC.

3.3 Ashdown Forest Special Protection Area

3.3.1 The Ashdown Forest SPA forms part of a complex of heathlands in southern England that support breeding bird populations of European importance. It was classified in 1996 and covers approximately 3,200 hectares comprising lowland heathland and woodland. It has a different boundary to the SAC, but the two designations overlap.

3.3.2 The SPA qualifies under by supporting populations of European importance of the following species during the breeding season:

- Dartford Warbler *Sylvia undata*, 29 pairs representing at least 1.8% of the breeding population in Great Britain (Count as at 1994); and
- Nightjar *Caprimulgus europaeus*, 35 pairs representing at least 1.0% of the breeding population in Great Britain (Two-year mean, 1991 & 1992).

European Site Conservation Objectives for Ashdown Forest Special Protection Area (Natural England, 2019a)

3.3.3 Subject to natural change, the Conservation Objectives for Ashdown Forest SPA are, to maintain or restore:

- the extent and distribution of the habitats of the qualifying features;
- the structure and function of the habitats of the qualifying features;
- the supporting processes on which the habitats of the qualifying features rely;
- the populations of each of the qualifying features; and
- the distribution of the qualifying features within the SPA.

3.4 The Mens Special Area of Conservation

3.4.1 The Mens SAC is situated within the South Downs National Park and covers an area of 204.69 hectares.

3.4.2 It comprises an extensive area of mature beech *Fagus sylvatica* woodland that is rich in lichens, broyphytes, fungi and saproxylic invertebrates. It is one of the largest areas of Atlantic acidophilous beech forests in the south-eastern portion of this habitat's UK range. In addition, the woodland habitat supports a significant population of Barbastelle *Barbastella barbastellus* bats.

3.4.3 Qualifying interest features include:

- Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*); and
- Barbastelle *Barbastella barbastellus*.

European Site Conservation Objectives for The Mens SAC (Natural England, 2018b)

3.4.4 Subject to natural change, the Conservation Objectives for the Mens SAC, are to maintain or restore:

- the extent and distribution of qualifying natural habitats and habitats of qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of qualifying species;
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;

- the populations of qualifying species; and,
- the distribution of qualifying species within the SAC.

Site Improvement Plan – The Mens SAC (Natural England, 2015a)

3.4.5 The SIP for the site includes the following priority issues:

- forestry and woodland management;
- habitat connectivity;
- invasive species;
- change in land management;
- air pollution: risk of atmospheric nitrogen deposition; and
- public access/disturbance.

3.5 Ebernoe Common Special Area of Conservation

3.5.1 Ebernoe Common SAC is located within the South Downs National Park and covers 234.93 hectares.

3.5.2 The citation for the site provides the following description of the SAC (Natural England, 2019b):

'Ebernoe Common is a complex of ancient woodland blocks largely derived from ancient wood pasture. The northern and southern sections of the site contain woodland managed ashigh forest in more recent times. The site also contains 78 of the 100 ancient woodland indicator plants for south-eastern England.

Ebernoe Common is of national importance for colonies of barbastelle and Bechstein's bats, which use trees as summer maternity roosts where the female bats gather to give birth and rear their young. The bats also use the site as a foraging area and as flight paths for dispersal to their foraging territories both within and outside of the SSSI.

In addition to the reasons for notification, thirty three species of butterfly have been recorded from the across the site, including purple emperor Apatura iris, brown hairstreak Thecla betulae, grizzled skipper Pyrgus malvae, and dingy skipper Erynnis tages. Stag beetles Lucanus cervus have also been recorded and their presence is indicative of a significant wood pasture invertebrate interest. A total of eleven other bat species have been recorded from the site, including Brandt's bat Myotis brandtii, whiskered bat Myotis mystacinus, Leisler's bat Nyctalus leisleri, and grey long-eared bat P. austriacus.'

3.5.3 Qualifying interest features include:

- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*);
- Barbastelle *Barbastella barbastellus*; and
- Bechstein's bat *Myotis bechsteinii*.

European Site Conservation Objectives for Ebernoe Common Special Area of Conservation (Natural England, 2018c)

3.5.4 Subject to natural change, the Conservation Objectives for Ebernoe Common, are to maintain or restore:

- the extent and distribution of qualifying natural habitats and habitats of qualifying species;
- the structure and function (including typical species) of qualifying natural habitats;
- the structure and function of the habitats of qualifying species;
- the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- the populations of qualifying species; and
- the distribution of qualifying species within the SAC.

Site Improvement Plan – Ebernoe Common (Natural England, 2015b)

3.5.5 The SIP for the site includes the following priority issues:

- forestry and woodland management;
- off site habitat availability/management;
- habitat fragmentation;
- change in land management;
- hydrological changes;
- air pollution: risk of atmospheric nitrogen deposition; and
- public access/disturbance.

3.6 Thames Basin Heaths Special Protection Area

3.6.1 The Thames Basin Heaths SPA was designated in 2005 and covers an area of 8,311.06 hectares. It comprises a range of remnant heathland and woodland sites across northern Hampshire, Berkshire and Surrey that were once continuous but are now fragmented into separate blocks by development and farmland. The open heathland and mire habitats are interspersed by woodland (both coniferous and broadleaved) and dense scrub. The area of the SPA is also covered by 14 Sites of Special Scientific Interest (SSSI).

3.6.2 The SPA was designated under Article 4.1 of the Birds Directive (2009/147/EC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

- Dartford Warbler *Sylvia undata*, 445 pairs representing at least 27.8 % of the breeding population in Great Britain (Count as at 1999);
- Nightjar *Caprimulgus europaeus*, 264 pairs representing at least 7.8 % of the breeding population in Great Britain (Count mean (1998-99); and
- Woodlark *Lullula arborea*, 149 pairs representing at least 9.9 % of the breeding population in Great Britain (Count as at 1997).

3.6.3 The Conservation Objectives for the SPA (Natural England, 2014d) are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring:

- the extent and distribution of the habitats of the qualifying features;
- the structure and function of the habitats of the qualifying features;
- the supporting processes on which the habitats of the qualifying features rely;
- the population of each of the qualifying features; and,
- the distribution of the qualifying features within the SPA.

3.6.4 The Supplementary Advice on Conserving and Restoring Site Features for the Thames Basin Heaths SPA (Natural England 2014d) provides additional guidance on '*the range of ecological attributes on which the qualifying features will depend and which are most likely to contribute to a site's overall integrity*'.

3.7 Thursley, Ash, Pirbright and Chobham Special Area of Conservation

3.7.1 The Thursley, Ash, Pirbright and Chobham SAC (TAPC SAC) covers an area of 5,138 hectares. It covers the same geographical area as part of the Thames Basin Heaths SPA and comprises a range of remnant heathland and wetland transition sites across northern Hampshire and Surrey. In addition to its designation as an SAC, the same geographic area is covered by the Thames Basin Heaths SAC with the qualifying habitats of the SAC providing supporting habitat for the interest feature birds of the SPA.

3.7.2 The qualifying habitats for the TAPC SAC include:

- Depressions on peat substrates of the *Rhynchosporion*;
- Northern Atlantic wet heaths with *Erica tetralix*; and
- European dry heaths.

3.7.3 The Conservation Objectives for the SAC (Natural England 2018d) are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- the extent and distribution of the qualifying natural habitats;
- the structure and function (including typical species) of qualifying natural habitats; and
- the supporting processes on which qualifying natural habitats rely.

3.7.4 The Supplementary Advice on Conserving and Restoring Site Features (Natural England, 2016) provides additional detail regarding the interest features and what help contribute to overall integrity.

4 Stage 2 - Likely Significant Effect

4.1.1 This section deals with the screening of likely significant adverse effects on the qualifying features of the relevant Natura 2000 as a result of the construction and operation of the Project. The environmental pathways that could lead to a significant effect may be summarised as:

- direct injury/killing of an interest feature species, loss or damage of habitats within a designated site or of nearby areas used by interest species, including functionally linked land;
- change in management regimes (eg grazing/mowing) of habitats within a designated site or of nearby areas used by interest species;
- urbanisation that results in over shadowing, reduction of sight lines or which hinders flight paths;
- air quality;
- water quality;
- hydrological changes, including in the balance of saline and non-saline conditions;
- disturbance (activity, recreation, noise and lighting); and
- introduction or spread of non-native invasive species.

4.1.2 The possibility of the Project having a likely significant effect on any of the designated sites identified in Section 3 is discussed for each of these impact pathways in turn below.

4.1.3 Screening matrices for all the sites identified in Section 4 above are provided in Annex 1.

4.2 Direct Injury / Killing of an Interest Species, Loss or Damage of Habitats Used by Interest Species

4.2.1 As the Project is a minimum of 9 km away from the nearest Natura 2000 site, it would not result in any direct loss of any designated habitat within any of the designated sites.

4.2.2 Bird surveys undertaken during 2018/2019 (Appendix 9.6.2 of the PEIR) demonstrate that the Project site does not support any of the birds listed as interest features for Ashdown Forest SPA or other sites for which SPAs may be selected. As such, there is no risk of collision.

4.2.3 With respect to bat interest features at The Mens and Ebernoe Common, Natural England along with other nature conservation organisations, working with local authorities have produced draft guidelines for the assessment of potential effects on the SAC bat populations within Sussex (including The Mens and Ebernoe Common) at a landscape scale, recognising the importance of foraging/commuting habitat out with the formal designated sites (South Downs National Park Authority and Natural England, undated) . Based on existing information (Bat Conservation Trust (BCT), 2018), this requires that development up to 12 km from the SAC consider the potential for effects on the bats.

4.2.4 This distance mainly relates to Barbastelle bats, which have been recorded foraging up to 15 km from a roost (South Downs National Park Authority & Natural England undated). Bechstein's bats forage in/close to woodland within which they roost, travelling usually no more than 1-3 km (Schofield and Morris, 2000; Fitzsimons *et.al.*, 2002; Dietz, 2009). Recent work on the HS2 development radio tracking this species also found the majority of foraging activity within 3 km of a roost, with a single male recorded foraging at 5 km (HS2, 2013).

4.2.5 Given the above and in view of the distance of the Project from their boundaries, the potential for a likely significant effect on the bat populations of the MGRE, The Mens and Ebernoe Common SACs is considered to be limited. However, during consultation, Natural England requested that consideration was given to the potential for effects on these interest features from the Project.

4.2.6 Surveys with respect to bats have been undertaken for the Project site during 2019, 2020 and 2021 and are presented in Appendix 9.6.3 of the PEIR. Barbastelle activity across the site was very low. Therefore, the Project site is considered unlikely to provide a key area of habitat for the local population, including any bats from MGRE/The Mens/Ebernoe Common SACs. As such, no impact due to loss of habitat used by Barbastelle but outwith the SACs is considered likely to cause any significant effect and can be screened out on that basis.

4.2.7 Data with respect to Bechstein's bats show that the Project site is used by this species, with foraging/commuting areas focused along the River Mole corridor, Brockley Wood, Museum Field and a number of other woodland parcels. Whilst current surveys suggest this species is relatively widespread around Gatwick, particularly to the west, all bats were male/non-breeding females with the trapping/radio tracking later in the year picking up younger bats, probably dispersing from a maternity colony in the nearby wider landscape.

4.2.8 The landscape-scale study completed in 2020/21 confirmed the presence of a number of maternity colonies in blocks of ancient woodland within 5 km of Gatwick, particularly to the west (Glover's Wood and Ifield Wood).

4.2.9 Therefore, the radio tracking data show that bats using the airport are associated with these colonies rather than those present within the surrounding SACs. As such, given the current evidence, any short-term effects due to habitat loss on the Gatwick bat population would not constitute a likely significant effect on the SACs.

4.2.10 Consequently, it is concluded that the effects of direct injury/killing and habitat loss on qualifying features of any nearby designated sites can be screened out.

4.3 Change in Habitat Management Regimes

4.3.1 The majority of the existing land use immediately surrounding, and in the vicinity of, the Project site is agricultural land to the east and west with the towns of Horley and Crawley to the north and south, respectively.

4.3.2 The current management regimes for the Natura 2000 sites focus on maintaining the habitats for the qualifying interest features.

4.3.3 Given the distance from the Project site boundary to the Natura 2000 sites (the Project is a minimum of 9 km away from the

nearest Natura 2000 site), the Project would result in no change to current management regimes of any feature of a SPA or SAC.

4.3.4 Therefore, impacts occurring from a change in habitat management regimes can be screened out.

4.4 Urbanisation

4.4.1 Industrial development has the potential to overshadow areas of habitat within designated sites, or areas used by the interest features of such sites, as well as obstructing flight paths and lines of sight, reducing the appeal of the habitat or increasing the risk of fatalities through collisions.

4.4.2 The Project site is over 9 km from the nearest Natura 2000 site. Therefore, no part of such sites would be visible from within the Project site such that there could be an increase in overshadowing of habitats within the Natura 2000 sites or that support interest features for such sites. There is no potential for the Project to overshadow any of the habitats for which the Natura 2000 sites considered here have been designated.

4.5 Air Quality

4.5.1 The two air quality issues that could arise during construction are dust and increased traffic emissions, while those that could arise during operation are increased traffic and emissions from the airport operations.

4.5.2 Levels of understanding of air quality effects on semi-natural habitats and qualifying interest species of Natura 2000 sites are relatively in their infancy. The Air Pollution Information System (APIS) is a publicly available support tool for UK conservation and regulatory agencies, industry and local authorities to help assess the potential effects of air pollutants on habitats and species. It aims to enable a consistent approach to air pollution assessment across the UK. This specifically includes informing assessments required under the Habitats Regulations. Consequently, reference has been made to the information contained within the APIS website where relevant.

Construction Dust

4.5.3 The potential for dust release exists during the construction phase, with potential sources including site clearance, earthworks and vehicle movements.

4.5.4 For sensitive ecological receptors, the Institute of Air Quality Management (IAQM) guidance on the assessment of dust from demolition and construction sets out 50 metres as the distance from the site boundary and from the site traffic route(s) within which there could potentially be nuisance dust and PM_{10} effects.

4.5.5 The boundary of the closest Natura 2000 site is over 9 km away from the Project site; therefore, there is no pathway for construction dust to reach any of the designated sites.

4.5.6 As such, the impact of construction dust on the designated sites can be screened out, as no likely significant effects are anticipated.

Traffic - Operational and Construction

4.5.7 The major impacts of air pollutants on habitats in the UK as a result of traffic are increases in nitrogen deposition and acidification. According to the Highways Agency's Design Manual for Roads and Bridges (DMRB), the contribution of vehicle emissions from the roadside to local pollution levels is not significant beyond 200 metres from a road (Highways England *et al*, 2019). This is therefore the distance that has been used to determine whether Natura 2000 sites are likely to be significantly affected by traffic emissions associated with the Project.

4.5.8 As set out in Chapter 12 Traffic and Transport, no quantifiable traffic increases on roads within 200 metres of the sites are anticipated during construction. Therefore, the effect from traffic-related pollution during construction is screened out from further assessment as it can be concluded that it would not have a likely significant effect on any of the designated sites.

4.5.9 Similarly, both The Mens and Ebernoe Common SACs are located more than 20 km from the Project site with no major road that may be used to travel to Gatwick nearby. As such, there is no potential for changes to vehicle emissions resulting from the operation of the Project due to increases in traffic within 200 metres of these sites.

4.5.10 Modelling of emissions to air from changes in traffic flows associated with the Project have been completed and are reported in Chapter 13: Air Quality of the PEIR. These have considered changes to both the aerial concentration of nitrous oxide NO_x and the rate of deposition of nutrient nitrogen. Two scenarios have then been considered:

- the Project only, ie only those changes in Annual Average Daily Traffic (AADT) associated with the Project (a 'do something' scenario), when compared to a future baseline in the absence of the Project ('do nothing' scenario); and
- a cumulative scenario that compares a future baseline 'do nothing' scenario in the absence of anticipated growth due to major infrastructure and local plans (see Chapter 19 for full details of the plans/projects considered) and a 'do something' scenario that includes these plans and projects alongside the contribution from the Project.

4.5.11 The cumulative scenario is considered in Section 5 below.

4.5.12 The modelling assumes a reduction in background nitrogen deposition due to the effect of general improvements to air quality of 1.12% per annum (derived from JNCC, 2020). Such a reduction was included in the modelling with respect to the Teesmouth Combined Cycle Power Plant DCO. In granting development consent for that project, the Secretary of State concluded that there would be no in-combination effect on the SPA/Ramsar site due to air quality (BEIS, 2019), despite that project predicting a small increase in nutrient nitrogen deposition on the site. In reaching this conclusion, on the advice of Natural England, the Secretary of State cited evidence provided by the applicant of the continued improvement to air quality both nationally (as a result of the implementation of various policy measures) and locally (due to the expected continued decline in background levels from pollution sources no longer in operation).

4.5.13 Similar reductions have been used in several similar assessments with respect to local plan Habitats Regulations Assessments, eg Bracknell Forest Council (WSP, 2021) and Guildford Borough Council (AECOM, 2019). The latter included an assessment of the modelled fall in oxidised nitrogen deposition (ie that derived from NO_x) presented on APIS over time. This showed a circa 3% per annum improvement between 2005 and 2014 (the years for which data were available at the time of the report). Current data on APIS (APIS 2021) show that whilst the rate of background improvement has slowed since 2016, the overall trend is still towards improvement. Therefore, for the purposes of this assessment, a lower rate of reduction(1.12%) has been assumed. Further work will ascertain the potential for a higher reduction to be applied, if appropriate.

4.5.14 The threshold for the consideration of a potential effect on a designated site is two-fold (adapted from Natural England's guidance (Natural England, 2018f)):

- a threshold of a change in AADT of >1,000; and
- where that occurs, a change between the 'do nothing' and 'do something' scenarios of >1% of the relevant critical level/load.

4.5.15 The 1% of the critical level/load threshold is the point at which a more detailed assessment of the potential for effects should be

undertaken; it does not automatically imply that an adverse effect will occur. That judgement requires more detailed assessment based on available scientific research and consideration of the conservation objectives of the site. The relevant lower critical load for the habitats within the SPA is 10 kgN.ha^{-1}.yr^{-1} (APIS, 2021).

4.5.16 Although the potential effects of NO_x-derived nitrogen deposition are an established basis for assessment, there is no current guidance on how to include nitrogen deposition derived from ammonia (NH_3). Discussions are ongoing with Natural England and other stakeholders, such as Highways England, on this issue and (if necessary) the approach to any appropriate modelling of potential effects and any relevant input assumptions to include. The assessment below shows the potential effects of NO_x derived nitrogen deposition only; however, following these further discussions with key stakeholders, the assessment may be refined and updated where required to consider ammonia as part of the shadow HRA submitted as part of the ES in support of the application for development consent.

4.5.17 Traffic modelling shows that at all locations within Ashdown Forest SAC/SPA and TAPC SAC/Chobham Common SSSI component of the Thames Basin Heaths SPA, there are no changes in AADT levels that are greater than 1,000 (Figure 4.5.1 and 4.5.2, respectively). As such, effects from emissions to air from changes in traffic flow arising from the Project by itself at these sites can be screened out as not having a significant effect.

4.5.18 With respect to the MGRE SAC (Figure 4.5.3), traffic modelling shows a single location where the change in AADT due to the Project is predicted to exceed 1,000, on the M25 between Junctions 8 and 9. The modelling of aerial emissions shows that the changes in air quality between the future baseline scenario and the with Project scenario (the 'do nothing' and the 'do something' scenarios) in this location is <1% of the relevant critical level for NO_x (Figure 4.5.5) and of the critical load for nutrient nitrogen deposition (15 kgN.ha^{-1}.yr^{-1}) (Figure 4.5.7).

4.5.19 On this basis, therefore, effects on the MGRE SAC due to changes in emissions from traffic arising from the Project by itself can be screened out as not having a significant effect.

4.5.20 Similarly, the change in AADT at Junction 10 along the M25 adjacent to the Ockham and Wisley Commons SSSI component of the Thames Basin Heaths SPA is greater than 1,000 (Figure 4.5.4). Further modelling of the changes in air quality show that the change in NO_x concentration between the 'do nothing' and 'do something' scenario is 0.3 µg.m^{-3} (i.e. <1% of the critical level of 30 µg.m^{-3}) (Figure 4.5.6), the maximum nitrogen deposition rate is also <1% of the relevant critical load (10 kgN.ha^{-1}.yr^{-1}) (Figure 4.5.8).

4.5.21 On this basis, therefore, effects on the Thames Basin Heaths SPA due to changes in emissions from traffic arising from the Project by itself can be screened out as not having a significant effect.

4.6 Water Quality/Hydrological Changes

4.6.1 The quality of the water entering Natura 2000 and Ramsar sites is an important determinant of habitat condition and hence the species they support. Poor water quality can have a range of ecological impacts.

4.6.2 There are no hydrological links between the Natura 2000 sites considered here and the Project site, with the exception of the MGRE SAC.

4.6.3 A section of the River Mole runs through GAL land and is to be diverted in order to facilitate the proposed works. The River Mole then runs north west, where it eventually reaches the MGRE SAC. A 140 metre section runs through the SAC, before continuing to run adjacent to (but outwith) the MGRE SAC.

4.6.4 The MGRE SAC in this location is designated for its chalk grassland escarpment habitats, specifically, the *Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia) (*important orchid sites)*. As the River Mole sits at the bottom of the escarpment, there is no ecological pathway for the water to influence the chalk habitats on site.

4.6.5 As such, there is no potential for likely significant effects due to changes to the water environment from the Project on any SAC and this issue can therefore be screened out on this basis.

4.7 Disturbance

4.7.1 Disturbance can be caused by activity, recreation, noise and lighting. The Project site is more than 9 km from the nearest Natura 2000 site. As such, there is no potential for any direct disturbance on such sites and all such effects can be screened out as not significant.

4.7.2 With respect to indirect effects on bats using the site that might be associated with the surrounding SACs, data collected in 2019, 2020 and 2021 suggest that bats of all species are using the wider airport site, despite the degree of existing lighting/disturbance; Bechstein's bat, for example, have been radio-tracked moving over the airfield.

4.7.3 As described above, the population of Bechstein's present is considered highly unlikely to be linked to the SACs, given the distance from the Project site. As such, any minor effects on the Bechstein's as a result of the Project are addressed within the PEIR and will be subject to appropriate avoidance measures. However, for the purposes of this Habitats Regulations Assessment, no likely significant effects on the bats associated with the SACs are considered likely and so the potential for indirect disturbance on such sites and all such effects can be screened out on that basis.

4.8 Introduction or Spread of Non-native Invasive Species

4.8.1 The movement of people and traffic, as well as importation of material and plants to a site, can result in the introduction of non-native species to a site. While several non-native species are currently known to be present on site, given the distance to the nearest Natura 2000 site, there is no pathway by which such species could be spread into such sites.

4.8.2 Given this, the issue of introduction and spread of non-native species is therefore screened out from further consideration in this assessment on the grounds of not likely to have a significant effect on any of the designated sites.

4.9 Conclusion

4.9.1 At this stage, following the screening, no likely significant effects have been identified for any sites or interest features with respect to the issues direct killing/injury, loss of/damage to habitat, of change in habitat management, changes in air quality during construction (from both vehicle movement and dust generation) and operation, water quality/hydrology, disturbance and introduction or spread of non-native invasive species.

4.9.2 These conclusions will be refined as the Project evolves with a final updated conclusion to be submitted with the ES.

5 Stage 4 - In-combination Assessment

5.1 Introduction

5.1.1 Regulation 63 of the Habitats Regulations requires that, prior to granting consent, a competent authority has to be satisfied that a plan or project will not have an adverse effect on the integrity of

Natura 2000 sites either alone or in combination with other plans or projects. Therefore, this section of the HRA considers the potential for such in combination effects with other plans or projects in the area.

5.1.2 This section assesses the cumulative effects of the Project, with other proposed developments near the Project site that are currently in the planning process or have been approved but are not yet constructed. These have been reviewed for relevance with respect to European designated sites with the following considered further.

5.1.3 The process of identifying other consented or proposed developments and screening to create a shortlist of those having potential for cumulative effects with the Project is described in Chapter 19 of the PEIR. Appendix 19.4.1 lists the shortlisted cumulative developments and the tier they have been assigned (reflecting the level of certainty regarding each development's likelihood of being realised) in accordance with Planning Inspectorate Advice Note 17 (Planning Inspectorate, 2019).

5.2 Cumulative Screening of Likely Significant Effects

5.2.1 An assessment of the ecological impacts of the Project is set out in Chapter 9: Ecology and Nature Conservation of the PEIR. The list of other projects and plans (with planning application reference) is provided within the cumulative effects assessment (CEA) section of that chapter. However, most of these developments do not have potential direct or indirect effects on the Natura 2000 designated sites, given the distance to such sites from the Project site.

5.2.2 Bechstein's bat was not confirmed to be present on any Tier 1 or 3 site. However, bats from the *Myotis* family were recorded and there is potential for some of those to be Bechstein's bat.

5.2.3 The majority of the Tier 1 and 3 developments are associated with existing built up areas within Gatwick, Horley and Crawley which comprise urban habitats unlikely to be of value to Bechstein's bats. Based on the landscape scale study completed in 2020/21, the Bechstein's bats recorded on the Project site are considered to be part of a population centred around higher value habitat to the west of Gatwick. There are few developments proposed in the area between and those that are proposed are small and unlikely to significantly affect Bechstein's bat habitat. As such, cumulative effects on the wider population of this species from the Project and other proposed developments are considered unlikely.

5.2.4 Barbastelle bats were recorded at one development, Forge Wood, a large residential lead development approximately 1.6 km south of the Project site boundary. The low detection rate of barbastelle both within the Project site and the Tier 1 and 3 developments suggests they do not frequently utilise habitats in close proximity to urban areas, or that the population in the area is very small. Larger areas of woodland within the surrounding landscape are predominantly not affected by proposed developments. As such, cumulative effects on barbastelle are also considered unlikely.

5.2.5 Potential effects on Natura 2000 sites could also occur through cumulative changes in operational traffic flows. Therefore, as described in paragraph 4.5.10 above, a detailed strategic traffic model has been created that includes the change in traffic flows due to local plans within 10 km of the designated sites and passive growth beyond this. This allows for a comparison between a 'do nothing' scenario without this growth and a 'do something' with the growth included, as required by Natural England's guidelines with respect to the assessment of air quality impacts arising from cumulative traffic growth (Natural England 2018e).

5.2.6 Cumulative traffic data are presented in Chapter 12 Traffic.

5.2.7 Data show that there are no cumulative increases in AADT levels greater than 1,000 on any road link through the Ashdown Forest SAC/SPA (Figure 4.5.1). As such, no cumulative effects from changes in traffic emissions are predicted.

5.2.8 With respect to the MGRE SAC, cumulative traffic flow increases are predicted to exceed 1,000 AADT in several locations (Figure 4.5.3). Therefore, further modelling of changes in air quality has been completed. The results predict no exceedance of the critical level for NO_x at any location (Figure 5.2.1). As such, no cumulative effects from NO_x emissions are predicted.

5.2.9 With respect to the corresponding nitrogen deposition, this is also predicted to be <1% of the critical load at all locations (Figure 5.2.4). As such, no cumulative effects from nitrogen deposition are predicted.

5.2.10 For the TAPC SAC/Chobham Common SSSI component of the Thames Basin Heaths SPA, the only location where the change in cumulative AADT is predicted to exceed 1,000 is along the M3 (Figure 4.5.2); the resulting cumulative NO_x concentration (Figure 5.2.2) is >1% of the relevant critical level. This issue is therefore taken through for appropriate assessment below. The resulting cumulative nitrogen deposition is <1% of the relevant critical load (Figure 5.2.5) and, as such, no cumulative effects are predicted.

5.2.11 Data for the Ockham and Wisley Commons SSSI component of the Thames Basin Heaths SPA at Junction 10 of the M25 show cumulative increases in AADT of up to 16,747 on the M25 and 14,455 on the A3 at the Wisley Interchange (Figure 4.5.4). Consequent air quality modelling shows the predicted change in NO_x concentration (Figure 5.2.3) and nitrogen deposition (Figure 5.2.6) are both >1% of the relevant critical load/level up to circa 100 metres from the roads Therefore, this issue is taken through for appropriate assessment.

5.2.12 To note, the assessment does not include NH_3-derived nitrogen deposition at this stage. As set out above, the assessment may be refined and updated to consider ammonia (where necessary) as part of the shadow HRA submitted as part of the ES in support of the application for development consent.

5.2.13 No other pathways for cumulative impacts exist and, as such, no other cumulative effects are considered likely.

5.3 Cumulative Appropriate Assessment

5.3.1 The Habitats Regulations set out that where a significant effect cannot be ruled out, the Competent Authority should make an appropriate assessment of the implications of the plan or project in view of the conservation objectives of the designated site.

5.3.2 The following analysis therefore makes reference to the conservation objectives of the sites, as necessary, and considers whether an adverse effect on integrity is possible.

Air Quality and Thursley, Ash, Pirbright and Chobham SAC

5.3.3 Data from air quality modelling with respect to the cumulative scenario for the TABC SAC shows that the NO_x concentration is predicted to exceed 1% of the relevant critical level at five locations directly adjacent to the M3. In this location, the site comprises a mown grass embankment, probably created when the M3 was built. On this basis, therefore, the habitats for which the SAC is designated will not occur in this location and as such, no adverse effect on integrity is likely.

Air Quality and Chobham Common SSSI Component of the Thames Basin Heaths SPA

5.3.4 As set out previously, the Thames Basin Heaths SPA was designated for supporting populations of European importance of the following species:

- Dartford warbler;
- Nightjar; and
- Woodlark.

5.3.5 Dartford warbler are small, insectivorous birds, resident in Britain and associated exclusively with heathland, favouring gorse with heather understorey for nesting (Bibby & Tubbs, 1975). Being dependant on invertebrates as prey, they are strongly associated with heathland areas that provide year-round sources of such food, ie where there is sufficient habitat variation to do so. Dartford warbler have therefore been shown to have a strong affinity for heathland (Bibby, 1979) and a negative association with woodland (van der Berg *et al*., 2001).

5.3.6 Nightjar are summer visitors to the UK, arriving to breed around May and typically departing around August. They are also insectivorous, feeding on flying insects such as moths. They breed in open heathland and typically forage across heathland and early stage plantation but require such foraging to be close to their nesting territories and will actively avoid foraging in established woodland (Sharps *et al*., 2015).

5.3.7 Woodlark are associated with short vegetation for foraging (feeding mainly on spiders and beetles), interspersed with taller, dense vegetation for nesting, frequently tall heather or grass (Mallord *et al*., 2007).

5.3.8 Breeding bird surveys undertaken in 2016, 2017 and 2018 to inform the M25 J10/A3 Wisley Interchange Development Consent Order (DCO) (HE, 2019) did not record any of the interest feature species within the woodland that borders the A3/M25, only within the heathland. This is consistent with previous survey work undertaken both on the Ockham and Wisley Commons SSSI and elsewhere across the wider SPA. For example, a review of bird survey data for the Ockham and Wiseley Commons SSSI to inform nearby development (EPR, 2015) found that the nearest SPA bird territories to either the A3 or M25 were approximately 300 metres from the roadside. Similar patterns in bird distribution data have been observed at Chobham Common SSSI along the M3 corridor (2Js Ecology monitoring data, as reported in Jacobs 2019).

5.3.9 As such, the habitats present in the area directly adjacent to the M3 where the exceedance occurs are not considered to support the interest feature birds either breeding or foraging and therefore, no adverse effect on the integrity of the SPA is considered likely.

Air Quality and Ockham and Wisley Common SSSI Component of the Thames Basin Heaths SPA

5.3.10 Given the exceedance of the 1% threshold, in particular for nitrogen deposition, at the Ockham and Wisley SSSI component of the Thames Basin Heaths SPA, a detailed assessment of effects is necessary before any conclusion with respect to whether such effects may be adverse to integrity is required.

5.3.11 The Ockham and Wisley Commons SSSI component of the Thames Basin Heaths comprises areas of open heathland (circa 78 hectares) and Scots pine-dominated mixed woodland/plantation woodland (around 143 hectares). The woodland occurs in linear strips alongside both the A3 and M25. All three interest feature species have historically been recorded within the SSSI.

5.3.12 In the cumulative 'do something' scenario, nitrogen deposition derived only from NO_x would exceed 1% of the relevant lower critical load for the habitats within the SPA (10 $kgN.ha^{-1}.yr^{-1}$ – taken from APIS) across an area of circa 100 metres to the west of the A3 and slightly less elsewhere (Figure 5.2.6).

5.3.13 The Conservation Objectives for the SPA are detailed in Section 3.6.3 above.

5.3.14 Figure 5.2.6 shows that the increases in NO_x-derived nitrogen deposition associated with the cumulative 'do something' scenario only exceeds 1% of the minimum critical load within areas of woodland (within 100 metres of the edge of the carriageways).

5.3.15 It is understood that the role of the woodland surrounding the SSSI in supporting the function of the SPA was discussed at the Examination of the M25 J10/A3 Wisley Interchange DCO. Natural England's response to Second Written questions from the Examining Authority (ExA) (Natural England, 2020) set out that the achievement of favourable condition for the Ockham and Wisley Commons component of the Thames Basin Heaths is dependent on the improvement of the conditions of the existing heathland and not the expansion of heathland through large-scale felling of woodland. Further, Natural England provided advice to retain the woodland buffers as evidence existed that the presence of the trees dispersed vehicle emissions away from sensitive habitats.

5.3.16 In addition, the Statement of Common Ground with Natural England for this DCO (Highways England, 2020) recognises that whilst the woodland buffer may contribute to the invertebrate resource within the SPA, it does not support the qualifying bird species.

5.3.17 Therefore, on the basis that the role of the woodland is as a buffer between the heathland and the M25/A3, rather than as a supporting habitat of interest feature birds within the SPA, adverse effects on the integrity of the SPA from additional NO_x-derived nutrient nitrogen deposition within the woodland would not occur.

6 References

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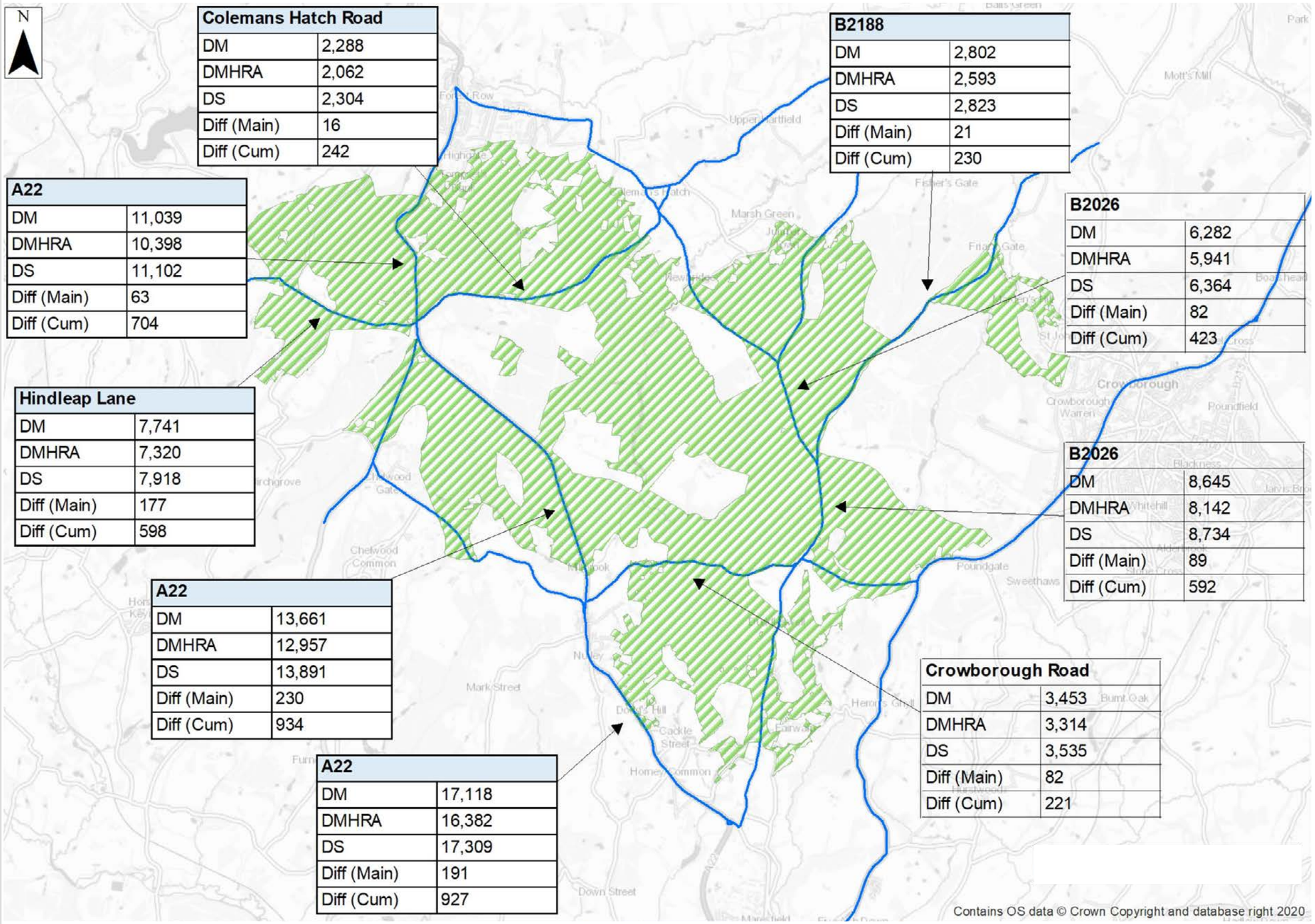
7 Glossary

7.1 Glossary of terms

Table 7.1.1: Glossary of Terms

Term	Description
APIS	Air Pollution Information System
AADT	Average Annual Daily Traffic
CEA	Cumulative Effects Assessment
CJEU	Court of Justice of the European Union
DCLG	Department for Communities and Local Government
DMRB	Design Manual for Roads and Bridges
EIA	Environmental Impact Assessment
ES	Environmental Statement
GAL	Gatwick Airport Limited
HRA	Habitats Regulations Assessment
IAQM	Institute of Air Quality Management
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MGRE	Mole Gap to Reigate Escarpment
PEIR	Preliminary Environmental Information Report
pSAC	Proposed Special Area of Conservation
pSPA	Proposed Special Protection Area
SAC	Special Area of Conservation
SIP	Site Improvement Plan
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest



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DOCUMENT
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DRAWING TITLE
Ashdown Forest SAC & SPA Traffic data (annual average daily traffic – AADT)

DATE
September 2021

ORIENTATION	DRAWING NO.	REVISION
N	Figure 4.5.1	For PEIR Issue
	DRAWN BY: AJC	PM / CHECKED BY: MS

SCALE @ A3
0 1.5 3 km

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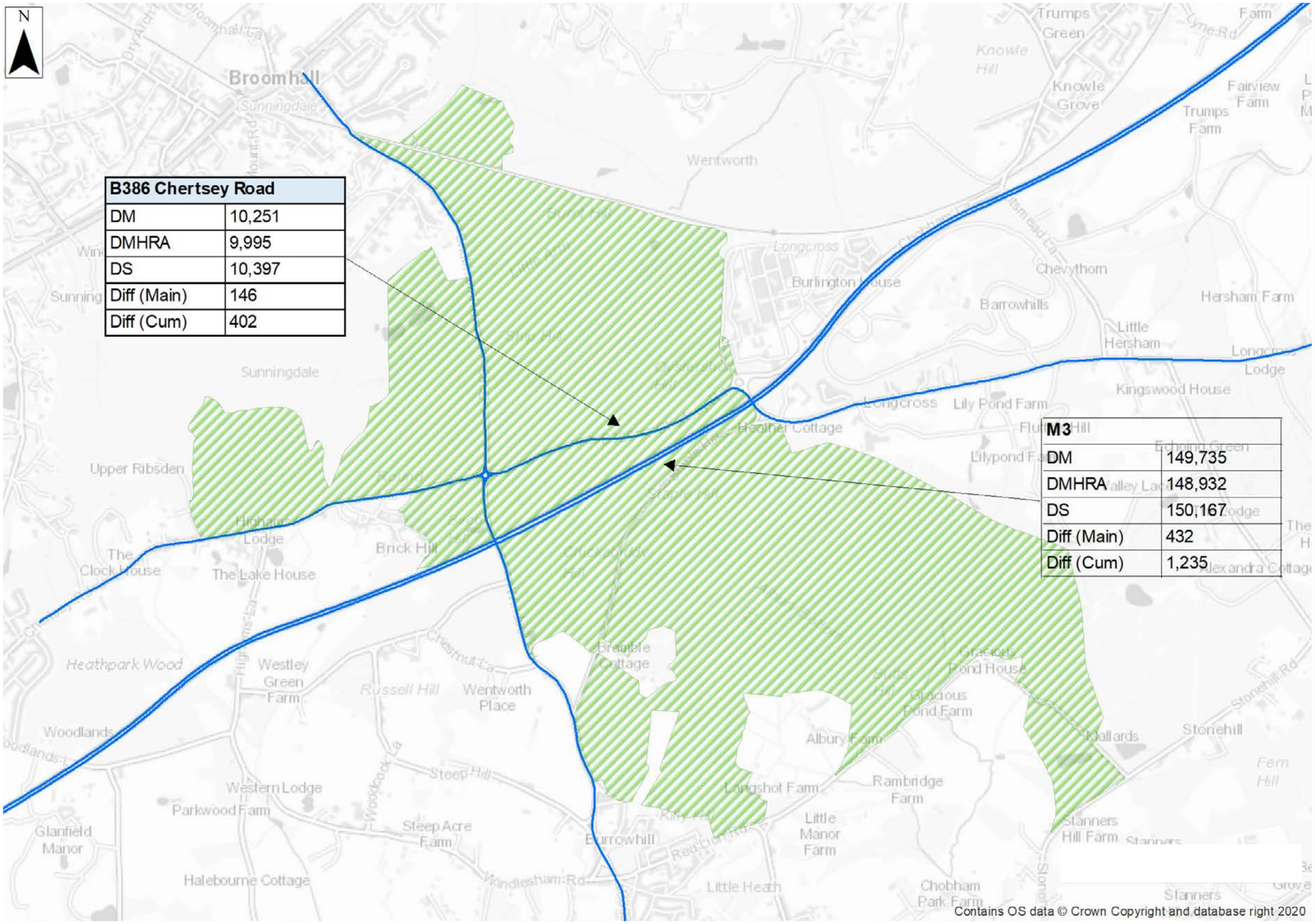

B386 Chertsey Road	
DM	10,251
DMHRA	9,995
DS	10,397
Diff (Main)	146
Diff (Cum)	402

M3	
DM	149,735
DMHRA	148,932
DS	150,167
Diff (Main)	432
Diff (Cum)	1,235

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Thursley, Ash, Pirbright & Chobham SAC Traffic data (annual average daily traffic – AADT)

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SCALE @ A3
0 0.5 1 km

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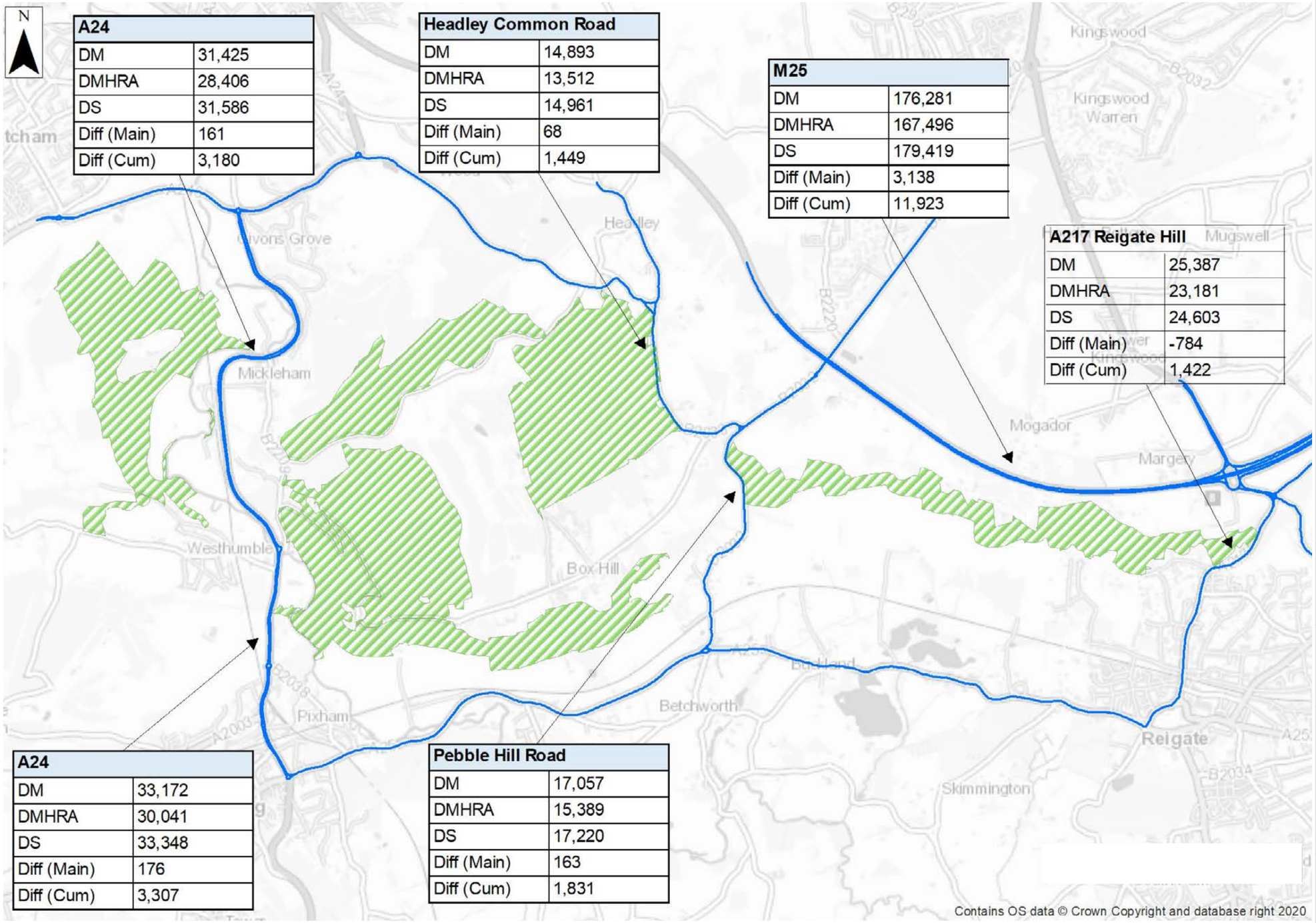

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Mole Gap to Reigate Escarpment SAC Traffic data (annual average daily traffic – AADT)

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September 2021

ORIENTATION	DRAWING NO.	REVISION
N	Figure 4.5.3	For PEIR Issue
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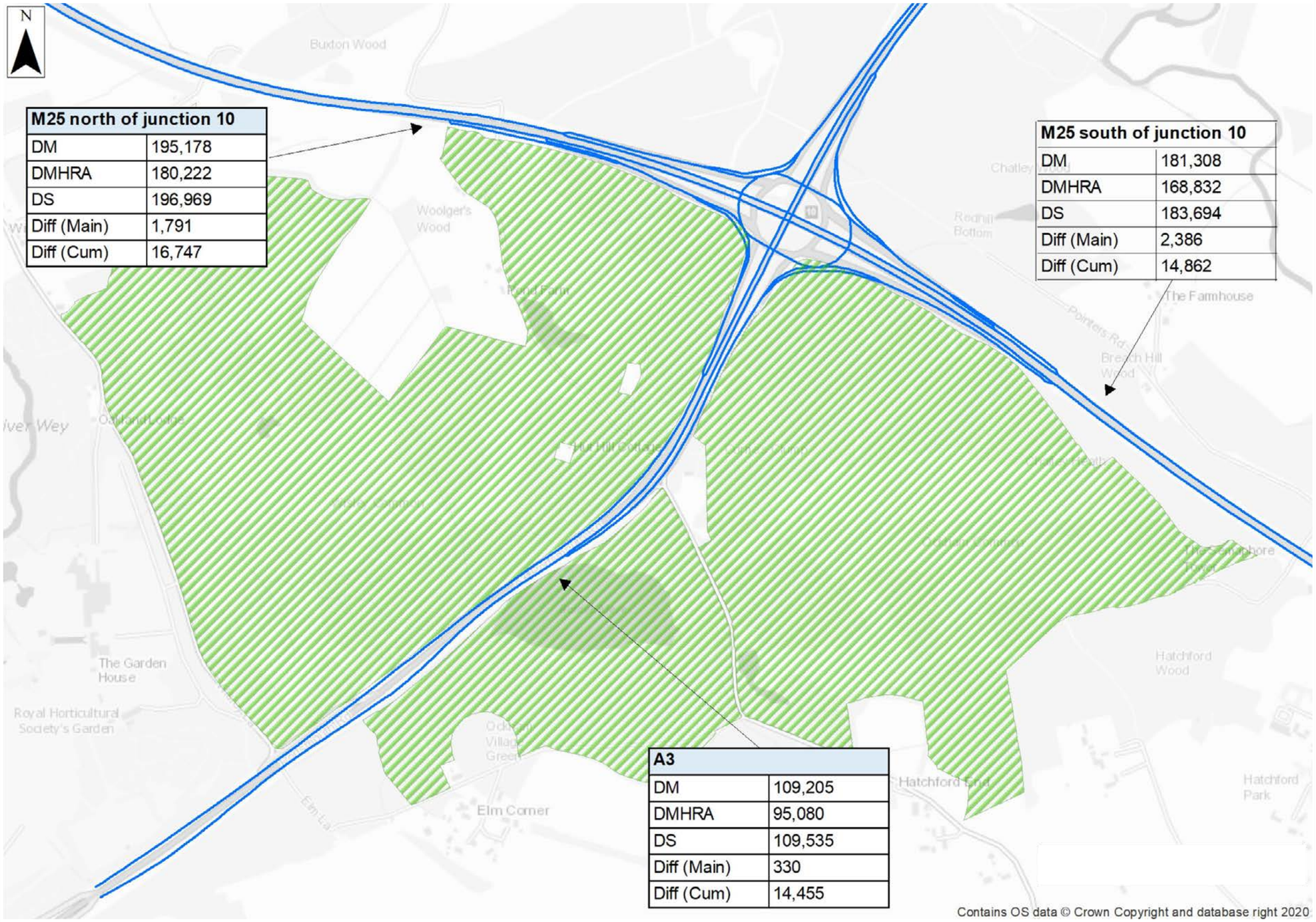
SCALE @ A3

0 1 2 km



M25 north of junction 10	
DM	195,178
DMHRA	180,222
DS	196,969
Diff (Main)	1,791
Diff (Cum)	16,747

M25 south of junction 10	
DM	181,308
DMHRA	168,832
DS	183,694
Diff (Main)	2,386
Diff (Cum)	14,862

A3	
DM	109,205
DMHRA	95,080
DS	109,535
Diff (Main)	330
Diff (Cum)	14,455

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Thames Basin Heaths SPA Traffic data (annual average daily traffic – AADT)

DATE
September 2021

ORIENTATION	DRAWING NO.	REVISION
N	Figure 4.5.4	For PEIR Issue
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SCALE @ A3
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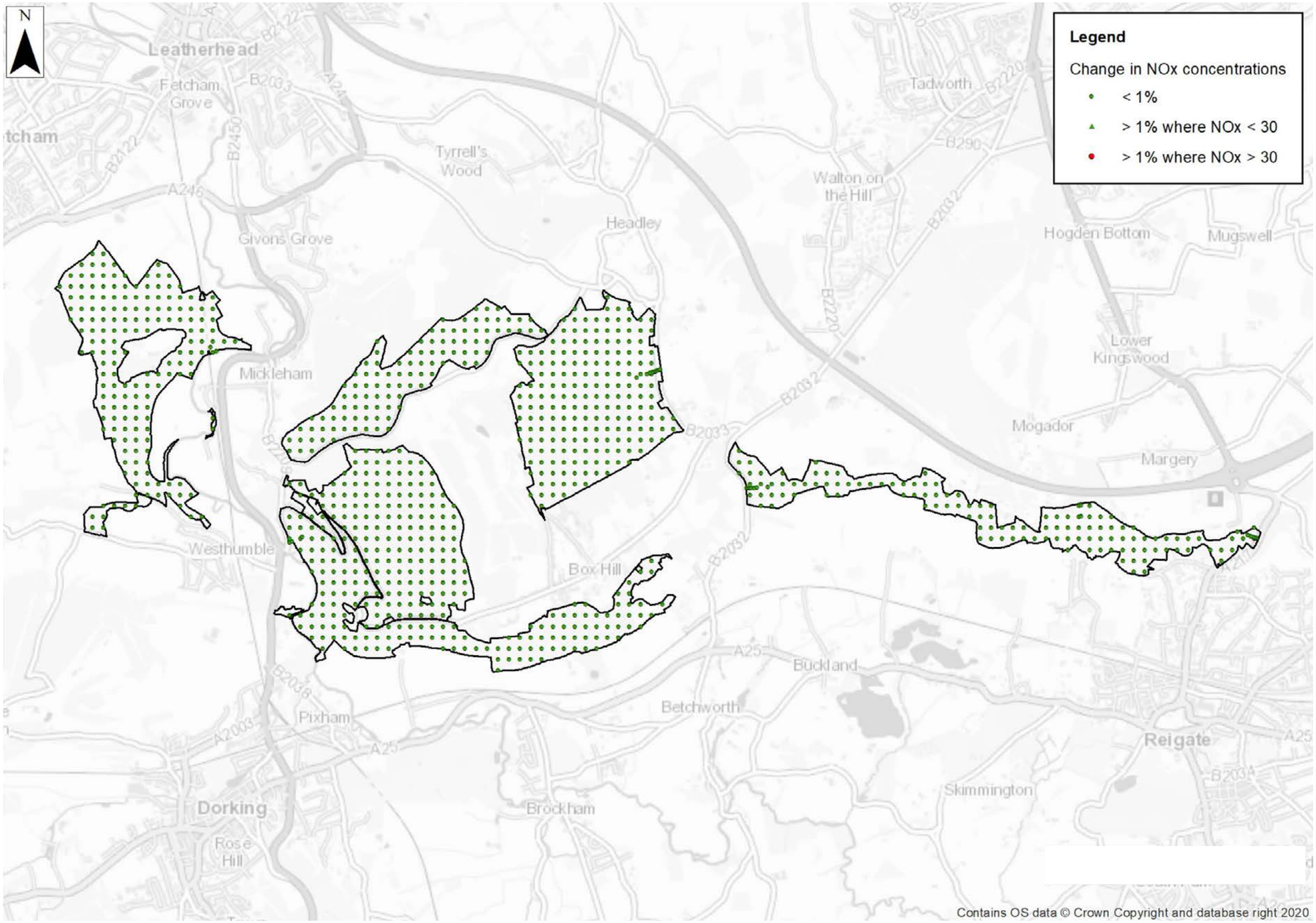

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DRAWING TITLE
Mole Gap to Reigate Escarpment SAC Change in NOx concentrations – NRP only

DATE
September 2021

ORIENTATION	DRAWING NO.	REVISION
N	Figure 4.5.5	For PEIR Issue
	DRAWN BY: AJC	PM / CHECKED BY: MS

SCALE @ A3

0 1 2 km

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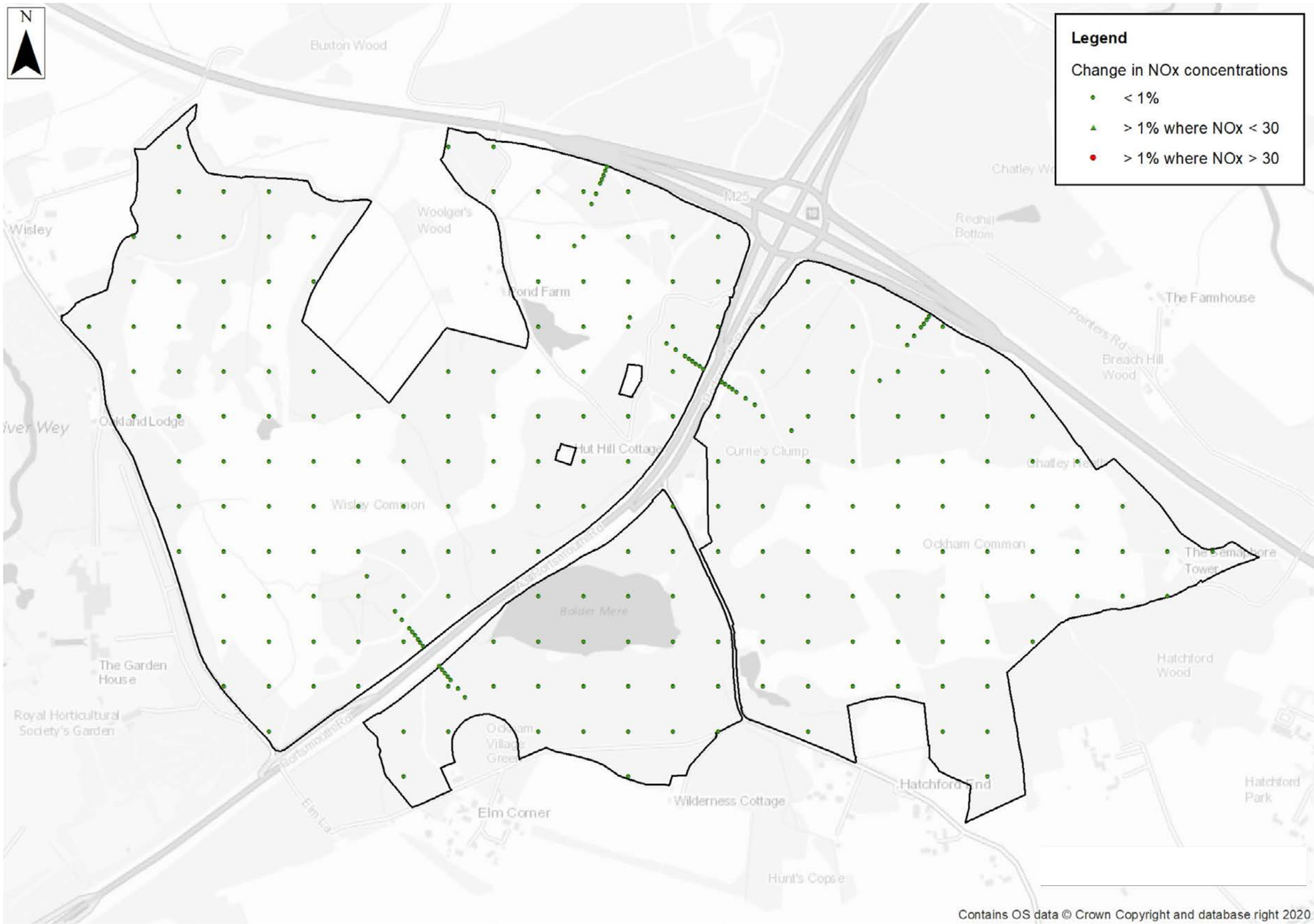

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DRAWING TITLE
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DATE
September 2021

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SCALE @ A3

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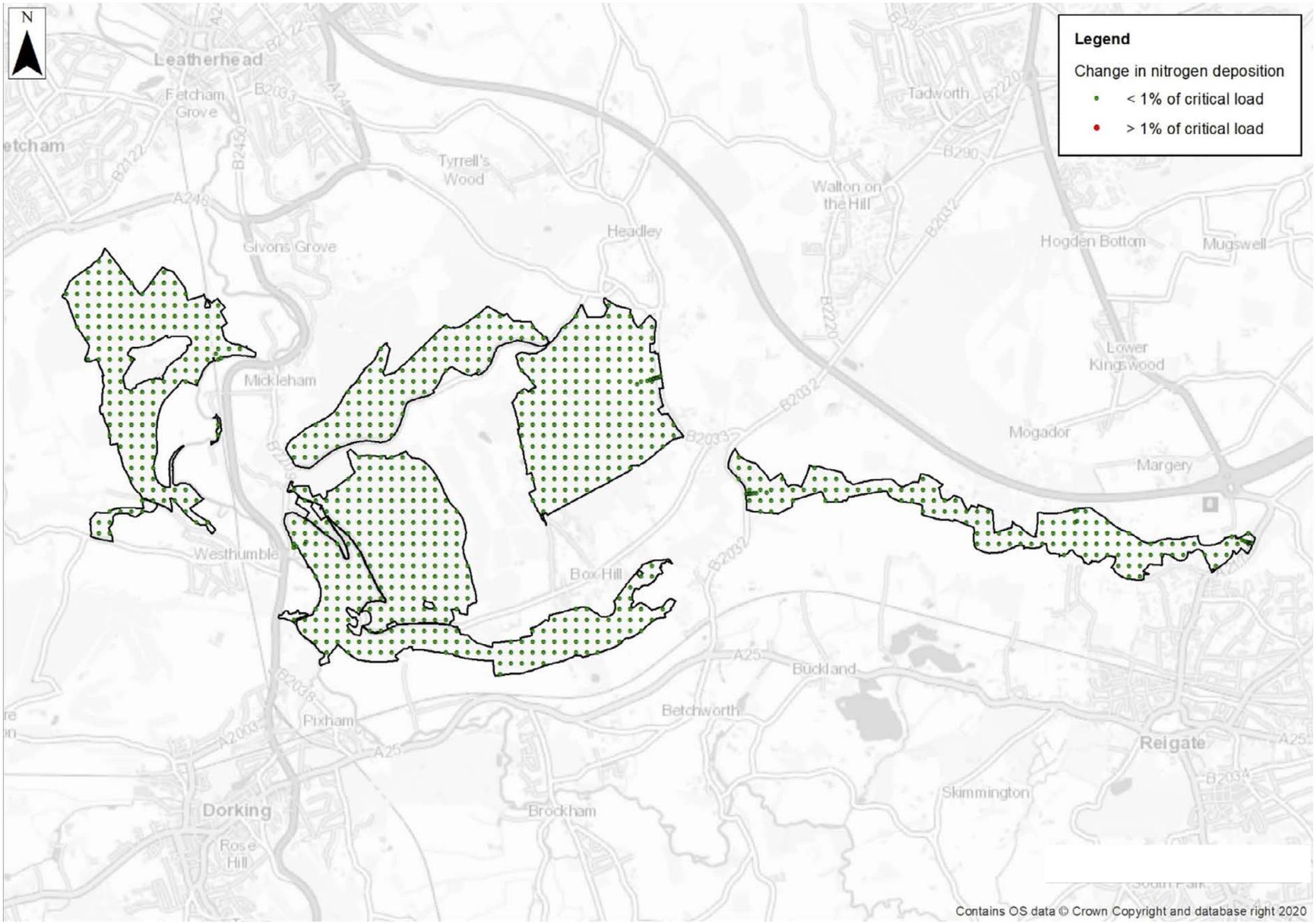

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DRAWING TITLE
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DATE
September 2021

ORIENTATION	DRAWING NO.	REVISION
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SCALE @ A3

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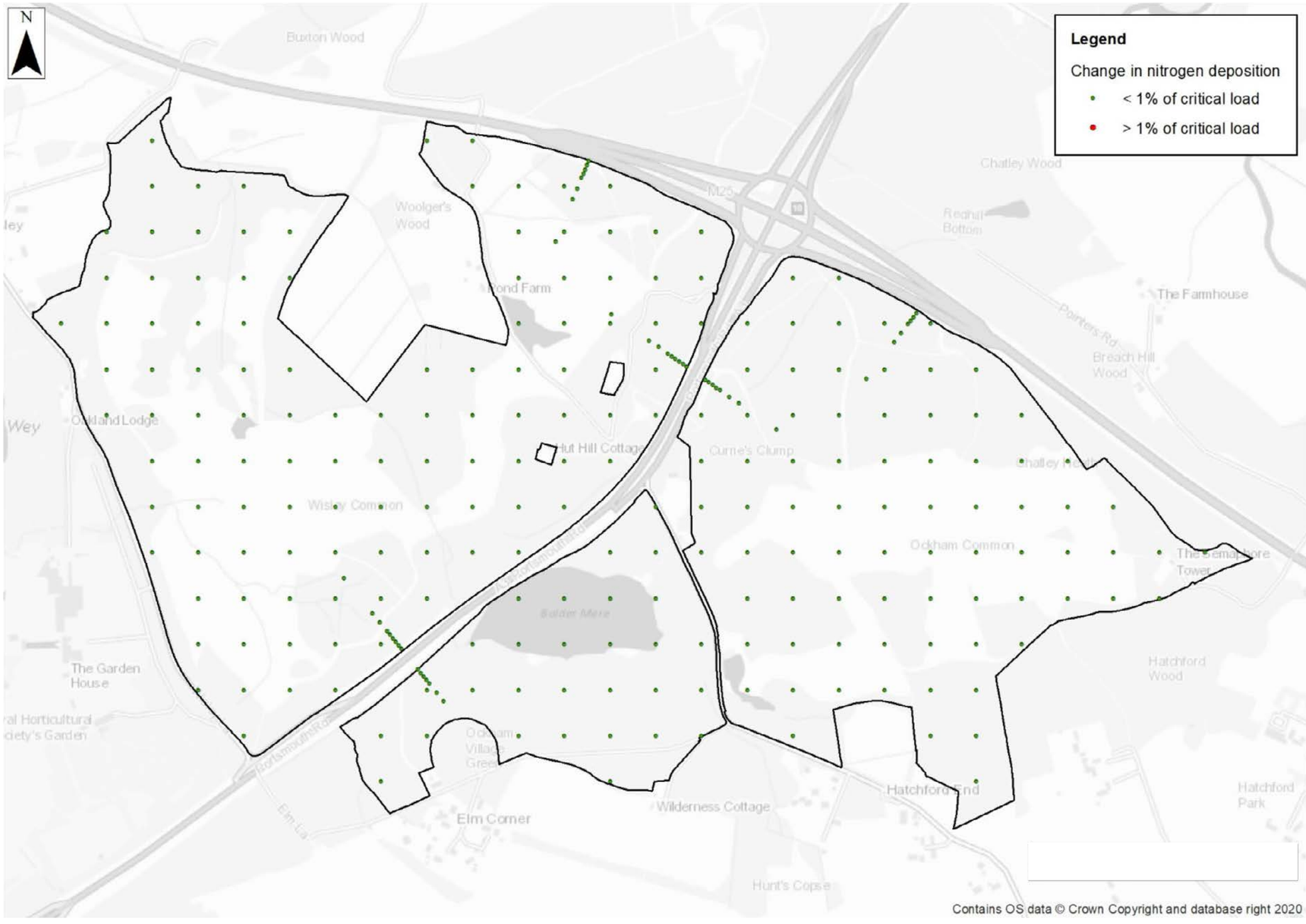

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September 2021

ORIENTATION	DRAWING NO.	REVISION
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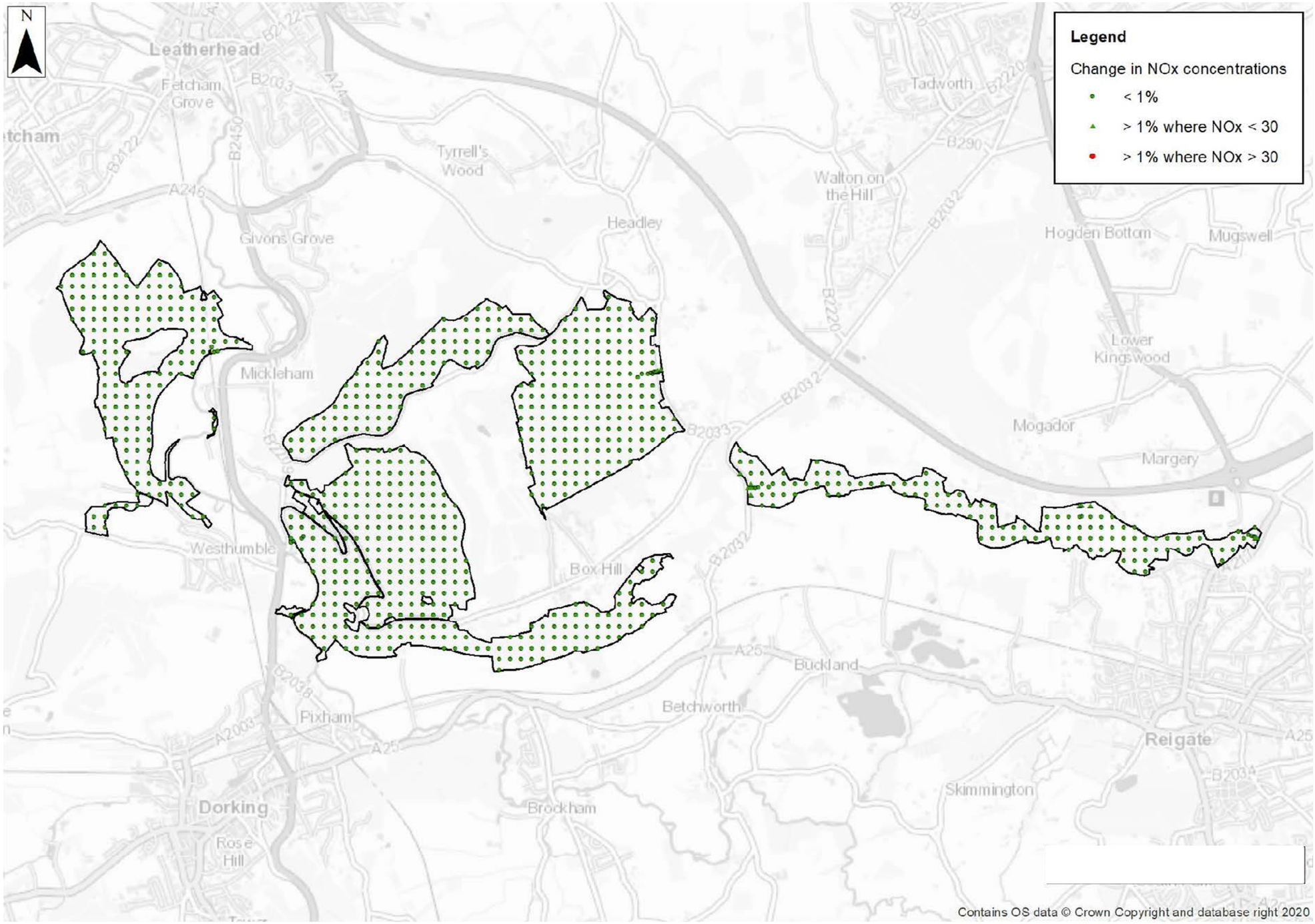

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DRAWING TITLE
Mole Gap to Reigate Escarpment SAC Change in NOx concentrations - Cumulative

DATE
September 2021

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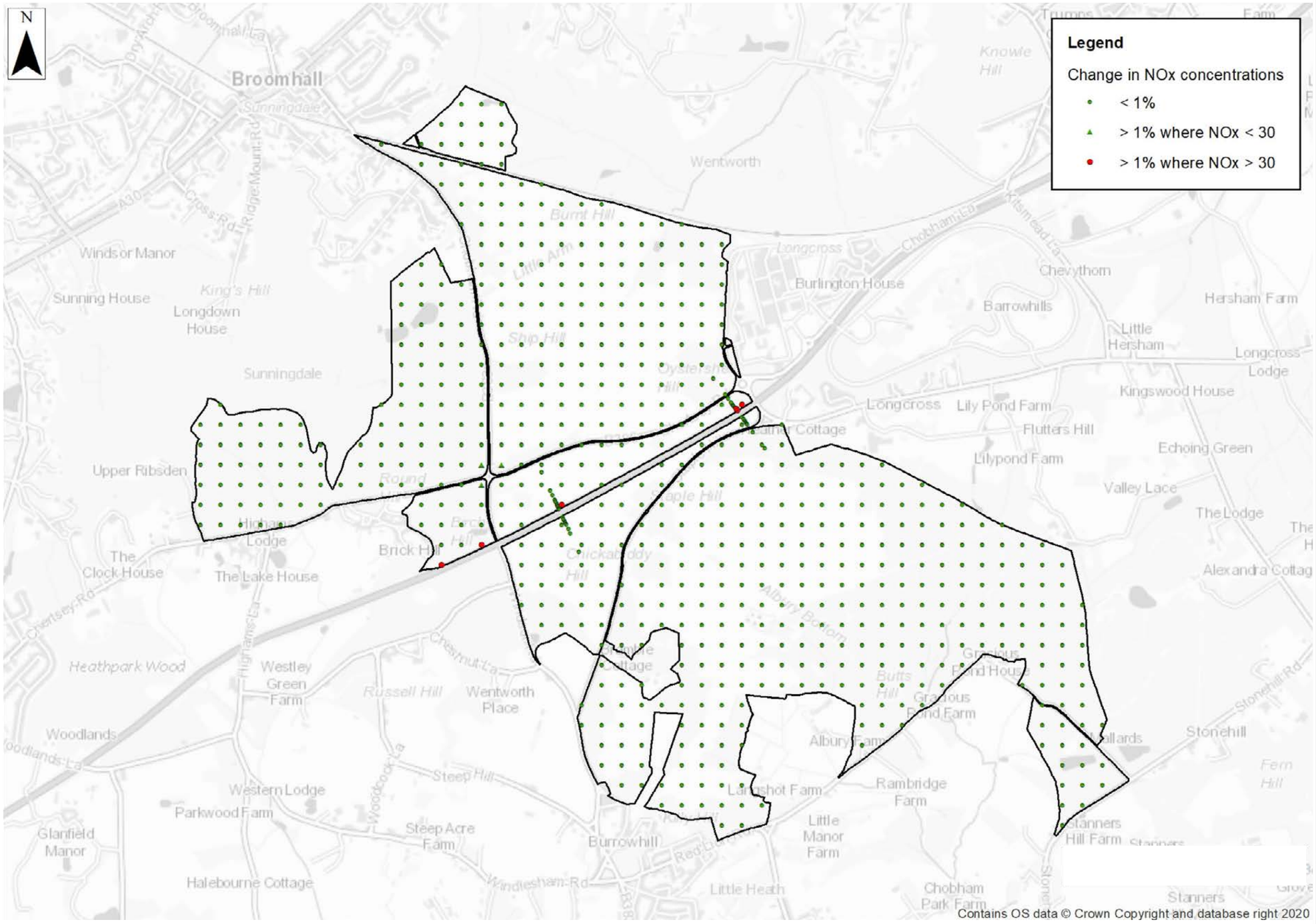

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DATE
September 2021

ORIENTATION	DRAWING NO.	REVISION
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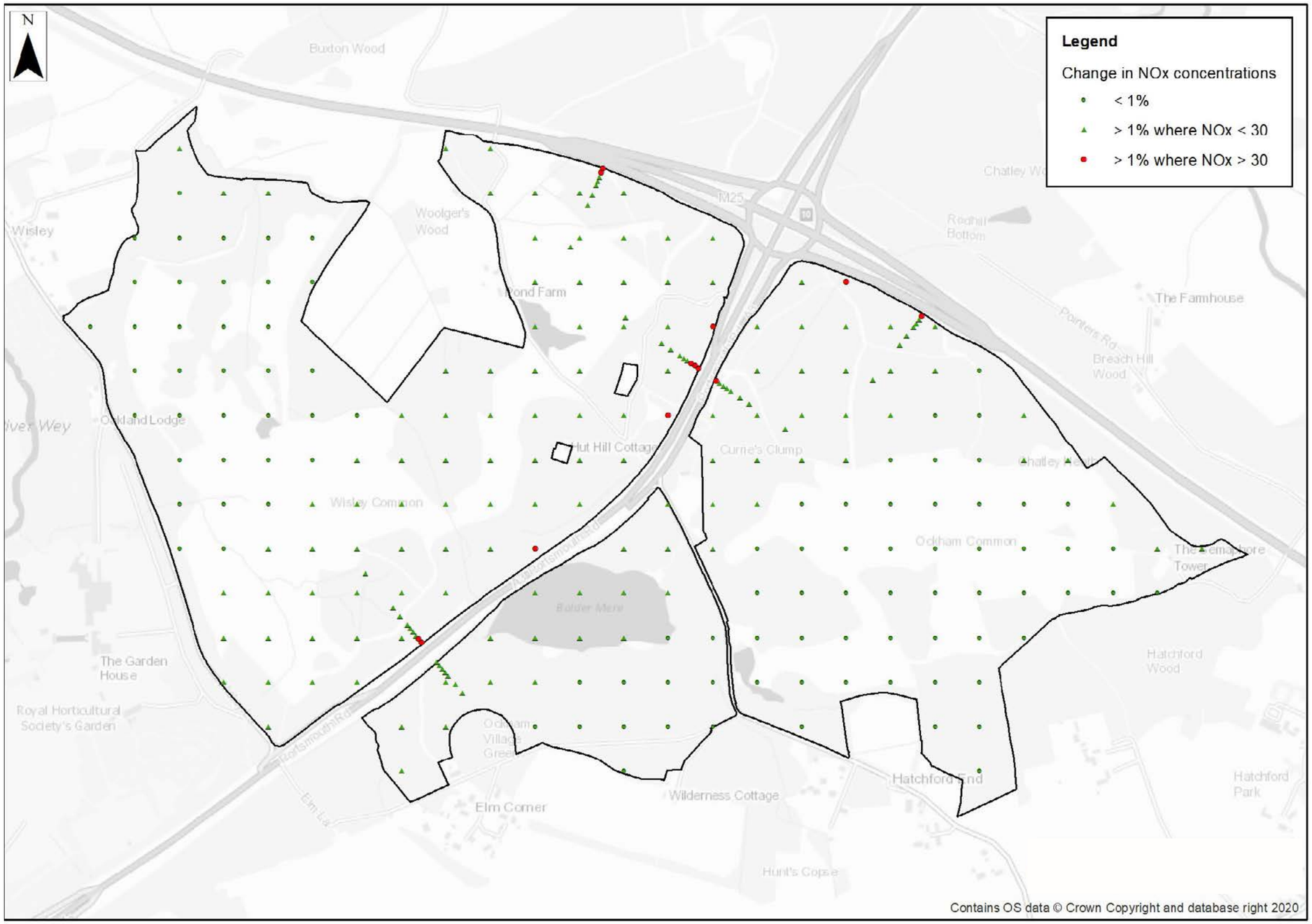

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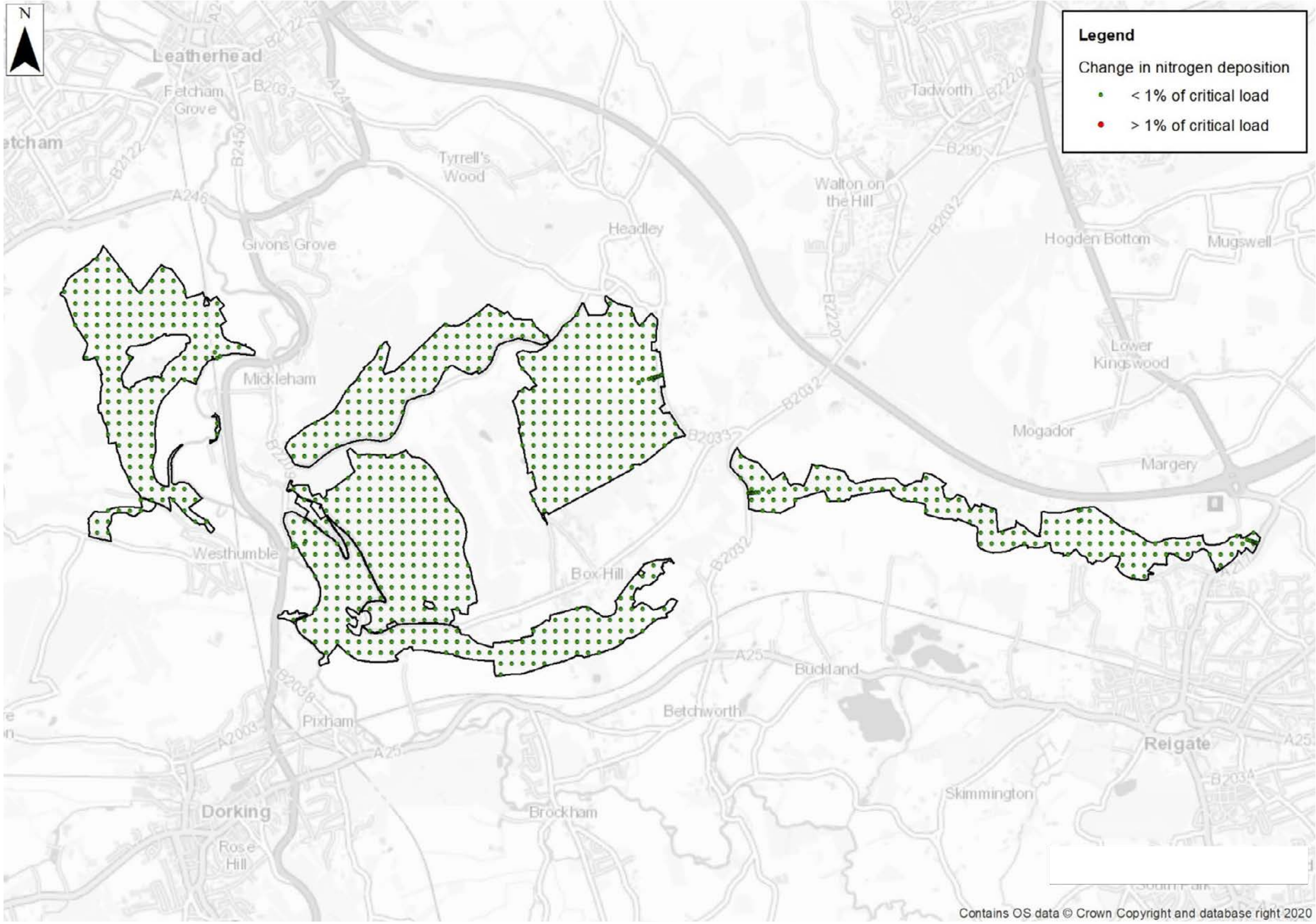

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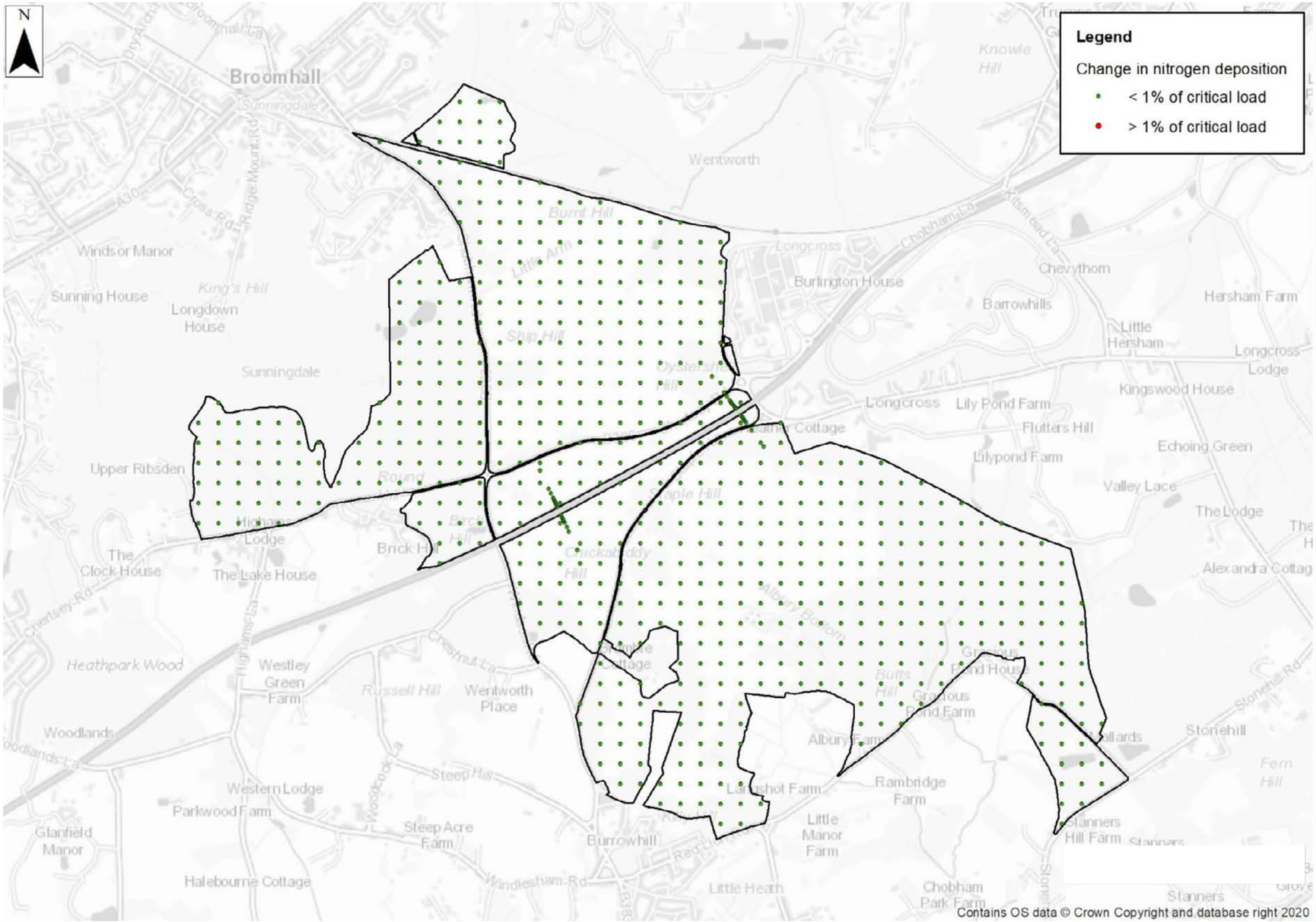

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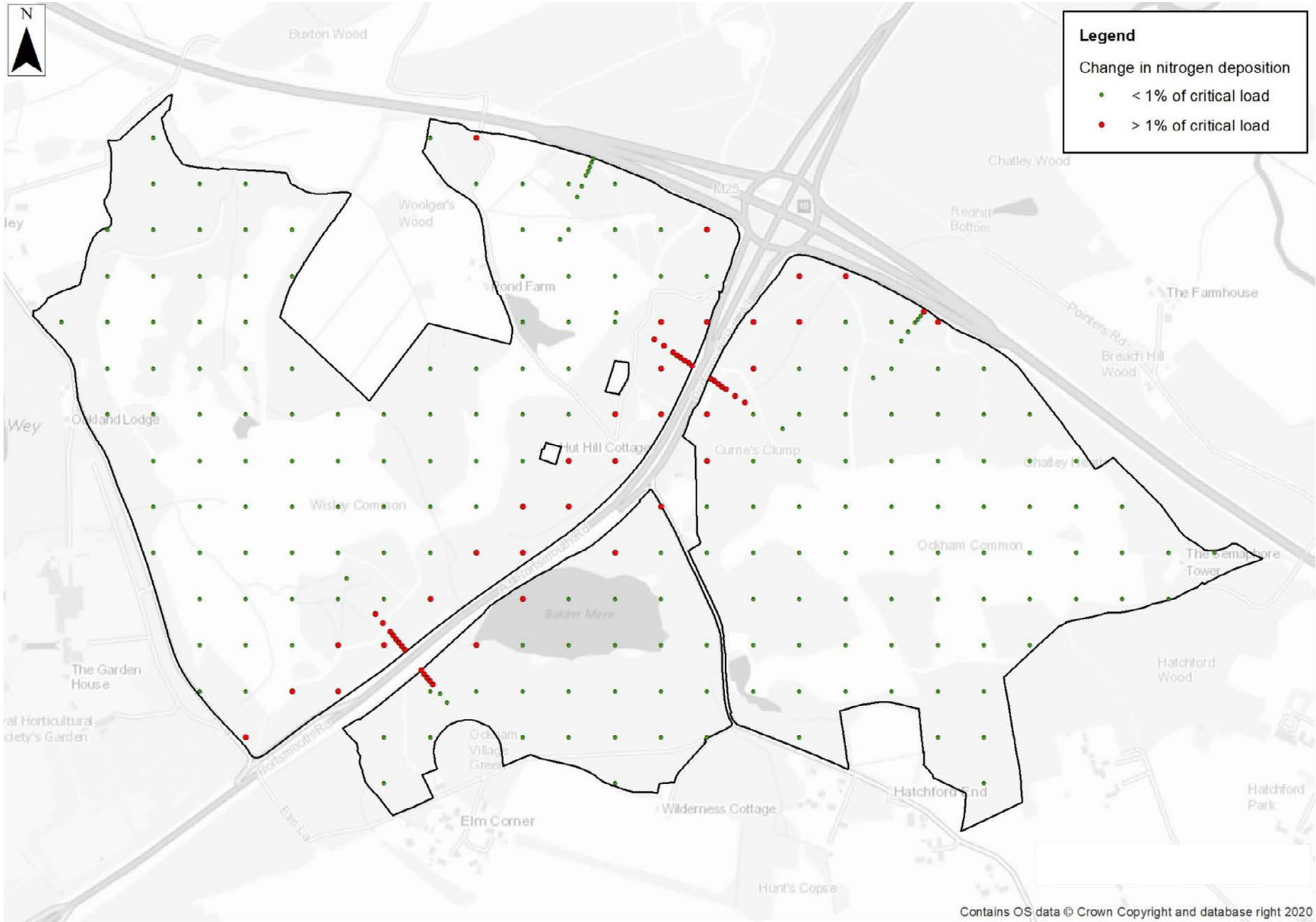

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SCALE @ A3

0 250 500 m

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Annex 1

Screening Matrices

Evidence for likely significant effects on their qualifying features is detailed within the footnotes to the screening matrices below.

Matrix Key:

✓ = Likely significant effect cannot be excluded until further studies carried out

× = Likely significant effect can be excluded

C = construction

O = operation

Ebernoe Common SAC (29.00 km south west).

Where effects are not applicable to a particular feature they are greyed out.

Stage 1 Matrix A: Mole Gap to Reigate Escarpment SAC

Name of European Site	**Mole Gap to Reigate Escarpment SAC**													
Distance to Project site boundary	**9 km**													
European site features	**Land Take**		**Habitat Fragmentation**		**Aerial Emissions – Surface Access**		**Aerial Emissions – Airport Operations**		**Aqueous Emissions/Discharges**		**Noise and Vibration**		**Lighting**	
	C	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***
Stable xerothermophilous formations with *Buxus sempervirens* on rock slopes (Berberidion p.p.)	×a	×a	×b	×b	×e	×f	×	×g	×h	×h	×i	×i	×j	×j
Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*)	×a	×a	×b	×b	×e	×f	×	×g	×h	×h	×i	×i	×j	×j

Name of European Site	Mole Gap to Reigate Escarpment SAC													
*important orchid sites														
Taxus baccata woods of the British Isles *priority feature	×a	×a	×b	×b	×e	×f	×	×g	×h	×h	×i	×i	×j	×j
European dry heaths	×a	×a	×b	×b	×e	×f	×	×g	×h	×h	×i	×i	×j	×j
Asperulo-fagetum beech forests	×a	×a	×b	×b	×e	×f	×	×g	×h	×h	×i	×i	×j	×j
Great crested newt	×a	×a	×c	×c	×e	×f	×	×g	×h	×h	×i	×i	×j	×j
Bechstein's bat	×a	×a	×d	×d	×e	×f	×	×g	×h	×h	×i	×i	×j	×j

Evidence Supporting Conclusions

a.	Nearest element of the Project is >9 km from site; unlike some other bat species, Bechstein's bat have been recorded foraging relatively close to roosts (usually between 1 and 3 km) (Schofield & Morris, 2000; Fitzsimons et.al., 2002; Dietz, 2009).; recent work on the HS2 development radio tracking this species found the majority of foraging activity within 3 km of a roost with a single male recorded foraging at 5 km (HS2, 2013). On this basis, there is no evidence to suggest that Bechstein's bats from the SAC would be foraging in any habitat to be lost and therefore no potential for effects of habitat fragmentation on this species.
b.	Nearest element of the Project is >9 km from site; no potential for fragmentation to affect habitats.
c.	Nearest element of the Project is >9 km from site; no potential for effects on species populations within the SAC.
d.	Nearest element of the Project is >9 km from site; unlike some other bat species, Bechstein's bat have been recorded foraging relatively close to roosts (usually between 1 and 3 km) (Schofield & Morris, 2000; Fitzsimons et.al., 2002; Dietz, 2009).; recent work on the HS2 development radio tracking this species found the majority of foraging activity within 3 km of a roost with a single male recorded foraging at 5 km (HS2, 2013). On this basis, there is no evidence to suggest that Bechstein's bats from the SAC would be foraging in any habitat to be lost and therefore no potential for effects of habitat fragmentation on this species.
e.	Site >9 km from Project; no potential for aerial emissions during construction work on site to affect habitats within SAC. Any generators etc. would be small scale and therefore, the potential zone of influence would be considerably smaller than this.
f.	Potential effects on habitats screened out as unlikely on the basis that no change in any pollutant predicted to be >1% of relevant critical load/level.
g.	Nearest element of the Project is >9 km from site; no changes in air quality associated with airport operations.
h.	Nearest element of the Project is >9 km from site; no potential for effects from aqueous emissions/discharges.
i.	Nearest element of the Project is >9 km from site; no potential for noise / vibration effects on species populations within SAC (including on flight lines to/from SAC as Bechstein's not known to travel such distances from roosts.
j.	Nearest element of the Project is >9 km from site; therefore, no potential for lighting effects on species/habitats within SAC.

Stage 1 Matrix B: Ashdown Forest SAC

Name of European Site	**Ashdown Forest SAC**													
Distance to Project site boundary	**12 km**													
European site features	**Land take**		**Habitat fragmentation**		**Aerial emissions – Surface access**		**Aerial emissions – Airport operations**		**Aqueous emissions**		**Noise & Vibration**		**Lighting**	
	C	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***
Northern Atlantic wet heaths with *Erica tetralix*	×a	×a	×b	×b	×d	×e	×c	×f	×g	×g	×h	×h	×h	×h
European dry heaths	×a	×a	×b	×b	×d	×e	×c	×f	×g	×g	×h	×h	×h	×h
Great crested newt	×a	×a	×c	×c	×d	×e	×c	×c	×c	×c	×c	×c	×c	×c

Evidence Supporting Conclusions

a.	Site 12 km from Project; no potential for direct habitat loss.
b.	Site 12 km from Project; no potential for fragmentation to affect habitats.
c.	Site 12 km from Project in direct line; no potential for effects on species populations within SAC.
d.	Nearest element of the Project is 12 km from site; no potential for effects from aerial emissions during construction work on site to affect habitats within SAC.
e.	Potential effects on habitats screened out as unlikely on the basis that no change in any pollutant predicted to be >1% of relevant critical load/level.
f.	Site 12 km from Project; no changes in air quality associated with airport operations.
g.	Site 12 km from Project; no potential for aqueous discharges to affect habitats within SAC.
h.	Site is 12 km from Project; no potential for noise / vibration / lighting effects on species populations or habitats within SAC.

Stage 1 Matrix C: Ashdown Forest SPA

Name of European Site	Ashdown Forest SPA													
Distance to Project site boundary	12 km													
European site features	**Land take**		**Habitat fragmentation**		**Aerial emissions – Surface access**		**Aerial emissions – Airport operations**		**Aqueous emissions**		**Noise & Vibration**		**Lighting**	
	C	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***
Dartford Warbler	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
Nightjar	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g

Evidence Supporting Conclusions

a.	Site 12 km from Project; no potential for direct species habitat loss.
b.	Site 12 km from Project; no potential for fragmentation to affect habitat.
c.	Nearest element of the Project is 12 km from site; no potential for effects from aerial emissions during construction work on site to affect habitats within SPA.
d.	Potential effects on habitats screened out as unlikely on the basis that no change in any pollutant predicted to be >1% of relevant critical load/level.
e.	Site 12 km from Project; no changes in air quality associated with airport operations.
f.	Site 12 km from Project; no potential for aqueous discharges to affect species or habitats within SPA.
g.	Site is 12 km from Project; no potential for noise / vibration / lighting effects on species populations within SPA.

Stage 1 Matrix D: The Mens SAC

Name of European Site	The Mens SAC													
Distance to Project site boundary	25 km													
European site features	**Land take**		**Habitat fragmentation**		**Aerial emissions – Surface access**		**Aerial emissions – Airport operations**		**Aqueous emissions**		**Noise & Vibration**		**Lighting**	
	C	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***
Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (or *Ilici-Fagenion*)	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
Barbastelle Barbastella barbastellus	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g

Evidence Supporting Conclusions

a.	Site 25 km from Project; no potential for direct species habitat loss. No evidence of Barbastelle present on site.
b.	Site 25 km from Project; no potential for fragmentation to affect habitat. No evidence of Barbastelle present on site.
c.	Nearest element of the Project is 25 km from site; no potential for effects from aerial emissions during construction work on site to affect habitats within SAC.
d.	Nearest element of the Project is 25 km from site; no potential for effects from surface access emissions to affect habitats within SAC.
e.	Site 25 km from Project; no changes in air quality associated with airport operations.
f.	Site 25 km from Project; no potential for aqueous discharges to affect species or habitats within SAC.
g.	Site is 25 km from Project; no potential for noise / vibration / lighting effects on species or habitats within SAC.

Stage 1 Matrix E: Ebernoe Common SAC

Name of European Site	**Ebernoe Common SAC**													
Distance to Project site boundary	**29 km**													
European site features	**Land take**		**Habitat fragmentation**		**Aerial emissions – Surface access**		**Aerial emissions – Airport operations**		**Aqueous emissions**		**Noise & Vibration**		**Lighting**	
	C	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***
Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (or *Ilici-Fagenion*)	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
Barbastelle Barbastella barbastellus	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
Bechstein's Myotis bechsteinii	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g

Evidence Supporting Conclusions

a.	Site 29 km from Project; no potential for direct species habitat loss. No evidence of Barbastelle present on site. Nearest element of the Project is >9 km from site; unlike some other bat species, Bechstein's bat have been recorded foraging relatively close to roosts (usually between 1 and 3 km) (Schofield & Morris, 2000; Fitzsimons et.al., 2002; Dietz, 2009).; recent work on the HS2 development radio tracking this species found the majority of foraging activity within 3 km of a roost with a single male recorded foraging at 5 km (HS2, 2013). On this basis, there is no evidence to suggest that Bechstein's bats from the SAC would be foraging in any habitat to be lost and therefore no potential for effects of habitat fragmentation on this species.
b.	Site 29 km from Project; no potential for fragmentation to affect habitat. No evidence of Barbastelle present on site. Nearest element of the Project is >9 km from site; unlike some other bat species, Bechstein's bat have been recorded foraging relatively close to roosts (usually between 1 and 3 km) (Schofield & Morris, 2000; Fitzsimons et.al., 2002; Dietz, 2009).; recent work on the HS2 development radio tracking this species found the majority of foraging activity within 3 km of a roost with a single male recorded foraging at 5 km (HS2, 2013). On this basis, there is no evidence to suggest that Bechstein's bats from the SAC would be foraging in any habitat to be lost and therefore no potential for effects of habitat fragmentation on this species.

c.	Nearest element of the Project is 29 km from site; no potential for effects from aerial emissions during construction work on site to affect habitats within SAC.
d.	Nearest element of the Project is 29 km from site; no potential for effects from surface access emissions to affect habitats within SAC.
e.	Site 29 km from Project; no changes in air quality associated with airport operations.
f.	Site 29 km from Project; no potential for aqueous discharges to affect species or habitats within SAC.
g.	Site is 29 km from Project; no potential for noise / vibration / lighting effects on species or habitats within SAC.

Stage 1 Matrix F: Thames Basin Heaths SPA

Name of European Site	**Thames Basin Heaths SPA**													
Distance to Project site boundary	**23.6 km**													
European site features	**Land take**		**Habitat fragmentation**		**Aerial emissions – Surface access**		**Aerial emissions – Airport operations**		**Aqueous emissions**		**Noise & Vibration**		**Lighting**	
	C	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***
Dartford Warbler	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
Nightjar	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
Woodlark	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g

Evidence Supporting Conclusions

a.	Site 23.6 km from Project; no potential for direct species habitat loss.
b.	Site 23.6 km from Project; no potential for fragmentation to affect habitat.
c.	Nearest element of the Project is 30.6 km from site; no potential for effects from aerial emissions during construction work on site to affect habitats within SPA.
d.	Potential effects on habitats screened out as unlikely on the basis that no change in any pollutant predicted to be >1% of relevant critical load/level.
e.	Site 23.6 km from Project; no changes in air quality associated with airport operations
f.	Site 23.6 km from Project; no potential for aqueous discharges to affect species or habitats within SPA.
g.	Site is 23.6 km from Project; no potential for noise / vibration / lighting effects on species populations within SPA.

Stage 1 Matrix G: Thursley, Ash Pirbright and Chobham SAC

Name of European Site	**Thursley, Ash Pirbright and Chobham SAC**													
Distance to Project site boundary	**33.8 km**													
European site features	**Land take**		**Habitat fragmentation**		**Aerial emissions – Surface access**		**Aerial emissions – Airport operations**		**Aqueous emissions**		**Noise & Vibration**		**Lighting**	
	C	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***	***C***	***O***

Name of European Site	Thursley, Ash Pirbright and Chobham SAC													
Depressions on peat substrates of the *Rhynchosporion*;	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
Northern Atlantic wet heaths with *Erica tetralix*;	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g
European dry heaths	×a	×a	×b	×b	×c	×d	×	×e	×f	×f	×g	×g	×g	×g

Evidence Supporting Conclusions

a.	Site 33.8 km from Project; no potential for direct species habitat loss.
b.	Site 33.8 km from Project; no potential for fragmentation to affect habitat.
c.	Nearest element of the Project is 33.8 km from site; no potential for effects from aerial emissions during construction work on site to affect habitats within SPA.
d.	Potential effects on habitats screened out as unlikely on the basis that no change in any pollutant predicted to be >1% of relevant critical load/level.
e.	Site 33.8 km from Project; no changes in air quality associated with airport operations
f.	Site 33.8 km from Project; no potential for aqueous discharges to affect species or habitats within SPA.
g.	Site is 33.8 km from Project; no potential for noise / vibration / lighting effects on species populations within SPA.