Llywodraeth Cymru
Welsh Government

www.cymru.gov.uk

A494 River Dee Bridge Replacement Scheme
Environmental Statement
Volume 3b: Appendices
September 2025



Contents

Chapter 8 Appendices

Appendix 8.A Arboriculture Survey reports

Appendix 8.B Ornithology Reports

Appendix 8.C Pond Locations and Descriptions

Appendix 8.D Bat Survey Results Tables 2018-2024

Appendix 8.E Green Infrastructure Statement

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix A

Arboriculture Survey reports

395318 | RML-00-XX-RP-Y-8011

First Issue | Revision P01 | September 2025



Contents

8. A. Arboriculture Survey Reports 1

8.1 Arboriculture Survey Report 2018 1

8.2 Arboriculture Survey Report 2022 2

8. A. Arboriculture Survey Reports

8.1 Arboriculture Survey Report 2018

RICHARDS
MOOREHEAD & LAING LTD

A494 RIVER DEE BRIDGE IMPROVEMENT

Arboriculture Survey

for

WELSH GOVERNMENT
AND
NORTH & MID WALES TRUNK ROAD AGENT

September 2018

3094/11

RICHARDS
MOOREHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

A494 RIVER DEE BRIDGE IMPROVEMENT

Arboriculture Survey

for

WELSH GOVERNMENT
AND
NORTH & MID WALES TRUNK ROAD AGENT

September 2018

3094/11

© Copyright. This report and figures remain the copyright of Richards, Moorehead & Laing Ltd.

QUALITY ASSURANCE PROCEDURES: QP4

Prepared by:	Simon Cope	Date:	28th September 2018
Checked by:	Rhodri Edwards	Date:	2nd October 2018
Approved by:	Stephen Blunt	Date:	2nd October 2018

Visit RML's web site at www.rmlconsult.com for the latest information on our services and staff.

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13

www.rmlconsult.com

CONTENTS

Page no.

1	INTRODUCTION	1
2	METHODOLOGY	2
3	RESULTS	3
4	CONCLUSIONS	6
5	RECOMMENDATIONS	7

LIST OF TABLES

Table 1 Survey results Error! Bookmark not defined.

LIST OF FIGURES

Figure 1 Location map of the development site at Queensferry **1**

Figure 2 Aerial photograph showing groups of trees surveyed **3**

APPENDICES

Appendix 1 Photographs

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13

1 INTRODUCTION

1.1 This report details the findings of an arboriculture survey on land involved in the construction of a second crossing at Queensferry (**Figure 1**).

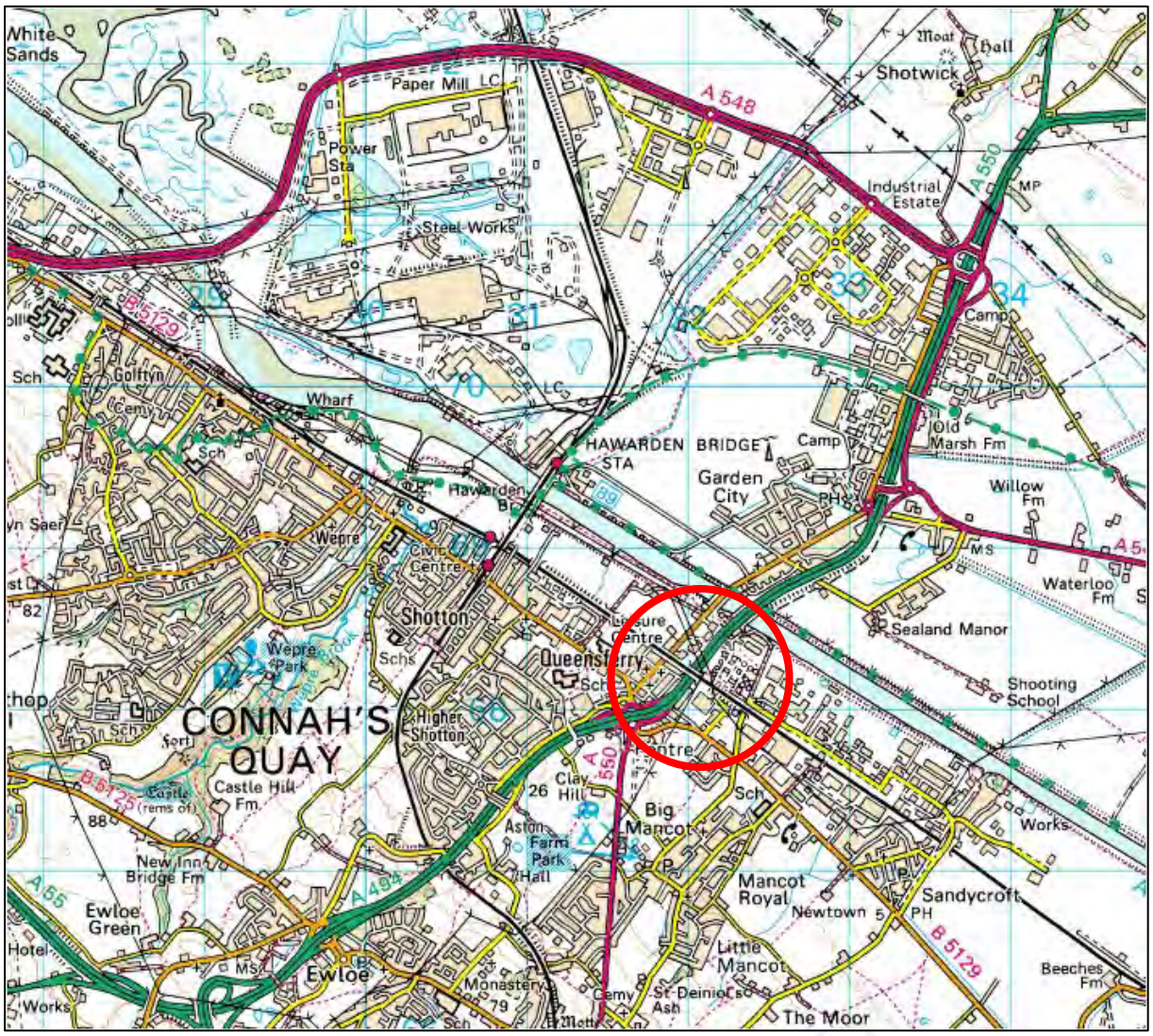


Figure 1 Location map of the development site at Queensferry (circled red).

(Reproduced under licence from Ordnance Survey, Licence No. 100056340).

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13

2 METHODOLOGY

2.1 The survey methodology followed best practice guidelines published by the Arboricultural Association (Fay et al., 2005) and additional guidance given in BS5837:2012. All plant names are taken from Stace (2010). Where relevant, the presence of recently fallen or felled stumps are recorded (S#), and the following parameters were recorded for each tree (T#), group (G#) or hedge (H#):

- Height;
- Stem Diameter at Breast Height (DBH) – measured according to Annex C of BS5837:2012;
- Age class – Young (Y), Early Mature (EM), Mature (M), Over-mature (OM) or Veteran (V).

2.2 The radius of the Root Protection Area (RPA) for each tree is given. For a single stemmed tree, the RPA radius = the DBH × 12; for multiple stems, the RPA radius = the combined DBH × 12. To calculate the combined DBH of a multi-stemmed tree: -

EITHER $\sqrt{(\text{stem diameter } 1)^2 + (\text{stem diameter } 2)^2 \ldots + \ (\text{stem diameter } 5)^2}$ (for up to 5 stems);

OR $\sqrt{(\text{mean stem diameter})^2} \times \text{number of stems}$ (for more than 5 stems)

2.3 Tree condition was evaluated using the Visual Tree Assessment (VTA) protocol described by Lonsdale (1999), augmented by information in Mattheck & Breloer (1998) and Strouts & Winter (1998). This involves a systematic, non-invasive, ground-based examination of each tree (aided by binoculars), looking for signs of ill-health, vulnerability or damage and their causes.

2.4 The physiological and structural condition of each tree was graded (good, fair, poor or physiologically dead). This is a judgement based on the knowledge and experience of the surveyor, and is derived from elements of the VTA and the known characteristics of the tree species. Due to the way trees can compensate for defects, it is often possible for specimens with apparently significant injuries or growth defects to be classified in good condition.

2.5 The likely remaining contribution of each tree or group was noted: <10, 10-20, 20-40 or >40 years. This can only be an informed opinion based on the surveyor's experience and the current condition of the tree, and obviously cannot take account of catastrophic weather events or other stochastic events.

3 RESULTS

3.1 The survey was carried out by Simon Cope on the 21st of September 2018 and included the five groups of trees indicated on the aerial photograph in **Figure 2**. The full results are presented in **Table 1**.

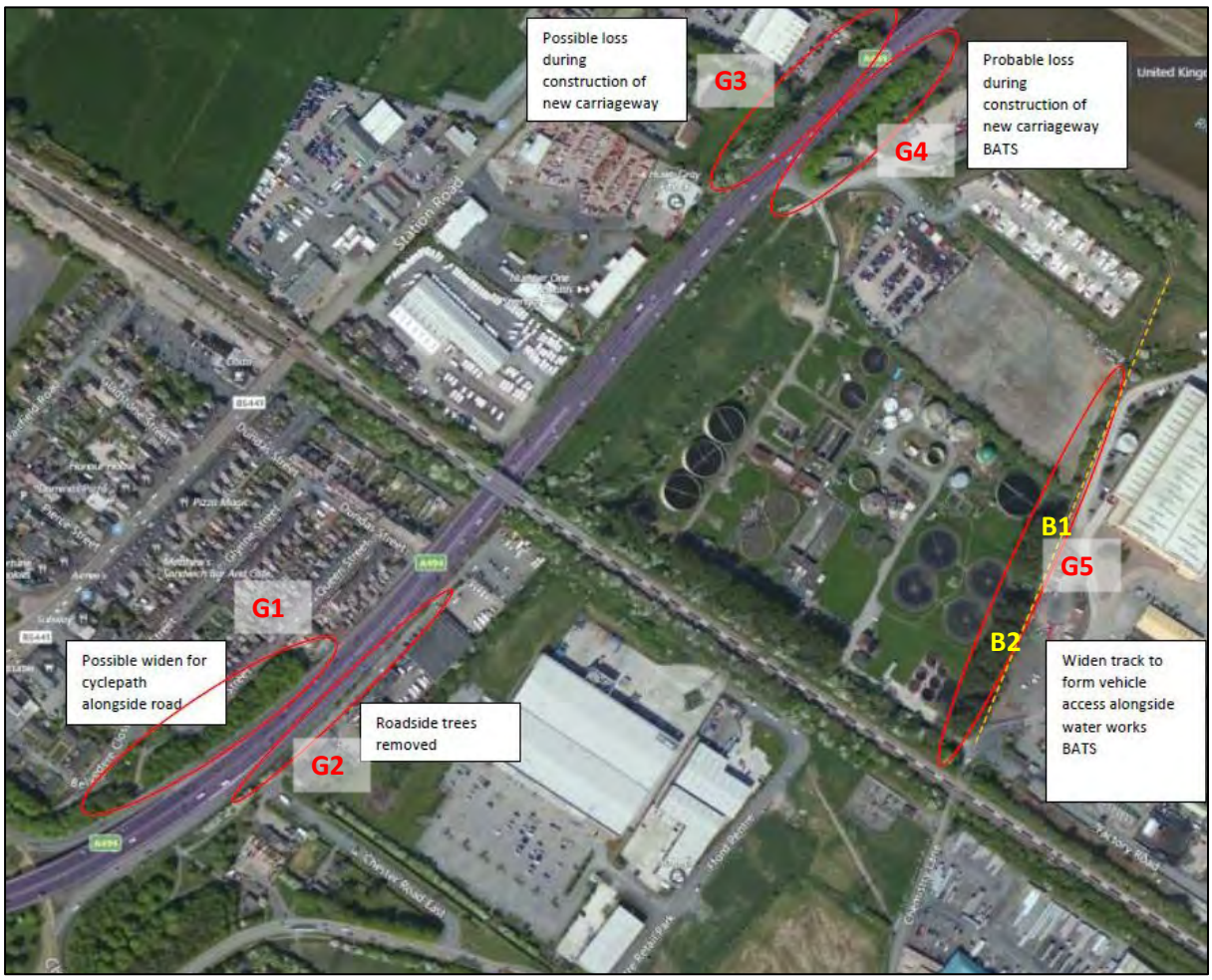


Figure 2 Aerial photograph showing groups of trees surveyed.

3.2 In addition, an assessment of the potential of the trees to harbour roosting bats was also carried out. G1, G2 and G3 had negligible potential in this regard. Some of the trees in G4 have loose bark on dead branches and stems which have low potential as bat roosts. In G5, there are two trees with moderate potential: one is a dead stump (approx. 4m high) that has an open crack, and the other is an intact tree with a dead stub that has woodpecker holes in it. The approximate location of these trees is marked on **Figure 2**.

Group no.	Species	Height (m)	DBH (mm)	RPA (m)	Age class	Condition		Remaining contribution (yrs)
						Physiological	Structural	
1	**Field Maple, Wild Cherry**, Ash	<10	<400 (est.)	4.80	Y & EM	Good	Good	>40
2	**Hawthorn**, Ash, Wild Cherry, Lime, Beech, Apple	<9	Mostly <250 (one Beech 570)	3.00 (Beech: 6.84)	Y & EM	Good	Good	>40
3	**Lombardy Poplar**, Hybrid Black Poplar & Sycamore	13	<640 (mode: ~300)	<7.68 (mode: ~3.60)	EM & M	Mostly good - minor deadwood. Tree no. 1349 has a substantial cavity at base of stem, one other small Lombardy poplar is dead	Mostly good - Tree no. 1349 has poor balance, untagged tree (double-stemmed Hybrid Black Poplar) has included bark in major fork @1m	20-40

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13

Group no.	Species	Height (m)	DBH (mm)	RPA (m)	Age class	Condition		Remaining contribution (yrs)
						Physiological	Structural	
4	**Norway Maple**, Hawthorn & Sycamore	10	<870 (multi-stemmed) (mean: 400)	<10.44 (mean: 4.80)	EM & M	Good - minor deadwood, some tight forks with included bark	Good	20-40
5	**Hybrid Black Poplar** (possibly 'Railway Poplar', a.k.a. 'Marilandica'), Lombardy Poplar, Goat Willow, Elder & Ash	18	<1500 (mode: 650)	15 (mode: 7.80)	Poplars OM, Willows etc. EM & M	Good - minor deadwood	Fair & Poor - long, heavy branches (some already dropped or broken and lodged), some leaning stems with poor balance, some with included metal near base (security fence)	20-40 overall, but some stems and/or branches could collapse at any time

Table 1 Survey results

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13

4 CONCLUSIONS

4.1 G1, G2 & G3 are all composed of Young or Early Mature trees. They are young enough to preserve their wind-firm character if some of them are removed due to construction works. They are also young enough to withstand significant root damage, although any incursion into their RPA's should be balanced by equivalent remedial pruning of their crowns.

4.2 The trees in G4 are mostly mature, relatively tall and well within striking distance of the existing carriageway. It is the understanding of the author that construction works will directly impact upon the RPA's of these trees, which could destabilise many of the rank of trees closest to the carriageway.

4.3 Given their over-mature status and often leaning habit, many of the trees in G5 are vulnerable to total collapse or branch loss, and the RPA's of the rank of trees closest to the proposed route of the new road will be directly impacted by construction works.

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13

5 RECOMMENDATIONS

- Any trees in G4 & G5 that lose part of their RPA as a result of the proposed works should be felled;

- All trees in G5 that are retained should be pruned so that no vulnerable long, heavy branches extend within striking distance of the new road;

- It is understood that part or all of G5 are covered by a Tree Preservation Order. The Planning Officer dealing with the development planning application should be provided with a copy of this report and consulted with regards to a 'change or discharge of condition' with respect to the TPO.

- Any tree surgery that is carried out in the future should be carried out to BS3998:2010 by suitably qualified and experienced personnel;

- All works must comply with the Wildlife and Countryside Act (1981) (as amended) and the Conservation of Habitats and Species Regulations (2018) (as amended), which includes the protection of bats and nesting birds. Climbing inspections to check for roosting bats should be carried out on B1 and B2 before any works commence, and action should be taken according to the findings of those inspections;

- The safety of the remaining trees should be monitored at five yearly intervals, and arboricultural recommendations should be submitted and acted upon.

APPENDIX 1 - PHOTOGRAPHS

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13



Photo 1. View of G1 from Queen's Road to the west, composed of Young and Early Mature Field Maple, Wild Cherry and Ash.



Photo 2. View of G2 from the east, dominated by Early Mature Hawthorn.



Photo 3. View of Lombardy Poplars in G3 from the verge of the A494.



Photo 4. View of Hybrid Black Poplars in G3 from the roadside verge.

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13



Photo 5. One Lombardy Poplar in G3 has a substantial cavity at its base and a pronounced lean towards the adjacent carriageway.



Photo 6. One of the larges Hybrid Black Poplars in G3 has included bark in a major fork near its base. Each of the co-dominant stems are poorly balanced, and one of these is weighted towards the adjacent carriageway.

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13



Photo 7. G4 is dominated by Early Mature and Mature Norway Maples.



Photo 8. The northern section of G5 is dominated by Mature Goat Willows.



Photo 9. G5 comprises of 48 Mature and Over-Mature Hybrid Black Poplars.

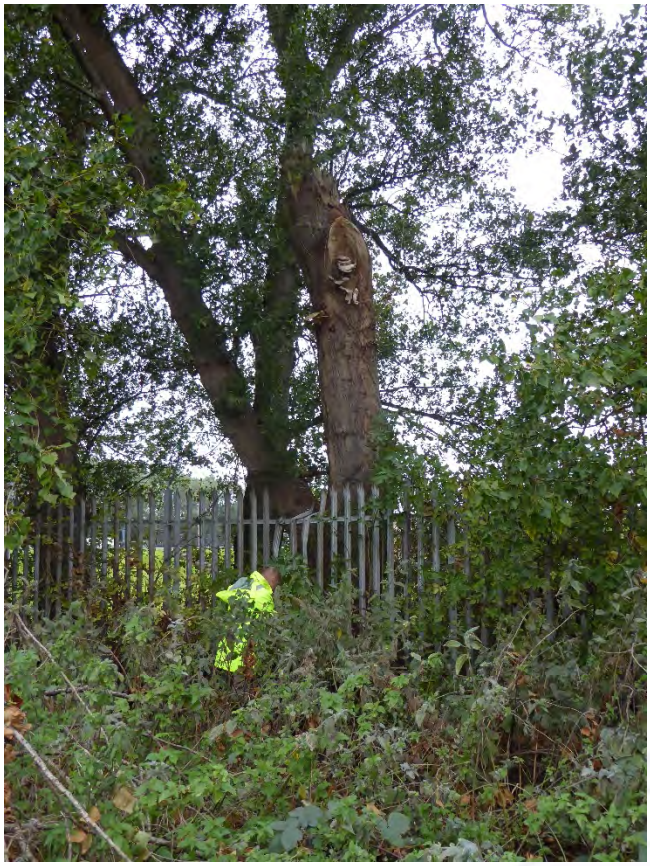


Photo 10. Many of the Poplars have a pronounced lean, and two have snapped at around 4m.

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13



Photo 11. An open crack in the dead stump of a Hybrid Black Poplar could harbour roosting bats.



Photo 12. The Poplars in G5 have many long heavy branches extending towards the proposed road, some of which have been shed or are broken and lodged.

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13



Photo 13. Some of the Poplars in G5 have metal included near their base, where they have engulfed the adjacent security fence.

RICHARDS, MOOREHEAD & LAING LTD
55 WELL STREET, RUTHIN, DENBIGHSHIRE LL15 1AF
Tel +44(0)1824 704366, Fax +44(0)1824 705450
email: rml@rmlconsult.com web: www.rmlconsult.com
Registered in England No. 1848683 VAT Reg. No. 401 4243 13

8.2 Arboriculture Survey Report 2022

ARBTECH

BS5837:2012
Trees in relation to design, demolition and construction – Recommendations

Arboricultural Impact Assessment Rev C

RML

Welsh Water Sewage Treatment Works,

Chemistry Lane,

Pentre,

Deeside,

CH5 2DA

28 March 2022

Author: Alan Thompson FdSc. (Arb.), M.Arbor.A.

Table of Contents

If this report has been released electronically the appendices referred to herein can be found in the annexed zip folder/s as .pdf files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans are annexed separately as A0, A1, A2 or A3 as appropriate.

Introduction 3
Executive Summary 3
General Information 4
Tree Survey 5
Arboricultural Impact Assessment 6
Tree Works 9
Protected Species 12
Appendix 1: Arboricultural Impact Assessment Plan 14
Appendix 2: Tree Survey Schedule 18
Appendix 3: Contact Details 28
Document Production Record 29

Introduction

Arbtech Consulting Limited (Arbtech) received written instruction in June 2021 from RML Ltd. to attend Welsh Water Sewage Treatment Works, Chemistry Lane, Pentre, Deeside, CH5 2DA to undertake an arboricultural survey a to BS5837:2012 guidance to assess trees, hedges and major shrub groups growing on and within influencing distance of the site and to produce a schedule of trees and tree constraints plan and arboricultural impact assessment.

Executive Summary

This report describes the extent and effect of the proposed development at the site on individual trees and groups of trees within and adjacent to the site.

Figure 1: Aerial Image of site (Bing Maps)



Trees within the site were surveyed; using a methodology guided by British Standard 5837:2012 ‘Trees in relation to design, demolition and construction – Recommendations’ (“BS5837”).

Subsequently, this report has been produced, balancing the layout of the proposed development against the competing needs of trees. This report comprises all of the requisite elements of an arboricultural implications assessment, method statement and supporting plans.

General Information

Client: Richards, Moorehead & Laing Ltd.

Site: Welsh Water Sewage Treatment Works, Chemistry Lane, Pentre, Deeside, CH5 2DA

Brief proposal description: Construction of link Road

Table 1: Documents referred to.

Document	Reference No.
Topographical Survey	395318-RML-ZZ-XX-SK-L-0028
Proposed layout drawing	395318-RML-ZZ-XX-DR-L-0030
Landscape master plan drawing	N/A
LPA pre-app comments	N/A
British Standard 5837:2012	“BS5837”
Arboricultural Impact Assessment	Arbtech AIA 01 – Rev C

Tree Survey

Survey: An arboricultural survey to BS5837 of all trees within impacting distance of the site was undertaken by Alan Thompson of Arbtech Consulting on 8th March 2022.

A total of 42 (No.) individual trees and 4 (No.) groups of trees were surveyed. Details for each of the trees surveyed are provided in the Schedule of Trees (see Appendix 1)

Table 2: Documents upon which this tree survey has been based

Document	Originator	Reference Number	Title
Survey Base Plan	RML Ltd.	395318-RML-ZZ-XX-SK-L-0028	Existing Site Plan

Limitations: The survey was made at ground level using visual observation only. Detailed examinations, such as climbing inspections and decay detection equipment were not employed, though may form part of the survey's management recommendations. Measurements were taken using specialist tapes, laser and GPS devices. Where this was not possible, measurements are estimated.

Scope: Pre-development tree surveys make arboricultural management recommendations based exclusively upon the individual tree or group of trees condition relative to their present context (*i.e. not in relation to the proposed development*).

Legal Status: No statutory protection check has been performed. BS5837 does not draw any distinction between trees subject to statutory protection, such as a Tree Preservation Order ("TPO"), and those trees without. This is principally because a detailed planning consent overrides any TPO protection. Consequently, we do not seek to offer any comparison between or infer any difference in the quality or importance of TPO trees and other trees.

* For more information on the surveyed trees please see Arbtech Consulting Ltd, Tree Survey Schedule (Appendix 1), Tree Survey Report and Tree Constraints Plan.

Arboricultural Impact Assessment

Table 3: Documents upon which this assessment has been based

Document	Originator	Reference Number	Title
Survey Base Plan	RML Ltd.	395318-RML-ZZ-XX-SK-L-0028	Existing Site Plan
Proposal	RML Ltd.	395318-RML-ZZ-XX-DR-L-0030	Proposed Site Plan

There are a number of issues that may need to be addressed in an arboricultural impact assessment between the trees and the proposed development, these are as follows:

- The effect and extent of the proposed development within the root protection areas (RPAs) of retained trees;
- The potential conflicts of the proposed development with canopies of retained trees; and
- The likelihood of any future remedial works to retained trees beyond which would have been scheduled as a part of usual management.

Table 4: Impacts upon the RPAs of retained trees

These impacts can be seen on the Arboricultural Impact Assessment drawing number Arbtech AIA 01.

Tree Number	Species	Structure	Incursion
T2	Hybrid black poplar	Link Road	RPA
T3	Hybrid black poplar	Link Road	RPA
T4	Hybrid black poplar	Link Road	RPA
T5	Hybrid black poplar	Link Road	RPA
T8	Hybrid black poplar	Link Road	RPA
T9	Hybrid black poplar	Link Road	RPA
T10	Hybrid black poplar	Link Road	RPA
T11	Hybrid black poplar	Link Road	RPA

Tree Number	Species	Structure	Incursion
T13	Hybrid black poplar	Link Road	RPA
T14	Hybrid black poplar	Link Road	RPA
T17	Hybrid black poplar	Link Road	RPA
T19	Hybrid black poplar	Link Road	RPA
T22	Hybrid black poplar	Link Road	RPA
T24	Hybrid black poplar	Link Road	RPA
T25	Hybrid black poplar	Link Road	RPA
T26	Hybrid black poplar	Link Road	RPA
T27	Lombardy poplar	Link Road	RPA
T28	Hybrid black poplar	Link Road	RPA
T29	Hybrid black poplar	Link Road	RPA
T30	Hybrid black poplar	Link Road	RPA
T31	Hybrid black poplar	Link Road	RPA
T32	Hybrid black poplar	Link Road	RPA
T42	Hybrid black poplar	Link Road	RPA

These RPA incursions are relatively minor predominantly. It is the opinion of the author that the proposal would not be detrimental to the long-term retention of the poplar trees on the adjacent Welsh Water site.

Trees to be removed

The proposal requires the removal of 2 No. grouped areas of trees/shrubs and the partial removal of 2 groups of trees/shrubs.

A breakdown of all tree removals and pruning works can be seen in Table 7: Summary of Tree Works

Table 5: Number of individual trees to be removed.

U	A	B	C
0	0	0	0

Table 6: Number of groups to be removed. () indicates partial removal.

U	A	B	C
0	0	1 (2)	1

Conclusion

It is the conclusion of this report that the overall quality and longevity of the amenity contribution provided for by the retained trees will not be adversely affected as a result of the local planning authority consenting to the proposed development. It is considered that any issues raised in this report, or beyond the scope of it can be dealt with by planning conditions

Tree Works

For reasons of public safety, all tree works referred to herein must be carried out prior to any site personnel commencing works or any building materials being delivered.

Table 7: Summary of Tree Works

No.	Species	Works	Category
T5	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T8	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B2
T9	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T13	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T14	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T16	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T17	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T26	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T34	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
T41	Hybrid black poplar	Crown lift canopy to give 6m clearance above proposed link road	B1
G1	Various	Partial removal of group	B2
G2	Various	Fell to ground level; remove stumps	C2
G3	Various	Fell to ground level; remove stumps	B2
G4	Various	Partial removal of group	B2

Notes

All tree work is to be undertaken in accordance with British Standard BS 3998:2010, Recommendations for tree work. All arising's are to be removed and the site is to be left as found. Care is to be taken of the ground around retained trees to make sure that it does not become compacted as a result of tree surgery operations. No equipment or vehicles such as timber Lorries, tractors, excavators or cranes shall be parked or driven beneath the crowns of any retained trees, to prevent subsequent compaction and root death.

Tree removal

A tree should be felled in one piece only when there is no significant risk of damage to people, property or protected species (see Annex A).
Where restrictions (e.g. lack of space, buildings, other features, land ownership or use, or other trees which are to be retained) cannot be overcome, trees should be dismantled in sections.
This also applies where a tall stump is being retained but where branches are to be removed/pruned.
Extensively decayed trees can be unpredictable when they are being felled, and special precautions should therefore be taken, such as the use of a winch to guide the direction of fall.

Stump removal – stump grinding

Stump grinding should be to a minimum of 300mm deep or to extend through the base of the stump leaving the major roots disconnected if the intention is to reduce the potential for the spread of Honey fungus.
The grinding residue should be treated as arising's and removed from site.
NOTE Mechanical destruction of a stump by stump grinding is less disruptive to the site than digging out.
The hole left by stump removal, should be filled with soil or other material. The filling should be appropriate for future site usage, and for any surface treatment that is to be installed.
Where future plant growth is desired, the backfill material should be firmed in 150 mm layers by treading, avoiding excessive compaction and destruction of the soil structure.

Stump removal - digging

Stump removal by digging out should include disposal/utilisation of woody material (see Clause **13**).

NOTE Whether done by hand or machine, digging out can cause severe disturbance of the site.

Where possible, when winching out a stump, a ground or other type of anchor should be used rather than a tree to be retained. If there is no alternative to using such a tree as an anchor, appropriate protective measures should be adopted.

After stump removal

The hole left by stump removal, whether by digging out or grinding, should be filled with soil or other material. The filling should be appropriate for future site usage and for any surface treatment that is to be installed.

Where future plant growth is desired, the back fill material should be firmed in 150mm layers by treading, avoiding excessive compaction and destruction of the soil structure.

Protected Species

Conservation Status of British Bats

The general consensus in Britain and Europe is that virtually all bat species are declining and vulnerable. Our understanding of population status is poor as there is very little historical data for most bat species. Certain species, such as the horseshoe bats, are better understood and have well documented contractions in range and population size.

Given this general picture of decline in UK Government within the UK Biodiversity Action Plan has designated five species of bats as priority species (greater and lesser horseshoe bats, barbastelle, Bechstein's and pipistrelle). These plans provide an action pathway whereby the maintenance and restoration of the former populations levels are investigated.

Legal Status of British Bats

Given the above position all British bats as well as their breeding sites and resting places enjoy national and international protection.

All bat species in the UK are fully protected under the Wildlife and Countryside Act 1981 (as amended) through inclusion in Schedule 5. All bats are also listed on Annex IV (and some on Annex II) of the EC Habitats Directive giving further, European protection. Taken together the act and Conservation of Habitats and Species Regulations 2012 (as amended)* make it an offence to; intentionally or deliberately kill, injure or capture (take) bats;

- Deliberately disturb bats (whether in a roost or not);
- Damage, destroy or obstruct access to bat roosts;
- Possess or transport a bat or any part of a bat, unless acquired legally;
- Sell, barter or exchange bats, or parts of bats

The legislation although not strictly affording protection to foraging grounds does protect roost sites. Bat roosts are protected at all times of the year whether or not bats are present. Any disturbance of a roost due to development must be licenced.

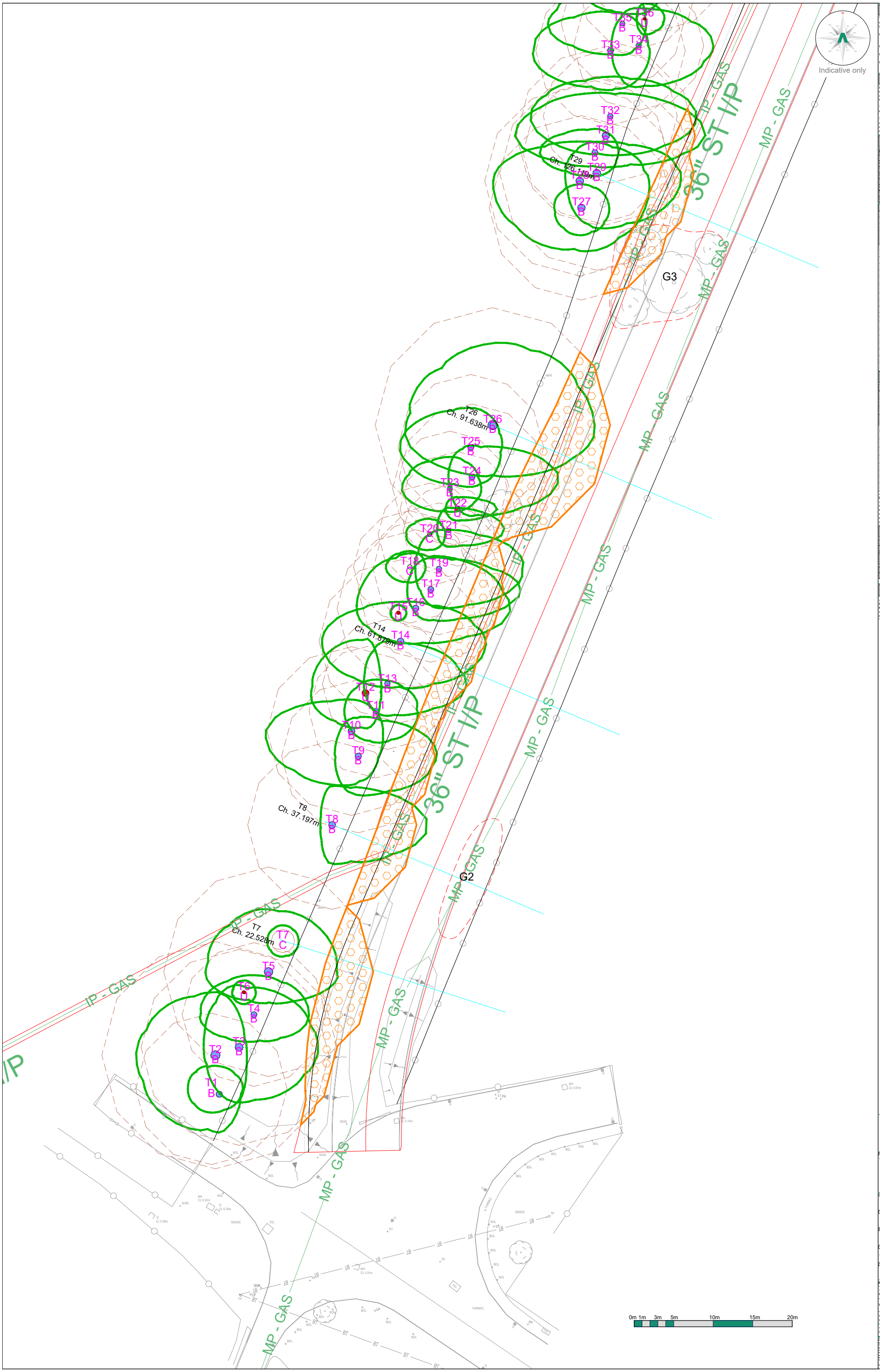
**the regulations that delivered by the UK's commitments to the Habitats Directive.*

Breeding birds

All nesting birds are protected under the Wildlife and Countryside Act (as amended) 1981, which makes it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. Furthermore a number of birds enjoy further protection under that Act and are listed on Schedule 1 of the Act. These further protected birds are also protected from disturbance and it may be necessary to operate “no-go” buffer zones around such nests – typically out to 100m.

Planning policy guidance on the treatment of species identified as priorities under the biodiversity action programme suggests that local authorities should take measures to protect the habitats of these species from further decline through policies in local development documents and should ensure that they are protected from the adverse effects of development, where appropriate, by using planning conditions or obligations. The conservation of these species should be promoted through the incorporation of

Appendix 1: Arboricultural Impact Assessment Plan



Tree Categories

Trees are categorised in accordance with the cascade chart in Table 1 of the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'

Category 'U' - Trees in such condition that they cannot realistically be retained as living trees in context of the current land use for longer than 10 years.
Category 'A' - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category 'B' - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
Category 'C' - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

Root Protection Area

In order to avoid damage to the roots or rooting environment of retained trees, the Root Protection Areas (RPAs) should be plotted around each of the category A, B and C trees. This is a minimum area in m² which should be left undisturbed around each retained tree.

The RPA is calculated using the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations.

The calculated RPA is capped to 707m², which is the equivalent to a circle with a radius of 15m. Where there appears to be restrictions to root growth the root protection area is reshaped to more accurately reflect the likely distribution of the roots.

Arboricultural Impacts

Impacts	Nos. of trees
Trees to be removed	0
Groups / Hedges to be removed (Partial removal of groups)	2 (2)
Trees with proposed incursions into RPAs	23
Groups / Hedges with proposed incursions into RPAs	0
Trees that will require pruning	9
Groups / Hedges that will require pruning	0
Trees to be transplanted	0
Groups / Hedges to be transplanted	0

No.	Species	Proposed structure	Incursion
T2	Hybrid black poplar	Link Road	RPA
T3	Hybrid black poplar	Link Road	RPA
T4	Hybrid black poplar	Link Road	RPA
T5	Hybrid black poplar	Link Road	RPA
T8	Hybrid black poplar	Link Road	RPA
T9	Hybrid black poplar	Link Road	RPA
T10	Hybrid black poplar	Link Road	RPA
T11	Hybrid black poplar	Link Road	RPA
T13	Hybrid black poplar	Link Road	RPA
T14	Hybrid black poplar	Link Road	RPA
T17	Hybrid black poplar	Link Road	RPA
T19	Hybrid black poplar	Link Road	RPA
T22	Hybrid black poplar	Link Road	RPA
T24	Hybrid black poplar	Link Road	RPA
T25	Hybrid black poplar	Link Road	RPA
T26	Hybrid black poplar	Link Road	RPA
T27	Lombardy poplar	Link Road	RPA
T28	Hybrid black poplar	Link Road	RPA
T29	Hybrid black poplar	Link Road	RPA
T30	Hybrid black poplar	Link Road	RPA
T31	Hybrid black poplar	Link Road	RPA
T32	Hybrid black poplar	Link Road	RPA
T42	Hybrid black poplar	Link Road	RPA

Tree Work Schedule

No.	Species	Works	Category
T5	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T8	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B2
T9	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T13	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T14	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T16	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T17	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T26	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T34	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
G1	Various	Partial removal of group	B2
G2	Various	Fell to ground level, remove stumps	C2
G3	Various	Fell to ground level, remove stumps	B2
G4	Various	Partial removal of group	B2

All tree work is to be undertaken in accordance with British Standard BS 3998:2010 Tree work - Recommendations.
All arising's are to be removed and the site is to be left as found.
Care is to be taken of the ground around retained trees to make sure that it does not become compacted as a result of tree surgery operations. No equipment or vehicles such as timber lorries, tractors, excavators or cranes shall be parked or driven beneath the crowns of any retained trees, to prevent subsequent compaction and root death.

No. of individual trees to be removed

U	A	B	C
0	0	0	0

No. of groups / hedges to be removed

U	A	B	C
0 (0)	0 (0)	1 (2)	1 (0)

( ) = Partial removal of a groups

Arboricultural Method Statement

All tree work is to be undertaken in accordance with British Standard Please refer to Arbtech Consulting Ltd. Tree Schedule, Arboricultural Method Statement and Tree Protection Plan, for full details of all surveyed trees and how all aspects of the development maybe implemented without detriment to retained trees.

ARBTECH
Unit 3, Well House Barns, Chester, CH4 0DH
https://arbtech.co.uk, 01244 661170

Project:
Welsh Water Sewage Treatment Works,
Chemistry,
Pentre,
Deeside,
CH5 2DA

Client:
Richards Moorehead & Laing

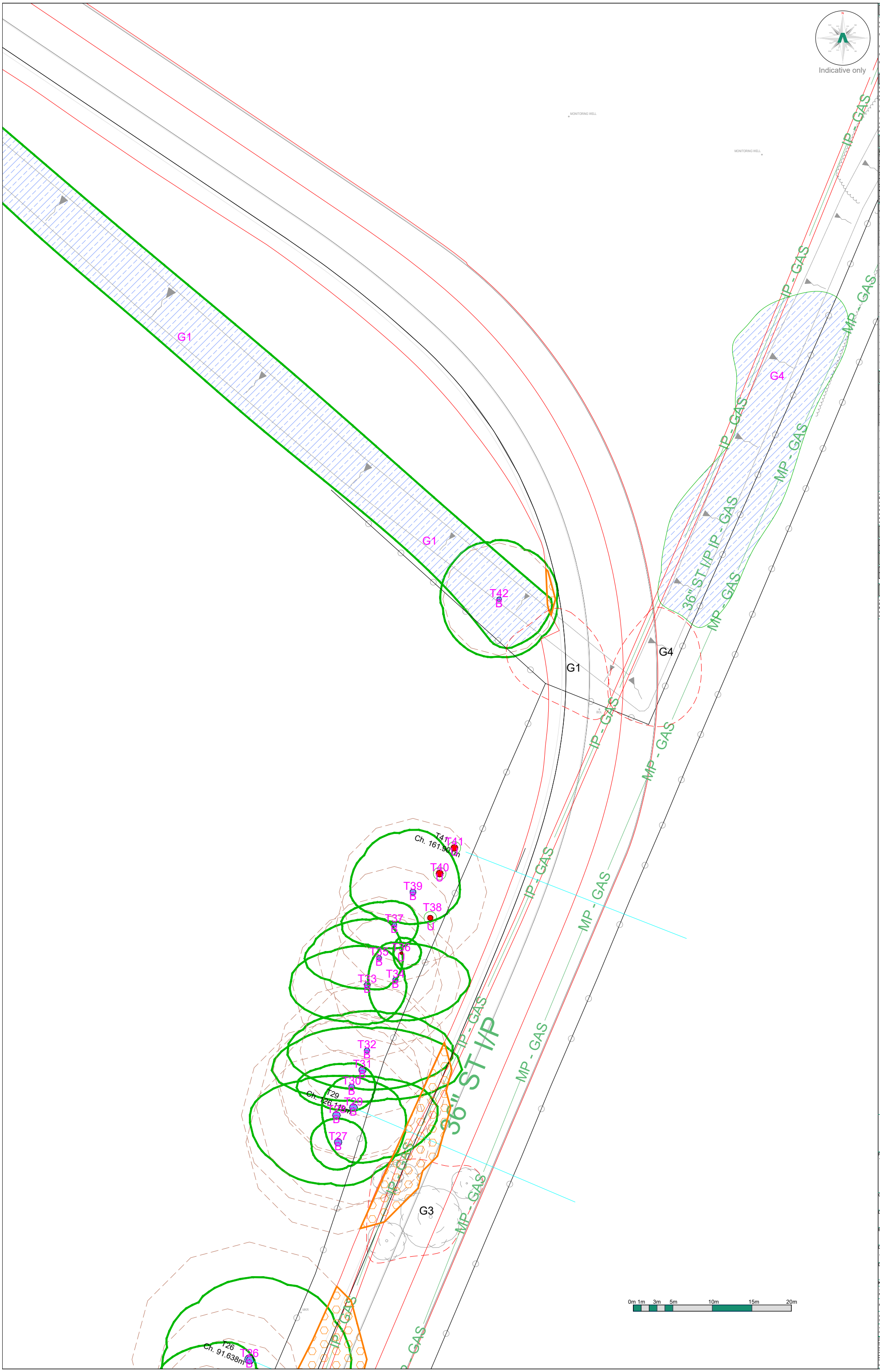
Drawing:
Arboricultural Impact Assessment

Based on:
395318-RML-ZZ-XX-DR-L-0030

Drawing No:		Rev:
Arbtech AIA 01 - Sheet 1 of 3		A
Date: Mar 2022	Scale: 1:150 @ A0	Drawn: AST

Key:
Tree Nos.: T1 | Tree Canopies: | Trunks:
RPAs: | Category 'U' trees: | Category 'B' trees:
Category 'B' groups: | Category 'C' trees: | Category 'C' groups:
Tree to be removed: T43 | Incursion - Proposed link road:

All dimensions should be checked on site. No dimensions are to be scaled from this drawing. Please notify us of any discrepancies found. Arbtech Consulting Ltd. cannot be held responsible for inaccuracies in any survey data on which this drawing is based.
This drawing is for information purposes and for the purposes of the layout or design only, and relates only to the protection of retained trees.
This drawing is not to be read as a definitive part of the engineering or construction designs or method-statement. An architect or structural engineer should be contacted over any matters of construction, detailing or specification and for any standards or regulatory requirements relating to proposed structures, hard surfacing or underground services.
This drawing was produced in colour - a monochrome copy should not be relied upon.
© Arbtech Consulting Ltd, 2022



Tree Categories

Trees are categorised in accordance with the cascade chart in Table 1 of the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'

Category 'U' - Trees in such condition that they cannot realistically be retained as living trees in context of the current land use for longer than 10 years.
Category 'A' - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category 'B' - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
Category 'C' - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

Root Protection Area

In order to avoid damage to the roots or rooting environment of retained trees, the Root Protection Areas (RPAs) should be plotted around each of the category A, B and C trees. This is a minimum area in m² which should be left undisturbed around each retained tree.

The RPA is calculated using the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations.

The calculated RPA is capped to 707m², which is the equivalent to a circle with a radius of 15m. Where there appears to be restrictions to root growth the root protection area is reshaped to more accurately reflect the likely distribution of the roots.

Arboricultural Impacts

Impacts	Nos. of trees
Trees to be removed	0
Groups / Hedges to be removed (Partial removal of groups)	2 (2)
Trees with proposed incursions into RPAs	23
Groups / Hedges with proposed incursions into RPAs	0
Trees that will require pruning	9
Groups / Hedges that will require pruning	0
Trees to be transplanted	0
Groups / Hedges to be transplanted	0

No.	Species	Proposed structure	Incursion
T2	Hybrid black poplar	Link Road	RPA
T3	Hybrid black poplar	Link Road	RPA
T4	Hybrid black poplar	Link Road	RPA
T5	Hybrid black poplar	Link Road	RPA
T8	Hybrid black poplar	Link Road	RPA
T9	Hybrid black poplar	Link Road	RPA
T10	Hybrid black poplar	Link Road	RPA
T11	Hybrid black poplar	Link Road	RPA
T13	Hybrid black poplar	Link Road	RPA
T14	Hybrid black poplar	Link Road	RPA
T17	Hybrid black poplar	Link Road	RPA
T19	Hybrid black poplar	Link Road	RPA
T22	Hybrid black poplar	Link Road	RPA
T24	Hybrid black poplar	Link Road	RPA
T25	Hybrid black poplar	Link Road	RPA
T26	Hybrid black poplar	Link Road	RPA
T27	Lombardy poplar	Link Road	RPA
T28	Hybrid black poplar	Link Road	RPA
T29	Hybrid black poplar	Link Road	RPA
T30	Hybrid black poplar	Link Road	RPA
T31	Hybrid black poplar	Link Road	RPA
T32	Hybrid black poplar	Link Road	RPA
T42	Hybrid black poplar	Link Road	RPA

Tree Work Schedule

No.	Species	Works	Category
T5	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T8	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B2
T9	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T13	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T14	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T16	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T17	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T26	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T34	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
G1	Various	Partial removal of group	B2
G2	Various	Fell to ground level, remove stumps	C2
G3	Various	Fell to ground level, remove stumps	B2
G4	Various	Partial removal of group	B2

All tree work is to be undertaken in accordance with British Standard BS 3998:2010 Tree work - Recommendations.
All arising's are to be removed and the site is to be left as found.
Care is to be taken of the ground around retained trees to make sure that it does not become compacted as a result of tree surgery operations. No equipment or vehicles such as timber lorries, tractors, excavators or cranes shall be parked or driven beneath the crowns of any retained trees, to prevent subsequent compaction and root death.

No. of individual trees to be removed

U	A	B	C
0	0	0	0

No. of groups / hedges to be removed

U	A	B	C
0 (0)	0 (0)	1 (2)	1 (0)

( ) = Partial removal of a groups

Arboricultural Method Statement

All tree work is to be undertaken in accordance with British Standard Please refer to Arbtech Consulting Ltd. Tree Schedule, Arboricultural Method Statement and Tree Protection Plan, for full details of all surveyed trees and how all aspects of the development maybe implemented without detriment to retained trees.

ARBTECH
Unit 3, Well House Barns, Chester, CH4 0DH
https://arbtech.co.uk, 01244 661170

Project:
Welsh Water Sewage Treatment Works,
Chemistry,
Pentre,
Deeside,
CH5 2DA

Client:
Richards Moorehead & Laing

Drawing:
Arboricultural Impact Assessment

Based on:
395318-RML-ZZ-XX-DR-L-0030

Drawing No: Arbtech AIA 01 - Sheet 2 of 3
Rev: A

Date: Mar 2022
Scale: 1:150 @ A0
Drawn: AST

Key:
Tree Nos.: T1
Tree Canopies:
Trunks:
RPAs:
Category 'U' trees:
Category 'B' trees:
Category 'B' groups:
Category 'C' trees:
Category 'C' groups:
Tree to be removed: T43
Incursion - Proposed link road:

All dimensions should be checked on site. No dimensions are to be scaled from this drawing. Please notify us of any discrepancies found. Arbtech Consulting Ltd. cannot be held responsible for inaccuracies in any survey data on which this drawing is based.
This drawing is to be read as a guideline of the layout or design only, and relates only to the protection of retained trees.
This drawing is not to be read as a definitive part of the engineering or construction designs or method-statement. An architect or structural engineer should be contacted over any matters of construction, detailing or specification and for any standards or regulatory requirements relating to proposed structures, hard surfacing or underground services.
This drawing was produced in colour - a monochrome copy should not be relied upon.
© Arbtech Consulting Ltd, 2022

UNMADE GROUND

CONCRETE

G

G

G1

G1

G1

G1

Note: No unauthorised excavations are to be carried out within the RPAs of any retained trees. Any level changes must form part of a construction method statement & must protect the rooting environments of all retained trees.

N

Indicative only

0m 1m 3m 5m 10m 15m 20m

Tree Categories

Trees are categorised in accordance with the cascade chart in Table 1 of the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations'

Category 'U' - Trees in such condition that they cannot realistically be retained as living trees in context of the current land use for longer than 10 years.
Category 'A' - Trees of high quality with an estimated remaining life expectancy of at least 40 years.
Category 'B' - Trees of moderate quality with an estimated remaining life expectancy of at least 20 years.
Category 'C' - Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150mm.

Root Protection Area

In order to avoid damage to the roots or rooting environment of retained trees, the Root Protection Areas (RPAs) should be plotted around each of the category A, B and C trees. This is a minimum area in m² which should be left undisturbed around each retained tree.

The RPA is calculated using the British Standard BS 5837:2012 'Trees in relation to design, demolition and construction - Recommendations.

The calculated RPA is capped to 707m², which is the equivalent to a circle with a radius of 15m. Where there appears to be restrictions to root growth the root protection area is reshaped to more accurately reflect the likely distribution of the roots.

Arboricultural Impacts

Impacts	Nos. of trees
Trees to be removed	0
Groups / Hedges to be removed (Partial removal of groups)	2 (2)
Trees with proposed incursions into RPAs	23
Groups / Hedges with proposed incursions into RPAs	0
Trees that will require pruning	9
Groups / Hedges that will require pruning	0
Trees to be transplanted	0
Groups / Hedges to be transplanted	0

No.	Species	Proposed structure	Incursion
T2	Hybrid black poplar	Link Road	RPA
T3	Hybrid black poplar	Link Road	RPA
T4	Hybrid black poplar	Link Road	RPA
T5	Hybrid black poplar	Link Road	RPA
T8	Hybrid black poplar	Link Road	RPA
T9	Hybrid black poplar	Link Road	RPA
T10	Hybrid black poplar	Link Road	RPA
T11	Hybrid black poplar	Link Road	RPA
T13	Hybrid black poplar	Link Road	RPA
T14	Hybrid black poplar	Link Road	RPA
T17	Hybrid black poplar	Link Road	RPA
T19	Hybrid black poplar	Link Road	RPA
T22	Hybrid black poplar	Link Road	RPA
T24	Hybrid black poplar	Link Road	RPA
T25	Hybrid black poplar	Link Road	RPA
T26	Hybrid black poplar	Link Road	RPA
T27	Lombardy poplar	Link Road	RPA
T28	Hybrid black poplar	Link Road	RPA
T29	Hybrid black poplar	Link Road	RPA
T30	Hybrid black poplar	Link Road	RPA
T31	Hybrid black poplar	Link Road	RPA
T32	Hybrid black poplar	Link Road	RPA
T42	Hybrid black poplar	Link Road	RPA

Tree Work Schedule

No.	Species	Works	Category
T5	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T8	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B2
T9	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T13	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T14	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T16	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T17	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T26	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
T34	Hybrid black poplar	Crown lift canopy to give 4m clearance above proposed link road	B1
G1	Various	Partial removal of group	B2
G2	Various	Fell to ground level; remove stumps	C2
G3	Various	Fell to ground level; remove stumps	B2
G4	Various	Partial removal of group	B2

All tree work is to be undertaken in accordance with British Standard BS 3998:2010 Tree work - Recommendations.
All arising's are to be removed and the site is to be left as found.
Care is to be taken of the ground around retained trees to make sure that it does not become compacted as a result of tree surgery operations. No equipment or vehicles such as timber lorries, tractors, excavators or cranes shall be parked or driven beneath the crowns of any retained trees, to prevent subsequent compaction and root death.

No. of individual trees to be removed

U	A	B	-
0	0	0	0

No. of groups / hedges to be removed

U	A	B	-
0 (0)	0 (0)	1 (2)	1 (0)

( ) = Partial removal of a groups

Arboricultural Method Statement

All tree work is to be undertaken in accordance with British Standard Please refer to Arbtech Consulting Ltd. Tree Schedule, Arboricultural Method Statement and Tree Protection Plan, for full details of all surveyed trees and how all aspects of the development maybe implemented without detriment to retained trees.

ARBTECH
Unit 3, Well House Barns, Chester, CH4 0DH
https://arbtech.co.uk, 01244 661170

Project:
Welsh Water Sewage Treatment Works,
Chemistry,
Pentre,
Deeside,
CH5 2DA

Client:
Richards Moorehead & Laing

Drawing:
Arboricultural Impact Assessment

Based on:
395318-RML-ZZ-XX-DR-L-0030

Drawing No: Arbtech AIA 01 - Sheet 3 of 3
Rev: A

Date: Mar 2022
Scale: 1:150 @ A0
Drawn: AST

Key:

Tree Nos.:	T1	Tree Canopies:		Trunks:	
RPAs:		Category 'U' trees:		Category 'B' trees:	
Category 'B' groups:		Category 'C' trees:		Category 'C' groups:	
Tree to be removed:	T43	Incursion - Proposed link road:			

All dimensions should be checked on site. No dimensions are to be scaled from this drawing.
Please notify us of any discrepancies found. Arbtech Consulting Ltd. cannot be held responsible for inaccuracies in any information supplied which is not to scale.
This drawing is produced for the purposes of the layout or design only, and relates only to the protection of retained trees.
This drawing is not to be read as a definitive part of the engineering or construction designs or method statement. An architect or structural engineer should be contacted over any matters of construction, detailing or specification and for any standards or regulatory requirements relating to proposed structures, hard surfacing or underground services.
This drawing was produced in colour - a monochrome copy should not be relied upon.
© Arbtech Consulting Ltd, 2022

Appendix 2: Tree Survey Schedule

BS5837:2012 Tree Survey

Client: Richards Moorehead & Laing
Project: Welsh Water Sewage Treatment Works, Pentre.
Survey Date: 08/03/2022
Surveyor: Alan Thompson

Artbech Consulting Ltd.

Unit 3, Well House Barns
Chester Road
Chester
Cheshire
CH4 0DH
Phone: 01244 66 11 70

Tree and Tag No / Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)	Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations / Survey Comment	Cat ERC
G1										Estimated Measurements	
A Group	7.5	1	280	N 3.5	2	Y	A: 35.5	Good	C: Good		B.2
- -				E 3.5	2		R: 3.36		S: Good		
				S 3.5	2				B: Good	Linear boundary screening group is comprised of approximately 70 young/early mature trees, predominantly hybrid black poplar interspersed with occasional goat willow. Measurements given are estimated averages for the group.	>40 yrs
				W 3.5	2						
G2										Estimated Measurements	
A Group	3.5	1	190	N 2.5	1.5	Y	A: 16.3	Good	C: Good		C.2
- -				E 2.5	1.5		R: 2.27		S: Good		
				S 2.5	1.5				B: Good	Off site group is comprised of 5 trees, species are ash and goat willow. Measurements given are estimated averages for the group.	>40 yrs
				W 2.5	1.5						
G3										Estimated Measurements	
A Group	4	1	250	N 3	1	SM	A: 28.3	Good	C: Good		B.2
- -				E 3	1		R: 3		S: Good		
				S 3	1				B: Good	Off site group is comprised of four early mature trees. Species are hawthorn and goat willow. Measurements given are estimated averages for the group.	20 to 40 yrs
				W 3	1						
G4										Estimated Measurements	
A Group	6.5	6	220 (Eq)	N 4	1.5	SM	A: 22	Good	C: Good		B.2
- -				E 4	1.5		R: 2.64		S: Good		
				S 4	1.5				B: Good	Linear boundary screening group is comprised of approximately 40 trees. Predominantly goat willow interspersed with occasional ash. Measurements given are estimated averages for the group.	>40 yrs
				W 4	1.5						

Age Classifications: N Newly planted; Y Young; SM Semi-mature; EM Early Mature; M Mature; OM Over Mature

Condition: C Crown; S Stem; B Basal area

Stems: Ø Diameter; (Eq) Equivalent stem diameter using BS5837:2012 definition

Tree and Tag No Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)	Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations Survey Comment	Cat ERC
T1											
Lombardy Poplar *Populus nigra 'Italica'*	21	1	780	N 3 E 4 S 3 W 3	11 9 9 9	M	A: 275.3 R: 9.36	Good	C: Good S: Good B: Good	Naturally occurring minor deadwood observed in tree's inner crown. Remove deadwood.	**B.1** >40 yrs
T2											
Hybrid Black Poplar *Populus x canadensis*	18.5	1	1170	N 8 E 4 S 10 W 10	4 14 4 1.5	M	A: 619.4 R: 14.04	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees to the east.	**B.1** >40 yrs
T3											
Hybrid Black Poplar *Populus x canadensis*	16.5	1	1010	N 8 E 10 S 7 W 4.5	5 5 11 5	M	A: 461.5 R: 12.12	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees.	**B.1** >40 yrs
T4											
Hybrid Black Poplar *Populus x canadensis*	17	1	740	N 5 E 7 S 3.5 W 7	12 7 11 2	SM	A: 247.8 R: 8.88	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees.	**B.1** >40 yrs
T5											
Hybrid Black Poplar *Populus x canadensis*	19	1	1080	N 8 E 9 S 4 W 8	4 1 9 3	M	A: 527.7 R: 12.96	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees.	**B.1** >40 yrs
T6 934											
Lombardy Poplar *Populus nigra 'Italica'*	12.5	1	410	N 1.5 E 1.5 S 1.5 W 1.5	7.5 7.5 7.5 7.5	SM	A: 76.1 R: 4.92	Poor	C: Fair S: Poor B: Poor	Tree's stem has failed and partially collapsed during a recent storm event. Tree is hung up in the crown of neighbouring tree. Fell tree as a matter of urgency	**U** <10 yrs

Age Classifications:
N Newly planted
Y Young
SM Semi-mature
EM Early Mature
M Mature
OM Over Mature

Condition:
C Crown
S Stem
B Basal area

Stems:
Ø Diameter
(Eq) Equivalent stem diameter using BS5837:2012 definition

Tree and Tag No Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)	Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations Survey Comment	Cat ERC
T7										Estimated Measurements	
Common Hawthorn *Crataegus monogyna*	3.5	1	120	N 2 E 2 S 2 W 2	0.5 0.5 0.5 0.5	SM	A: 6.5 R: 1.43	Good	C: Good S: Good B: Good		C.1 >40 yrs
T8											
Hybrid Black Poplar *Populus x canadensis*	14	1	870	N 5 E 12 S 5 W 1.5	5 3 5 3	M	A: 342.5 R: 10.44		C: Fair S: Good B: Good	Neighbouring tree has recently been felled. Tree's crown has been historically suppressed by neighbouring tree and is heavily weighted to the east as a result.	B.2 20 to 40 yrs
T9											
Hybrid Black Poplar *Populus x canadensis*	16	1	790	N 5 E 10 S 5 W 3	5 2.5 5 6	M	A: 282.4 R: 9.48	Fair	C: Fair S: Good B: Fair	Tree's crown is partially suppressed by neighbouring trees. Slight apical dieback in tree's upper crown. Basal cavity (west) observed, >200mm, tree is responding well with adaptive cambium thickening around the cavity. Internal decay column was detected to 1.5m. Reinspect tree within 24 months.	B.1 20 to 40 yrs
T10											
Hybrid Black Poplar *Populus x canadensis*	16	1	870	N 4 E 4 S 7 W 11	11 11 3 3	M	A: 342.5 R: 10.44	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees.	B.1 >40 yrs
T11											
Hybrid Black Poplar *Populus x canadensis*	15.5	1	690	N 4 E 5.5 S 4 W 4	11 1 4 5	SM	A: 215.4 R: 8.28	Fair	C: Fair S: Good B: Good	Slight apical dieback observed in tree's upper crown. Tree's crown is partially suppressed by neighbouring trees.	B.2 20 to 40 yrs
T12 904											
Hybrid Black Poplar *Populus x canadensis*	15	1	860	N 7 E 2 S 4.5 W 7	7 11 3 2	M	A: 334.6 R: 10.32	Poor	C: Fair S: Poor B: Fair	Large decay cavity was observed in tree's stem at 1.5m, excessive internal decay was detected in tree's stem around cavity. Tree is recommended to be felled within 12 months.	U 10 to 20 yrs

Age Classifications: N Newly planted; Y Young; SM Semi-mature; EM Early Mature; M Mature; OM Over Mature

Condition: C Crown; S Stem; B Basal area

Stems: Ø Diameter; (Eq) Equivalent stem diameter using BS5837:2012 definition

Tree and Tag No Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)		Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations Survey Comment	Cat ERC
T13												
Hybrid Black Poplar *Populus x canadensis*	18	1	670	N E S W	5.5 10 4 3	9 2 8 11	M	A: 203.1 R: 8.04	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees to the west.	**B.1** >40 yrs
T14												
Hybrid Black Poplar *Populus x canadensis*	18	1	840	N E S W	5 11 6 10	9 1.5 7 2	M	A: 319.2 R: 10.07	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees. Minor cavity was observed in tree's stem (northwest) at 0.2m. Tree is beginning to seal the cavity with adaptive cambium thickening.	**B.1** >40 yrs
T15 905												
Lombardy Poplar *Populus nigra 'Italica'*	13.5	1	430	N E S W	1 1 1 1	7.5 7.5 7.5 7.5	SM	A: 83.7 R: 5.16	Poor	C: Fair S: Poor B: Poor	Excessive internal decay and basal decay was detected with sounding hammer. Tree is recommended to be felled within 12 months.	**U** 10 to 20 yrs
T16												
Hybrid Black Poplar *Populus x canadensis*	17	1	810	N E S W	7 12 4.5 7.5	9 2 7 5	SM	A: 296.9 R: 9.72	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees	**B.1** >40 yrs
T17												
Hybrid Black Poplar *Populus x canadensis*	16.5	1	750	N E S W	4 11.5 4 3	8 1.5 4 4	SM	A: 254.5 R: 9	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees.	**B.1** >40 yrs
T18 935												
Hybrid Black Poplar *Populus x canadensis*	7.5	1	580	N E S W	2 2 2 3	7 7 3 3	SM	A: 152.2 R: 6.96	Fair	C: Fair S: Fair B: Fair	Two decay cavities were observed in tree's stem (south) at 1m and 1.7m. Tree is recommended to be felled within 6 months, to prevent foreseeable stem failure. Tree is located immediately adjacent to waste water infrastructure.	**C.1** 10 to 20 yrs

Age Classifications: N Newly planted; Y Young; SM Semi-mature; EM Early Mature; M Mature; OM Over Mature

Condition: C Crown; S Stem; B Basal area

Stems: Ø Diameter; (Eq) Equivalent stem diameter using BS5837:2012 definition

Tree and Tag No Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)	Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations Survey Comment	Cat ERC
T19											
Hybrid Black Poplar *Populus x canadensis*	16	1	680	N 5 E 11 S 5 W 3	7 3 7 12	M	A: 209.2 R: 8.16	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees.	**B.1** >40 yrs
T20											
Hybrid Black Poplar *Populus x canadensis*	8.5	1	530	N 2 E 2 S 2 W 3	3 3 3 3	SM	A: 127.1 R: 6.36	Fair	C: Fair S: Fair B: Good	Decay cavity (>300mm) observed in tree's stem at 1.2m. Tree is recommended to be felled within 6 months, to prevent foreseeable stem failure. Tree is located immediately adjacent to waste water infrastructure.	**C.1** 10 to 20 yrs
T21											
Hybrid Black Poplar *Populus x canadensis*	9	1	470	N 3 E 7 S 2 W 1.5	5 4 5 5	SM	A: 99.9 R: 5.63	Fair	C: Fair S: Good B: Good	Tree's crown is heavily suppressed by neighbouring trees to the west.	**B.2** 20 to 40 yrs
T22 906											
Hybrid Black Poplar *Populus x canadensis*	5.5	1	590	N 1.5 E 5 S 1.5 W 1.5	2.5 2.5 2.5 2.5	M	A: 157.5 R: 7.08	Poor	C: Poor S: Poor B: Good	Tree's stem previously snapped out at 3m, possibly storm damage, 3m pole with 120mm live limb remains. Recommended to fell remainder of tree within 12 months.	**U** 20 to 40 yrs
T23										Estimated Measurements	
Hybrid Black Poplar *Populus x canadensis*	9	1	590	N 4 E 4 S 3 W 6	7 7 4 3	SM	A: 157.5 R: 7.08	Good	C: Fair S: Good B: Good	Tree's crown is becoming heavily suppressed by neighbouring trees	**B.2** 20 to 40 yrs
T24											
Hybrid Black Poplar *Populus x canadensis*	17.5	1	750	N 4 E 11 S 5 W 3	7 5 7 12	M	A: 254.5 R: 9	Fair	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees. Slight apical dieback observed in tree's upper crown.	**B.1** 20 to 40 yrs

Age Classifications: N Newly planted; Y Young; SM Semi-mature; EM Early Mature; M Mature; OM Over Mature

Condition: C Crown; S Stem; B Basal area

Stems: Ø Diameter; (Eq) Equivalent stem diameter using BS5837:2012 definition

Tree and Tag No Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)	Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations Survey Comment	Cat ERC
T25											
Hybrid Black Poplar *Populus x canadensis*	17	1	750	N 5 E 4 S 5 W 9	4 7 7 5	M	A: 254.5 R: 9	Good	C: Fair S: Good B: Good		**B.1** >40 yrs
T26											
Hybrid Black Poplar *Populus x canadensis*	20	1	1210	N 11 E 12 S 6 W 12	4 3 7 4	M	A: 662.4 R: 14.52	Good	C: Good S: Good B: Good		**B.1** >40 yrs
T27										Estimated Measurements	
Lombardy Poplar *Populus nigra 'Italica'*	21	1	950	N 3 E 3.5 S 3.5 W 3.5	9 9 9 9	M	A: 408.3 R: 11.4	Good	C: Good S: Good B: Good		**B.1** 20 to 40 yrs
T28											
Hybrid Black Poplar *Populus x canadensis*	19	1	980	N 5 E 9 S 9 W 11	9 4 3 3	M	A: 434.5 R: 11.76	Good	C: Good S: Good B: Good		**B.1** >40 yrs
T29											
Hybrid Black Poplar *Populus x canadensis*	18.5	1	1000	N 4 E 11 S 7 W 4	9 5 5 9	M	A: 452.4 R: 12	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees. Tree's crown is coming into contact with adjacent palisade fencing	**B.1** >40 yrs
T30											
Hybrid Black Poplar *Populus x canadensis*	14.5	1	740	N 3 E 3 S 3 W 7	7 7 7 3	SM	A: 247.8 R: 8.88	Fair	C: Fair S: Good B: Good	Slight apical dieback observed in tree's upper crown. Tree's crown is partially suppressed by neighbouring trees.	**B.2** 20 to 40 yrs

Age Classifications: N Newly planted; Y Young; SM Semi-mature; EM Early Mature; M Mature; OM Over Mature

Condition: C Crown; S Stem; B Basal area

Stems: Ø Diameter; (Eq) Equivalent stem diameter using BS5837:2012 definition

Tree and Tag No Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)		Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations Survey Comment	Cat ERC
T31 907												
Hybrid Black Poplar *Populus x canadensis*	20.5	1	920	N E S W	5.5 12.5 4 11.5	9 7 9 4		A: 383 R: 11.04	Good	C: Fair S: Good B: Good	Several hung up snapped out branches were observed in tree's crown. Remove hung up limbs within six months. Tree's crown is partially suppressed by neighbouring trees	**B.1** >40 yrs
T32												
Hybrid Black Poplar *Populus x canadensis*	20	1	690	N E S W	5 11 5 10	11 5 11 4	SM	A: 215.4 R: 8.28	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees. Remove faulted limb from tree's crown (west at 3m) within three months.	**B.1** >40 yrs
T33												
Hybrid Black Poplar *Populus x canadensis*	17.5	1	770	N E S W	5 5 5 10	7 7 7 2	SM	A: 268.3 R: 9.24	Good	C: Fair S: Good B: Good	Canopy	**B.1** >40 yrs
T34												
Hybrid Black Poplar *Populus x canadensis*	12	1	670	N E S W	5 10 5 3	6 1.5 5 5	SM	A: 203.1 R: 8.04	Good	C: Fair S: Good B: Good	Tree's crown is heavily suppressed by neighbouring trees to the west and is heavily weighted to the east as a result.	**B.2** 20 to 40 yrs
T35												
Hybrid Black Poplar *Populus x canadensis*	14	1	630	N E S W	5 3 4 9.5	7 5 7 3	SM	A: 179.6 R: 7.56	Good	C: Fair S: Good B: Good	Tree's crown is partially suppressed by neighbouring trees	**B.2** 20 to 40 yrs
T36 908												
Hybrid Black Poplar *Populus x canadensis*	7	1	320	N E S W	2 2.5 2 1	3 4 4 4	SM	A: 46.3 R: 3.83	Decline	C: Poor S: Fair B: Good	Tree is entering terminal decline. Tree's upper crown has previously snapped out. Internal decay was detected in tree's stem. Recommend tree's removal within six months.	**U** <10 yrs

Age Classifications:
N Newly planted
Y Young
SM Semi-mature
EM Early Mature
M Mature
OM Over Mature

Condition:
C Crown
S Stem
B Basal area

Stems:
Ø Diameter
(Eq) Equivalent stem diameter using BS5837:2012 definition

Tree and Tag No / Species	Hght (m)	Stems No	Stems Ø (mm)	Crown Spread (m)	Crown Clear (m)	Age	RP A (m²) R (m)	Phys Condition	Structural Condition	Preliminary Recommendations / Survey Comment	Cat ERC
T37											
Hybrid Black Poplar *Populus x canadensis*	16	1	600	N 3 E 3 S 3 W 7	6 5 6 3	SM	A: 162.9 R: 7.2	Good	C: Fair S: Good B: Good	Tree's crown is becoming heavily suppressed by neighbouring trees.	**B.2** 20 to 40 yrs
T38 937											
Hybrid Black Poplar *Populus x canadensis*	18	1	690	N 0.5 E 0.5 S 0.5 W 0.5	5 5 5 5	SM	A: 215.4 R: 8.28	Good	C: Poor S: Good B: Good	Tree's stem has failed at 5m during storm event. Fell remaining 5m pole within six months.	**U** <10 yrs
T39											
Hybrid Black Poplar *Populus x canadensis*	20	1	760	N 8 E 6 S 4 W 8	2 7 7 1	M	A: 261.3 R: 9.11	Good	C: Fair S: Good B: Good		**B.1** >40 yrs
T40											
Hybrid Black Poplar *Populus x canadensis*	3.5	1	880	N 0.5 E 0.5 S 0.5 W 0.5	3 3 3 3	M	A: 350.4 R: 10.56	Fair	C: Poor S: Fair B: Good	Tree's stem failed and snapped out at 3m during storm event. Fell remaining 3m pole within six months.	**U** <10 yrs
T41											
Hybrid Black Poplar *Populus x canadensis*	3.5	1	870	N 0.5 E 0.5 S 0.5 W 0.5	3 3 3 3	M	A: 342.5 R: 10.44	Good	C: Fair S: Good B: Good	Tree's stem failed at 3.5m during storm event. Fell remaining 3.5m pole within six months.	**U** <10 yrs
T42											
Hybrid Black Poplar *Populus x canadensis*	16	1	580	N 7.5 E 7.5 S 7.5 W 7.5	3.5 3.5 3.5 3.5	SM	A: 152.2 R: 6.96	Good	C: Good S: Good B: Good	Off site tree could not be fully inspected and measurements given are estimated.	**B.1** >40 yrs

Age Classifications: N Newly planted; Y Young; SM Semi-mature; EM Early Mature; M Mature; OM Over Mature

Condition: C Crown; S Stem; B Basal area

Stems: Ø Diameter; (Eq) Equivalent stem diameter using BS5837:2012 definition

Appendix 3: Contact Details

Name	Position	Company	Contact
Jon Stoddard	Client	RML Ltd.	
	Tree Officer		
Alan Thompson	Arboricultural Consultant	Arbtech Consulting Ltd.	01244 661170 07703 676216 at@arbtech.co.uk
	Site Manager		
	Main contractor		

Document Production Record

Document number	Editor	Signature	Position	Issue number	Date
Arbtech AIA 01 Rev C	Alan Thompson		Arboricultural Consultant	1	28/03/2022

Limitations

Arbtech Consulting Ltd has prepared this Report for the sole use of the above named Client/Agent in accordance with our terms of business, under which our services were performed. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by us. This Report may not be relied upon by any other party without the prior and express written agreement of Arbtech Consulting Ltd. The assessments made assume that the sites and facilities will continue to be used for their current purpose without significant change. The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested. Information obtained from third parties has not been independently verified by Arbtech Consulting Ltd.

Copyright

© This Report is the copyright of Arbtech Consulting Ltd. Any unauthorised reproduction or usage by any person other than the addressee is strictly prohibited.

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix B

Ornithology Reports

395318 | RML-00-XX-RP-Y-8012

First Issue | Revision P01 | September 2025



Contents

8. B. Ornithology Reports 1

8.1 Wintering Bird Survey Data Report - September 2019 1

8.2 Breeding Bird Survey Report - September 2021 2

8.3 Over Wintering Bird Survey Report - October 2021 3

8.4 Non-Breeding Bird Technical Report - September 2023 4

8.5 Breeding Bird Technical Report - January 2024 5

8.6 Breeding Bird Technical Report - November 2024 6

8. B. Ornithology Reports

8.1 Wintering Bird Survey Data Report - September 2019

MOTT MACDONALD

River Dee

Wintering bird survey data report

27 June 2019

Mott MacDonald
Ground floor
Royal Liver Building
Pier Head
Liverpool L3 1JH
United Kingdom

T +44 (0)151 482 9910
F +44 (0)151 236 2985
mottmac.com

River Dee

Wintering bird survey data report

27 June 2019

Mott MacDonald Limited. Registered in England and Wales no. 1243967.
Registered office: Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
1	27/06/19	K. Bowman	C. Maghanga N. Shelton	S. Blunt (RML)	For Issue

Document reference: 395318-0070

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Executive summary

Mott MacDonald Limited undertook over-wintering bird surveys to support a proposal to undertake the renewal of the A494 Dee Bridge and approximately 1.75 km of the A494 between the River Dee and Queensferry Interchange.

Three survey visits were conducted during the calendar winter months, over a 3-month winter period (December 2018 to February 2019).

A total of 28 bird species were recorded, of which 17 notable species were identified;

- Four SPA qualifying species;
- Five Bird species of Principal Importance (Wales Environment Act);
- Two Red List Birds of Conservation Concern;
- Six Amber List Birds of Conservation Concern and,
- Eleven Other Bird species

The SPA species recorded during the surveys did not represent a significant proportion of the Dee Estuary SPA or RAMSAR populations (<1% of total wintering population).

Additionally, the Red or Amber List Birds of Conservation Concern are species which are widespread in the UK, meaning that the site does not provide particularly important habitat for these species.

Recommendations are made for mitigation, which include:

- Avoidance-
  - Avoid the removal of hedgerows, trees and wetland where possible.
  - Any vegetation clearance that cannot be avoided should be undertaken outside of the bird nesting season (28th Feb – 31st Aug inclusive), however please note that nesting can extend beyond the recognised period; and
  - Avoid working during low tide only, where possible. This will enable bird species to have freedom of movement with regards to full riverbank availability, flight pathways and using the underneath area of the bridge in order to commute and feed.
- Minimisation
  - Ensure that the design of the preferred option minimises the project footprint that would result in the loss of hedgerow, tree, and wetland habitats and retains/creates connective habitats between them.
  - Implement BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites’;
  - Visual barriers/sound bunds should be used to shield birds from the increased disturbance caused by human activity and vehicular activities on the bridge/watercourse.
  - Use of fully shielded lighting; and
- Compensation
  - Where the loss of habitats a occur, seek to restore degraded or create new areas of similar habitat within and/or outside the development boundary by planting suitable

species and/or improving the management in perpetuity. In addition, the employment of nest boxes should be considered in areas of woodland losses if necessary.

- Where on-site mitigation is not considered sufficient to meet the Local Planning Authority's biodiversity duty and to ensure that the National Planning Policy Framework's target of net biodiversity gain is achieved, then off site compensation may be required.

1 Introduction

1.1 Project background

Mott MacDonald Limited was commissioned by Transport Wales to undertake wintering bird surveys in support of an on-line improvement of approximately 1.75 km of the A494 between the River Dee and the Queensferry Interchange.

Full details of the proposed scheme are described in the Scheme Assessment Report (ref 36057/054).

In summary, the proposed scheme consists of two new bridges to carry eastbound and westbound traffic. The eastbound carriageway will make use of the current A494 bridge's supporting river piers combined with a new deck structure and abutments. The westbound carriageway will include a completely new river crossing bridge structure and highway construction constructed immediately to the south of the existing A494 (Map. 1).

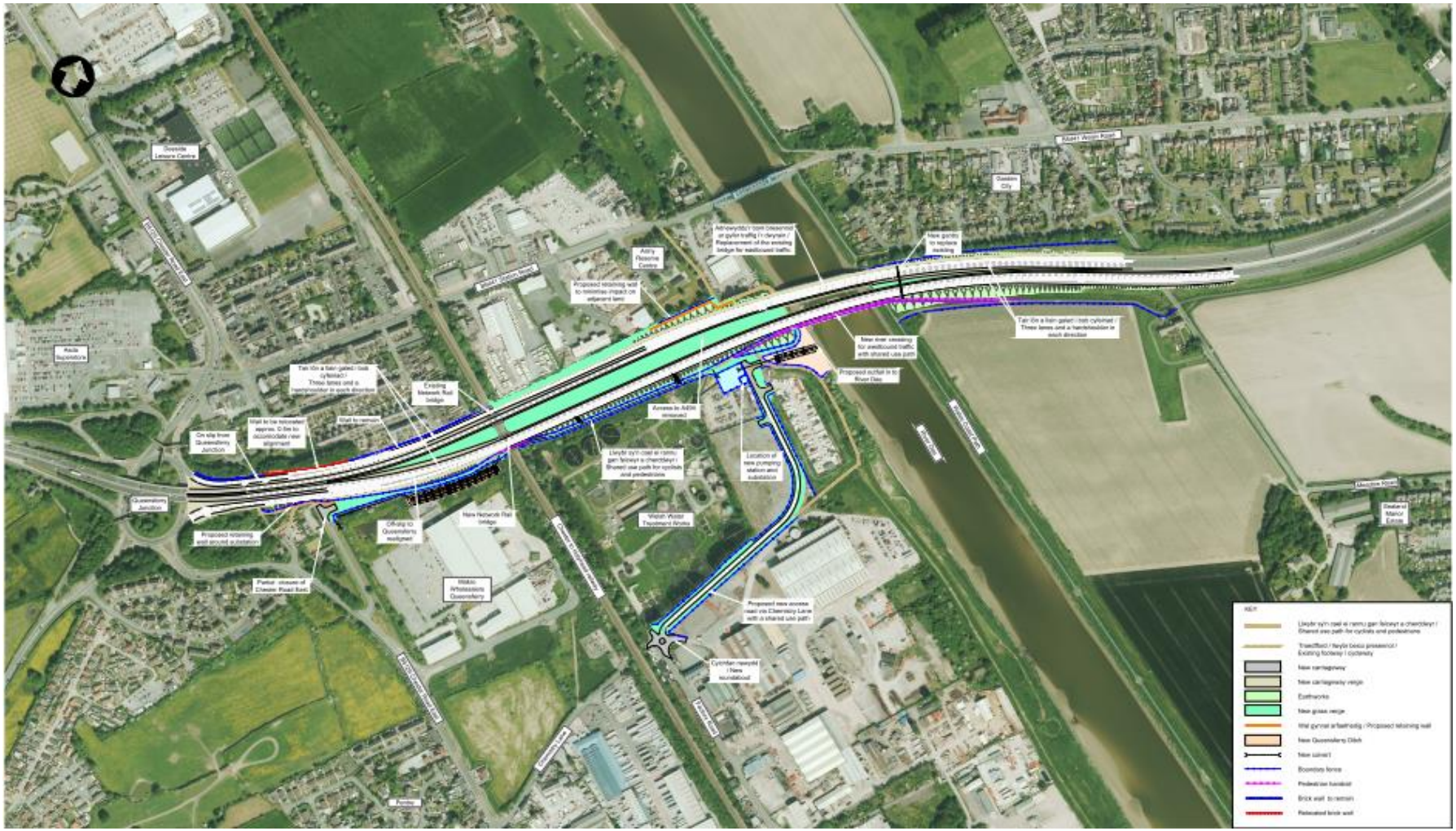
The key features of the proposed scheme are:

- A 1.4km long off line widening in order to create three lanes.
- A hard shoulder in each direction to increase safety and reduce the congestion associated with break-downs.
- A new rail bridge to carry the Chester to Holyhead line over the proposed new A494 westbound carriageway.
- A new access road to connect Chemistry Lane with the area east of the A494 and west of the river. This has been provided to replace the current sub-standard access off the A494 which would be closed.
- A shared path for pedestrians and cyclists alongside the westbound carriageway which will connect with the current Wales Coast Path.

Winter bird surveys were required to determine the areas within and surrounding the proposed works where wild birds are utilising the area of and adjacent to the proposed scheme and which species and what numbers of these species are present during the wintering period (December to February), and where:

- The presence of bird species in the study area during the winter season may be a material consideration in planning and will likely result in a constraint to the client; and
- Potential mitigation is required and enable decisions to be made with regards to the wild birds identified within the site extent.

Map 1: Proposed works of two new bridges to carry eastbound and westbound traffic.



Source: Mott MacDonald, 2019

1.2 Site description

The site limits are between grid references SJ316679 and SJ327688, along the A494 dual carriageway in Queensferry, Wales. Central to the proposed works and where over-wintering bird surveys were conducted is the River Dee crossing (central OS grid reference SJ 32373 68598). The river is fringed with intertidal mudflats and is surrounded by industrial and residential buildings, farmlands and amenity grasslands.

The River Dee has a total length of 110.0km and flows through both England and Wales, and forms part of the border between the two countries. The river rises in Snowdonia in Wales, runs East through Chester (Wales) and England, it then discharges in to the Dee Estuary between both Wales and the Wirral peninsula.

The Dee estuary is a Special Protection Area (SPA), Special Area of Conservation (SAC) and RAMSAR site and is significantly important, specifically for over-wintering birds. The estuary contains vital intertidal mudflat and saltmarsh habitats that provide optimal feeding and roosting opportunities for large populations of coastal birds. In addition, the site is also particularly important during migration periods for bird species and supports breeding population of two species of Terns of European importance: Common Tern *Sterna hirundo* and Little Tern *Sternula albifrons*.

1.2.1 SPA qualifying species

SPA's are designated for both the habitats they contain and the species of wild birds that they support – being known as qualifying features. Both individual species and groups of species, known as assemblages, are listed in the reasons for designating a site. The Dee estuary area qualifies under **Article 4.2** of the Birds Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. During the over-winter period, the estuary supports an average of 130,408 individual waterfowl.

Special Protection Areas are selected to protect one or more rare, threatened or vulnerable bird species listed in Annex I of the Birds Directive, and regularly occurring migratory species. The qualifying SPA species for this site are the following:

- On passage:
  - Sandwich Tern *Sterna sandvicensis*
  - Redshank *Tringa totanus*
- Over winter:
  - Bar-tailed Godwit *Limosa lapponica*
  - Curlew *Numenius arquata*
  - Black-tailed Godwit *Limosa limosa islandica*
  - Dunlin *Calidris alpina*
  - Grey Plover *Pluvialis squatarola*
  - Knot *Calidris canutus*
  - Oystercatcher, *Haematopus ostralegus*

- Pintail *Anas acuta*
- Redshank *Tringa tetanus*
- Shelduck, *Tadorna totanus*
- Teal *Anas crecca*

1.3 Scope of Report

This report will:

- Present data from the winter bird surveys conducted for the scheme between December 2018 and February 2019, to enable an assessment of potential impacts to over-wintering birds utilising the site to be undertaken;
- Form part of the Environmental Impact Assessment (EIA) which will be presented for planning within an Environmental Statement (ES). It is understood that the ES will be submitted for planning consideration in 2019;
- Identify patterns of habitat and bank utilisation within the proposed works site extent and zone of influence by wintering birds;
- Assess the ecological importance of the wintering bird populations and assemblages within the site extent; and
- Provide enough survey data to begin the development of appropriate mitigation, which may be required (more detailed in the ES).

1.4 Legislation and policy

The Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017 (as amended), together form the cornerstone for species and habitat protection in Wales and England. In the UK all wild birds, their nests and their eggs are protected by the Wildlife and Countryside Act 1981 (as amended). Offences under this Act include:

- Intentionally killing injuring or taking any wild bird;
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built; and
- Intentionally taking or destroying the egg of any wild bird

Birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) have further protection making it an offence to intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or at/near a nest containing eggs or young, or to disturb the dependent young of such a bird.

Species which are noted features or form part of SPA assemblages are effectively protected from harm to habitats and/or disturbance when using habitats. These habitats include those which are not part of the site but are of importance for the species for which the site is designated. In the case of wild birds, which are highly mobile, these areas of habitat (known as functionally linked land) also require special consideration in terms of potential impacts upon the site.

The Environment (Wales) Act 2016 replaces the duty previously applied under the Natural Environment and Rural Communities Act (2006) placed on planning authorities to have due regard to biodiversity when making decisions. Several species of bird are listed on the Environment (Wales) Act 2016 Section 7 as Priority Species. These are the species found in Wales which were identified as requiring action under the UK Biodiversity Action Plan (BAP) and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework. As such, it is targeted for measures necessary to support its conservation status in the UK.

Section 40 of the NERC Act 2006 requires public bodies, including local authorities, 'to have regard to the conservation of biodiversity in England' when carrying out their normal functions. The list of species of 'principal importance for the conservation of biodiversity in England' (Section 41) guides public bodies in implementing their duty. The Local Authority therefore must consider the impact on biodiversity of the proposed development. The recommendations section of this report illustrates ways in which this Biodiversity Duty can be met.

A list of birds that are of conservation concern has also been developed. This uses standardised criteria to assess birds and assign them to Red, Amber or Green lists. An assessment criterion includes conservation status at global and European levels and, within the UK, historical decline, trends in population and range, rarity, localised distribution and international importance.

The UK's leading bird conservation organisations undertake review of the status of the birds that occur regularly within the UK. The last review was undertaken in 2015, when 244 bird species were assessed against a set of objective criteria to place each species within one of three lists. The lists (green, amber and red) indicate the level of conservation concern.

Bird species in the red and amber lists will be subject to at least one of the relevant factors as listed below:

Red list criteria

- Globally threatened;
- Historic population decline in UK during the period 1800‑1995;
- Severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969); and
- Severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period.

Amber list criteria

- Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern);
- Historical population decline during 1800‑1995, but recovering; population size has more than doubled over last 25 years;
- Moderate (25-49%) decline in UK breeding population over last 25 years, or the longer-term period;
- Moderate (25-49%) contraction of UK breeding range over last 25 years, or the longer-term period;
- Moderate (25-49%) decline in UK non-breeding population over last 25 years, or the longer-term period;

- Rare breeder; 1‑300 breeding pairs in UK;
- Rare non-breeders; less than 900 individuals;
- Localised at least 50% of UK breeding or non-breeding population in 10 or fewer sites, but not applied to rare breeders or non-breeder; and
- Internationally important; at least 20% of European breeding or non-breeding population in UK (NW European and East Atlantic Flyway populations used for non-breeding wildfowl and waders respectively).

Green list

- Species that occur regularly in the UK but do not qualify under any or the above criteria.

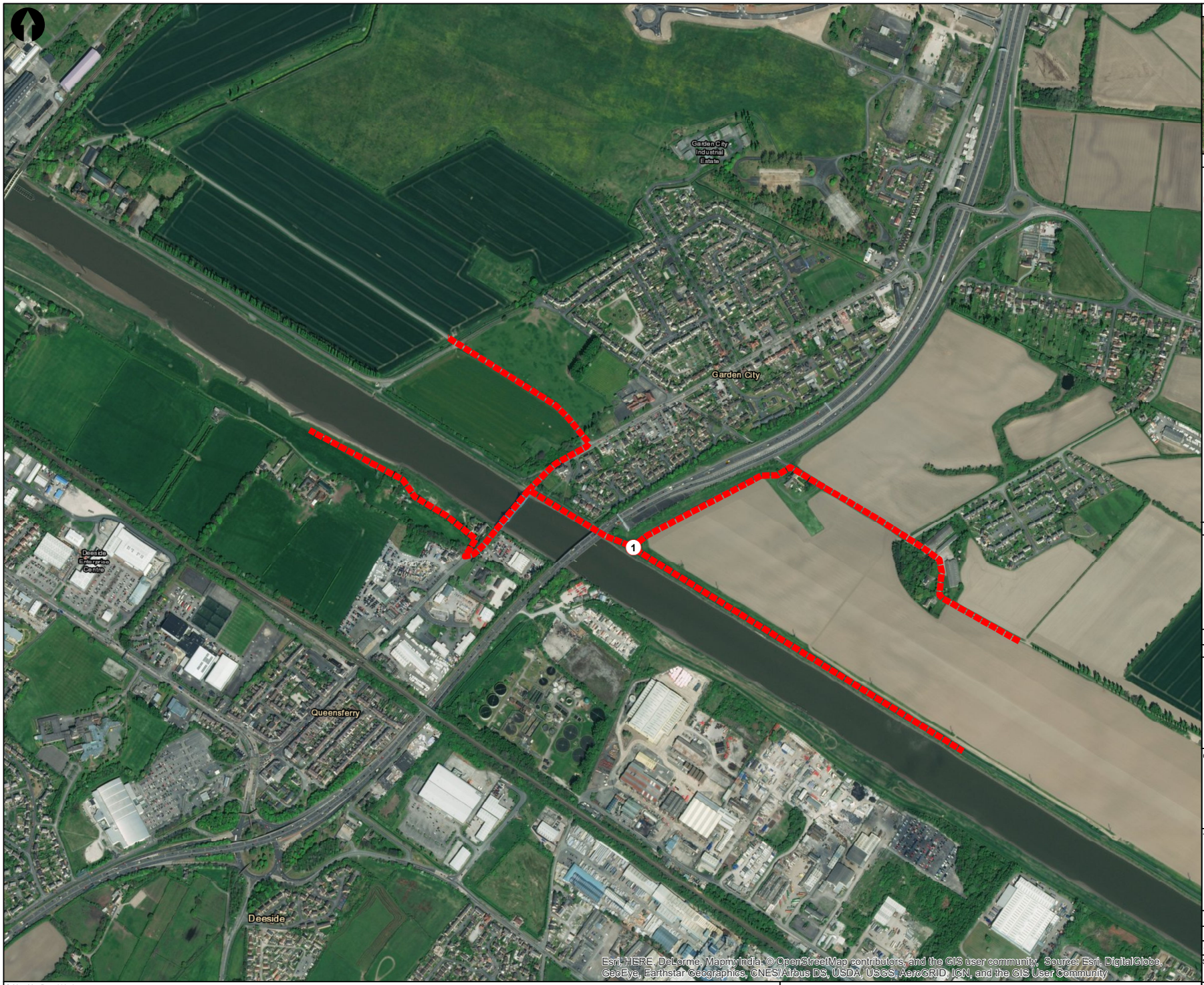
2 Methodology

2.1 The survey area

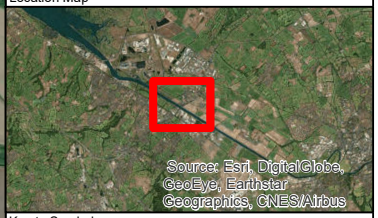
The survey area illustrated in Map.2 below, has been defined as the area of land take (footprint) of the proposal and the zone of influence (ZoI). The ZoI "is the area over which ecological features (in this case birds) may be subject to local scale effects as a result of a proposed project and associated activities" (CIEEM, 2016). For this project, the ZoI is up to 0.5km beyond the site boundary. The ZoI considers the likelihood that significant changes to the baseline noise conditions and visual disturbance during works from both the construction works and the use of roads will be greater than currently experienced.

Following review of the Extended Phase 1 Habitat Survey data (See Environmental Statement Chapter 8 Figures 08.1A – D in Volume 2), a number of suitable habitats for wintering birds were identified within 0.5km of scheme, hereafter referred to as 'the site' or 'the site extent'. These habitats included open farmland, hedgerows, woodland, mudflats and tidal river. Residential and industrial areas of Queensferry were excluded from the study area due to a lack of suitable habitat.

Map 2: Survey area



Location Map



Key to Symbols

- Vantage point
- Transect route

Notes

DRAFT

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	24/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Transect route and vantage point

Designed	K. Bowman	KB	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:8,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0200

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 100 200 300 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\24.06.19\Transect route and vantage pointV2.mxd

2.2 Survey coverage

All surveys were carried out in accordance with current best practice guidance survey methodology: British Trust for Ornithology (BTO) Wetland Bird Survey (WeBS) Low Tide Counts as described by Bibby et al. and Rose & Scott, (2000; 1997), BTO Wintering Farmland Bird Survey methodology (Gillings *et al*. 2008) and generic wintering bird monitoring methods detailed in Gilbert et al. (1998).

2.3 Survey area

A single vantage point located at grid reference SJ 32439 68617 (central of the programmed works) was used to ensure that there was full visibility to any exposed flats and banks within 0.5km both to the left and right extents of the current A494 River Dee crossing.

In addition, a single transect route was subsequently identified to ensure coverage of all suitable habitats likely to support wintering bird assemblages were scoped (See Map. 1). The transect route was designed to ensure that surveyors passed within 0.5km of all parts of the site area.

2.4 Survey methodology

Three site visits were made once per month between December 2018 and February 2019 inclusive. Surveys at the single vantage point commenced at low tide and ended three hours after, this enabled optimal low tide counts to be made.

Once at mid tide going through to high tide, surveyors immediately moved on to walk the pre-determined transect at a slow walking pace within the areas surrounding the River Dee. High tide is the peak time to establish whether any birds from nearby designated areas utilise the arable and amenity grasslands surrounding the river Dee for roosting or feeding as they are pushed from the estuary due to high water.

Surveys were carried out during optimal weather conditions only, meaning that surveys where adverse weather was anticipated such as heavy rain and winds were avoided as this reduces bird detectability significantly.

2.5 Data collection

Whilst the primary aim of the data collection is to support the planning process, Clause 6.4.7 of BS 42020:2013 (The British Standards Institute, 2013) recommends that data are collected in a way that facilitates the process of making the data available to local, county and/or national recording schemes where this has the agreement with the project proponent. The data were collected so that it was compatible with Bird Track, a partnership between the BTO, the RSPB, Birdwatch Ireland, the Scottish Ornithologists' Club and the Welsh Ornithological Society.

2.5.1 Competency

Surveys were carried out by one competent ecologist and one suitably experienced Ornithologist from Mott MacDonald limited.

2.5.2 Equipment

Surveyors recorded all birds seen and (or) heard with the aid of a spotting telescope (20x-60x) and a pair of binoculars (10 x 40). Any bird species encountered were then directly inputted on to the live time digital map using the appropriate British Trust for Ornithology (BTO) symbology.

2.5.3 Recorded

During all surveys, bird identification, location, count, sex, behaviour and age (where possible) were recorded at each detection.

Consideration and care were always taken in to account to avoiding any double counting.

2.5.4 Species excluded from analysis

Species observed during surveys but excluded from the analysis include:

- Non-native species protected under the Game Act 1831 (as amended) but likely to be derived from a self-sustaining population.
- Non-native species considered to be under the permanent or temporary control of man.

2.6 Constraints and limitations

- No previous and (or) valid records of wintering and (or) breeding birds have been produced for this particular section of the River Dee.
- Site access was restricted to publicly accessible local footpaths and walkways.
- Access was not possible to large area south of the site extent (see Map .1) due to a large percentage of the land being enclosed with a waste water treatment works (WWtW), industrial and commercial buildings.
- The survey methodology does not detect all species evenly and it is known that cryptic species such as grey partridge *(Perdix perdix*), snipe (*Gallinago gallinago*), skylark (*Alauda arvensis*) and meadow pipit (*Anthus pratensis*) are likely to be under recorded (Atkinson et al. 2006).
- Furthermore, surveys were carried out in daylight hours only and therefore species most frequently observed during hours of darkness or twilight are also likely to have been under recorded.
- The course of surveys was carried out do not include the full bird over-wintering period (October to February inclusive). Despite these limitations, the surveys were spread over three calendar winter months and provided a good baseline figure regarding the number and variety of species present close to the River Dee during the winter period.

2.7 Site visit timings

As briefly mentioned in Section 2.4, the three survey visits were conducted within the winter season (mid-December to end-February) defined by Gillings *et al*. (2013). Where practicable, surveying avoided the first and last hours of daylight (Gillings *et al*. 2008) to avoid uneven coverage as a result of rapid changes in the detection of birds (Bibby *et al*. 2000).

Surveys were always coordinated with tidal timings, which were retrieved from https://tides.willyweather.co.uk.

Survey metadata can be found in Table. 1, below.

Table 1: Metadata for wintering bird surveys

Visit	Date	Start/Finish Time (BST)	Total Cloud Cover (Oktas)[1]	Wind Direction & Speed (Beaufort Scale)[2]	Precipitation	Surveyor(s)
1	13th December 2018	10:10/14:50	2	3 SE	None	K. Bowman C. J. Taylor
2	17th January 2019	08:20/13:20	2	2 NNW	None	K. Bowman C. J. Taylor
3	14th February 2019	10:00/15:00	0	2 SSE	Light to none	K. Bowman C. J. Taylor

Source: Mott MacDonald, 2019

2.8 Nomenclature

The English vernacular and scientific bird names used in this report follows that of the 8th Edition of the British Ornithologists' Union official list of species recorded in Great Britain as at June 2013 (Harrop *et al.* 2013).

3 Results

The results from the three surveys are summarised below. Bird species encountered are split in to the following groups;

- SPA species (in relation to the Dee estuary).
- Bird Species of Principal Importance (SPI; Section 7- Wales Environment Act)

This list includes 51 species of birds which are of key significance to maintain or sustain in Wales.

- Red and Amber listed Bird species of Conservation Concern (BoCC[4]) (which are not already included in the above 2 categories).
- Other protected birds,
  - All wild bird species are protected under the Wildlife and Countryside Act 1981.

Birds listed under Section 41 Natural Environment and Rural Communities (NERC) Act (2006) have been added to all groups of species here listed in the results, due to birds being highly mobile and the river Dee forming the border between England and Wales. Birds listed under Section 41 are the rare and most threatened species in England. Birds listed within this section are a part of Outcome 3 of the Government's Biodiversity 2020 strategy which contains an objective that strives to ensure that there will be an overall improvement in the status of the birds by the set year.

Further to this, some species in this report are listed under more than one of the categories listed above and these have been merged within the following results tables below.

A full list of protection, peak counts and SPA qualifying species numbers for the Dee estuary can be found in Section. 6.1 and maps of species distribution can also be found in Section. 6.2.

There are also photographs taken during surveys which are located in Section 6.3 of the report.

Please note that grid reference SJ 32439 68617, is the location hereby known as central of the works.

3.1 SPA species

Small numbers of four over-wintering SPA species were recorded across the course of the three surveys, utilising the fields and the river banks within the site extent. Common redshank appeared to be a localised species out of three identified, meaning that they were detected in the same areas during each monthly survey.

Peak counts of each species can be found in Table. 3.

Table 2: Peak counts of SPA species by visit

Species	Scientific name	December'18	January'19	February'19	BoCC[4]	Section 7 (Wales)	Section 41 (England)
Curlew	*Numenius arquata*	0	3	0	Red	X	X
Oystercatcher	*Haematopus ostralegus*	2	1	0	Amber		
Common Redshank	*Tringa totanus*	8	9	14	Amber		
Shelduck	*Tadorna tadorna*	0	0	2	Amber		

Source: Mott MacDonald, 2019

3.1.1 Curlew

During the January transect survey, a total of three curlew were identified feeding in a field located 1.3km west, at grid reference SJ310689.

3.1.2 Oystercatcher

Two oystercatchers were observed feeding on the bank 700m north-west, central of the works during December's survey. Subsequently, in January only one individual was recorded feeding in the field during high tide at grid reference SJ316686.

3.1.3 Common redshank

Common redshank was recorded feeding along the banks during each month at low to high tide, or vice versa. On all occasions each individual identified tended to walk and (or) fly low (under the bridge) to feed along the banks and were never seen using the banks specifically to roost. Common redshank peak numbers almost doubled from December 2018 to February 2019.

Further to this, common redshank was usually at least 100m away from the proposed works area. However, these birds were observed to use the area under the crossing to commute (walk and fly) south-east and north-west of the river only.

3.1.4 Shelduck

One pair of shelduck were identified feeding and commuting north-west along the river at low tide, crossing under the A494 bridge crossing during February's survey.

3.2 Bird species of Principal Importance (Wales Environment Act) – Section 7

A total of five bird species of principal importance (Wales) were recorded during the course of the three surveys.

Species	Scientific name	December'18	January'19	February'19	BoCC[4]	Section 41 (England)
Black-headed gull	*Chroicocephalus ridibundus*	736	268	552	Amber	
Herring gull	*Larus argentatus*	18	42	131	Red	x
Kestrel	*Falco tinnunculus*	0	0	1	Amber	
Lapwing	*Vanellus vanellus*	30	25	5	Red	x
Skylark	*Alauda arvensis*	0	0	2	Red	x

Source: Mott MacDonald, 2019

3.2.1 Black-headed gull

A large number of black-headed gull were noted on all surveys. Visual analysis of the distribution maps located in Section 6.2 shows that the majority of gulls took advantage of the medium gradient, intertidal, rocky banks located approximately >250m south-east and > 650m north-west of the A494 River Dee crossing. However, no gulls used the exposed banks below the bridge.

In addition, this species of gull was seen occasionally lifting during low tide and taking to the river to feed and (or) commute up and down the river. When the banks became fully submerged during medium to high tide, gulls would fly away in various directions, however they were rarely noted utilising the fields surrounding the works.

Only four individuals were identified feeding in the field >1.0km, east of the proposed works during the walking transect.

Large flocks of roosting black headed gull commonly also contained other species, such as lapwing, common gull and cormorant.

3.2.2 Herring gull

Herring gull was distributed well across the site extent on all surveys and usually in small flocks or small numbers. In general, many were detected roosting amongst flocks of black-headed gull and flying over the site, usually in the Easterly direction heading inland/following the river. In addition, many were also identified predominantly roosting upon the banks further north-west of the A494, approximately 1.4km away.

3.2.3 Kestrel

One kestrel was identified hunting in the field located east of the proposed works, approximately 100m away at grid reference SJ325685.

3.2.4 Lapwing

Lapwing were identified on all surveys; however, they were present in greater numbers during December and January. Lapwing were mostly detected roosting upon the small, rocky bays located south-east and north-west, central of the site extent. Lapwing predominantly roosted with black-headed gull.

3.2.5 Skylark

Two skylarks were seen during February's survey.

All observations for this species were in the field located 200m east of the proposed works, which is typical breeding habitat for this species. Grid reference: SJ326685.

Please note that skylark was potentially under recorded by the survey methodology, as noted in Section 2.5 (Atkinson *et al*. 2006).

3.3 Red listed species (BoCC[4])

Two Red listed species were identified during surveys (Table. 2).

Table 3: Peak counts of Red listed bird species by visit

Species	Scientific name	December'18	January'19	February'19	Section 41
Fieldfare	*Turdus pilaris*	*0*	1	*0*	
Redwing	*Turdus iliacus*	*0*	3	*0*	

Source: Mott MacDonald, 2019

3.3.1 Fieldfare

One fieldfare was detected feeding in a field 700m, west central of the works at grid reference SJ316686.

3.3.2 Redwing

Three redwings were heard then seen feeding in trees and small shrubs on the edge of Welsh road, approximately 250m west, central of the works (SJ321686).

3.4 Amber listed species (BoCC[4])

Six amber listed species were recorded throughout the wintering bird surveys.

Table 4: BoCC[4] bird species by visit

Species	Scientific name	December'18	January'19	February'19	Section 41
Barnacle goose	*Branta leucopsis*	0	0	5	
Great-black backed gull	*Larus marinus*	8	11	6	
Common gull	*Larus canus*	11	7	3	
Lesser Black-backed gull	*Larus fuscus*	3	0	19	
Mallard	*Anas platyrhynchos*	10	6	36	
Yellow-legged gull	*Larus michahellis*	0	0	1	

Source: Mott MacDonald, 2019

3.4.1 Barnacle goose

Five barnacle goose were identified flying from south-east to north-west, moving under the A494 crossing and roosting approximately 1.8km east central of the site extent. These were only detected in February's survey.

It is difficult to distinguish whether the individuals noted above are from the main two migratory populations that winter in the U.K or from establishing resident populations, largely created by escaped birds from captivity. The U.K. has an increasing population of naturalised barnacle goose and it is most likely these bird form part of that population, not the migratory birds which winter in Scotland.

3.4.2 Great black backed and Lesser black-backed gull

Great black-backed gull and lesser black-backed gull were predominantly together and located >600m north-west of the proposed works area. However, few were noted roosting amongst a large flock of black-headed gulls on the small, rocky bays located south-west of the programmed works.

3.4.3 Common gull

Small numbers of common gull were identified roosting with large flocks of black-headed gull and lapwing south-east of the A494 River Dee crossing. Few were also recorded heading north-west of the works, heading towards the Dee estuary during the transition of medium to high tide when the banks became fully submerged.

3.4.4 Mallard

Groups of usually 2-4 mallard were identified across the site extent, each month. Mallard were regularly seen commuting up and down the river whilst feeding, usually in pairs. The number of mallards detected tripled from December to February and this is likely due overall wintering bird numbers increasing or migratory birds moving in time for breeding.

3.4.5 Yellow-legged gull

A single yellow-legged gull was recorded in February roosting, 1.5km north-west of the A494 crossing on a man-made structure in the river during high tide.

Please note that this species is a scarce and non-breeding visitor to the U.K.

3.5 Other bird species

A total of eleven other species (Non-notable species which are BoCC[4] green listed) were identified throughout the wintering bird surveys.

Species	Scientific name	December'18	January'19	February'19
Buzzard	*Buteo buteo*	1	1	1
Carrion crow	*Corvus corone*	82	56	5
Cormorant	*Phalacrocorax carbo*	14	23	60
Little egret	*Egretta garzetta*	1	1	0
Feral Pigeon	*Columba livia domestica*	41	32	23
Goosander	*Mergus merganser*	0	0	5
Grey heron	*Ardea cinerea*	1	1	3
Jackdaw	*Corvus monedula*	4	0	2
Little grebe	*Tachybaptus ruficollis*	1	0	1
Magpie	*Pica pica*	11	12	27
Woodpigeon	*Columba palumbus*	21	12	20

3.5.1 Buzzard

A suspected resident buzzard was detected in a field 470m south-west of the works, at grid reference SJ319687. The single buzzard was recorded on each survey within approximately 400m of same area and it was recorded perched, feeding and flying over.

3.5.2 Carrion crow

There were a large number of carrion crows utilising the fields north-east and east of the works during December and January. However, only five were noted during February, but this is most likely due to the agricultural operations occurring on the field being during that time.

3.5.1 Cormorant

Cormorant were well distributed across the site on most surveys. The majority of those recorded were detected commuting along the river, usually feeding. However, several of these were also sighted loafing amongst the small, rocky bays where mixed species flocks roosted (various gulls and lapwings). In addition, few were also noted perching on man-made structures 1.5km north-west of the proposed works.

3.5.2 Little egret

A single little egret was recorded during December and January roosting and feeding within the small jetty area just 40m south, central of the works.

3.5.3 Feral pigeon

Feral pigeon was noted in abundance underneath the A494 bridge, nestlings were also heard within the structure of the crossing itself.

3.5.4 Goosander

Goosander were only noted in February, both male and females usually together (paired). All were seen on the river only and never came on to land to roost. They also commuted from south-east of the river, heading in the westerly direction.

3.5.5 Grey heron

A single grey heron was noted in December and January roosting and feeding within the jetty area located 40m south of the works, along with the single little egret recorded. However, during February three grey heron were noted across the site, with one flying north-west, over the A494 crossing and a further two roosting and feeding >200m north-west of the proposed works.

3.5.6 Jackdaw

Jackdaw were noted flying over the fields >500m west, central of the scheduled works during December and February.

3.5.7 Little grebe

A single little grebe was recorded feeding along the river >500m south-east and north-west of the River Dee works during December and February.

3.5.8 Magpie

Regular sightings of magpie were recorded throughout December through to February, feeding in the fields north-east and west of the proposed works.

3.5.9 Wood pigeon

Wood pigeon were commonly sighted feeding in the field >500m west of the scheduled works area.

3.6 Summary of results

A total of 28 species were recorded during the three visits. A full species list along with SPA qualifying counts and peak counts during the surveys are provided in Section 6.1.

Records of species that may be a material consideration in planning for which they are given special legal protection and/or a duty to conserve (herein referred to as notable species) include:

- Four SPA qualifying species;
- Five Bird species of Principle Importance
- Two Red List Birds of Conservation Concern;
- Six Amber List Birds of Conservation Concern and,
- Eleven Other Bird species

3.7 Additional observations – habitat suitability and species use of site.

The grasslands located south-west of the proposed works provide suitable habitat for over-wintering oystercatcher, curlew and gull species. Similarly, the farmlands surrounding the river Dee also offer good roosting and feeding habitat for Red and Amber listed species such as kestrel, fieldfare, skylark, lapwing and redwing, which are all known to forage in open farmland areas.

However, it is important to note that the majority of this suitable habitat does have a nearby shooting school (0.8km east of the works), regular agricultural operations, footpaths and roads leading through them which ultimately causes disturbance and reduces the habitats condition and favourability.

Most of the species listed above are known to range widely and use a wide range of habitats. There are significant amounts of equal or better habitat areas beyond the site extent, including the Dee estuary that provides less disturbed, foraging and roosting habitat

Whilst the banks and small rocky bays fringing the river offer good roosting and feeding opportunities to over-wintering common redshank, shelduck and gull species, these are relatively small in size and number and are only temporarily exposed. The low number of species within this area is most likely due to the amount of suitable area available, which is particularly low in comparison to the wider areas outside of the site extent.

During the surveys it was noted that the site is subject to various levels of anthropogenic impact including loud noises emitted from a nearby shooting range, regular agricultural practice, heavy traffic, pedestrians and cyclists.

There were two separate occasions in February where disturbance events were observed between bird species and humans, including one dog walker and a large group of cyclists passing through the site along a public footpath close to the river (both occasions, at grid reference: SJ 32561 68547). Both events caused common redshank (x3 individuals), common gull (1x individual) and black-headed gull (1x individual) to flush from their roosting or feeding area. However, the displacement of these birds was only temporarily, meaning that the bird(s) returned back to their original roosting and/or feeding location a short time after being disturbed.

3.8 Conservation Importance of site and wintering species assemblage

Considering the range and number of species recorded during the surveys *(n*=28), the site generally supports local populations of birds and is considered to be of **Local Importance** as described by Fuller (1980).

In general, the utilisation of this area by wintering birds is considered to be typical in respect to the habitat types located within the site extent.

4 Evaluations and conclusions

A total of 28 wintering bird species were recorded using the total site extent and the site has a 'local' level of importance with regards to the wintering bird assemblage present within the area. The assemblage includes many common and widespread wintering species that are typical of the habitats presented in the site extent, including tidal banks, farmland and grasslands.

Of the 28 species recorded, 17 of these are notable in that they are of conservation importance or have additional protection.

The overwinter qualifying species for the designated site; common redshank, shelduck, oystercatcher and curlew, appeared to use the areas within the site extent surveyed. However, these particular species were recorded in relatively small numbers and did not represent a significant proportion of the Dee Estuary SPA or RAMSAR populations (<1% of total wintering population). See Section 6.1 for further information on the number of species detected within this area, SPA qualifying numbers and protections.

The majority of roosting species located within the site were primarily identified as using the small, rocky bays which were located >150m away from the proposed bridge works, on either side. In addition, species identified were never noted as utilising the areas beneath the bridge specifically for roosting or feeding. However, species did use this part of the area to commute up and down the river and this could be either through flight, upon the water or the banks running alongside of the river during low tide.

It is not considered that the coastal bird assemblages within the site are heavily reliant on the habitats offered within the area surveyed as during the surveys they were frequently recorded roosting and feeding in greater numbers >1.50km south-east and north-west of the central area (A494 river Dee crossing).

Beyond the site extent there are much larger banks, more manmade structures and larger, rocky bays of which the birds noted in this report, such as, common redshank, cormorant, lapwing and gulls, favour during the over-wintering period. Therefore, there is alternative and suitable roosting or feeding areas beyond the proposed works area.

It is considered that the proposed works do have the potential to cause some disturbance and displacement of coastal bird species. However, given the observed tolerance or short reaction period of birds present within or near the site during surveys, it is expected that this disturbance will have a minimal impact on the species. Species largely show habituation to anthropogenic influences at this location.

As for non-coastal birds including buzzard, kestrel, fieldfare, skylark and redwing, it is likely that the works will not affect these species due to the distance they were detected away from the planned works.

5 References

Atkinson, P.W. Fuller, R. A., Gillings, S. and Vickery, J. A. (2006). Counting birds on farmland habitats in winter. Bird Study 53: 303-309.

Balmer, D., Gillings, S., Caffrey, B., Swann, B., Downie, I. and Fuller, R. (2013). Bird Atlas 200711: The Breeding and Wintering Birds of Britain and Ireland. British Trust for Ornithology, Thetford.

Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S., 2000. Bird census techniques. Elsevier.

Bibby, C.J., Burgess, N.D., & Hill, D.A. (2000). Bird Census Techniques: 2nd Edition. London Academic Press.

CIEEM (2016). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Eaton, M.A. Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D. and Gregory, R. (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108, 708–746.

ESRI (2017). ArcGIS Desktop: Release 10.4. Redlands, CA: Environmental Systems Research Institute.

Fuller, R. (1980). A method for assessing the ornithological interest of sites for conservation. Biological Conservation, 17: 229-239.

Gillings, S. Balmer, D. E., Caffrey, B. J., Swann, R. L., Downie, I. S. and Fuller, R. J (2013). Survey methods and data sources. In: Bird Atlas 2007-11: The Breeding and Wintering Birds of Britain and Ireland. British Trust for Ornithology, Thetford.

Harrop, A.H.J., Collinson, J. M., Dudley, S. and Kehoe, C. (2013). The British Ornithologists' Union Records Committee (BOURC), 2013. The British List: A Checklist of Birds of Britain (8th edition). Ibis (2013), 155, 635–676.

Kirby, J., Davidson, N., Giles, N., Owen, M. and Spray, C. 2004. Waterbirds & Wetland Recreation Handbook: A review of issues and management practice., Slimbridge, The Wildfowl & Wetlands Trust.

Marchant, J.H. (1983). Common Birds Census Instructions. British Trust for Ornithology, Tring. 12pp.

The British Standards Institute (2013). BS 42020:2013. Biodiversity — Code of practice for planning and development. BSI Standards Limited, London.

Winspear, R. & Davis, G. (2005). A management guide to birds of lowland farmland. RSPB, Sandy, Bedfordshire.

6 Appendices

6.1 Bird protections, SPA qualifying numbers and peak counts during the course of surveys.

Table 5: Bird species observed with designations, SPA qualifying numbers and monthly peak counts

BTO species	Scientific name	BOCC[4] status	Schedule 1 (Wales)	Environment (Wales) Act 2016 – Section 7	SPA Species (Dee estuary)	Section 41	Peak count Dec'18	Peak count Jan'19	Peak count Feb'19
Black-headed gull	*Chroicocephalus ridibundus*	Amber		X			736	268	552
Barnacle goose	*Branta leucopsis*	Amber							5
Buzzard	*Buteo buteo*	Green					1	1	1
Carrion crow	*Corvus corone*	Green					82	56	5
Cormorant	*Phalacrocorax carbo*	Green					14	23	60
Common gull	*Larus canus*	Amber					11	7	3
Curlew	*Numenius arquata*	Red		X	X **Over-winter (4,028)**	X		3	
Little egret	*Egretta garzetta*	Green					1	1	
Fieldfare	*Turdus pilaris*	Red	X					1	
Feral Pigeon	*Columba livia domestica*	Green					41	32	23
Great black-backed gull	*Larus marinus*	Amber					8	11	6
Goosander	*Mergus merganser*	Green							5
Grey heron	*Ardea cinerea*	Green					1	1	3
Herring gull	*Larus argentatus*	Red		X		X	18	42	131
Jackdaw	*Corvus monedula*	Green					4		2
Kestrel	*Falco tinnunculus*	Amber		X					1
Lapwing	*Vanellus vanellus*	Red		X		X	30	20	5
Lesser Black-backed gull	*Larus fuscus*	Amber					3		19
Little grebe	*Tachybaptus ruficollis*	Green					1		1
Mallard	*Anas platyrhynchos*	Amber					10	6	36
Magpie	*Pica pica*	Green					11	12	27
Oystercatcher	*Haematopus ostralegus*	Amber			X **Over winter**		2	1	

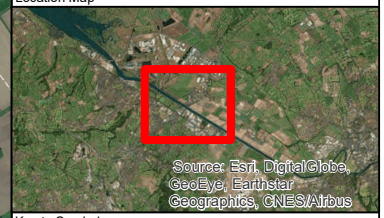
BTO species	Scientific name	BOCC[4] status	Schedule 1 (Wales)	Environment (Wales) Act 2016 – Section 7	SPA Species (Dee estuary)	Section 41	Peak count Dec'18	Peak count Jan'19	Peak count Feb'19
					(28,434)				
Redwing	*Turdus iliacus*	Red	**X**					3	
Redshank	*Tringa totanus*	Amber			**X On Passage (8,451) & Over-winter (6,382)**		8	9	14
Skylark	*Alauda arvensis*	Red		**X**	**X Over-winter (6,827)**	**X**			2
Shelduck	*Tadorna tadorna*	Amber			**X Over-winter (7,725)**				2
Woodpigeon	*Columba palumbus*	Green					21	12	20
Yellow-legged gull	*Larus michahellis*	Amber							1

6.2 Maps

6.2.1 A map to show the overall utilisation distribution of bird species detected throughout the site extent during the winter period.



Location Map



Key to Symbols

Species observed

- Black-headed gull: 92 observations
- Barnacle goose: 3 observations
- Buzzard: 3 observations
- Carrion crow: 16 observations
- Cormorant: 67 observations
- Common gull: 9 observations
- Curlew: 1 observation
- Little egret: 1 observation
- Fieldfare: 1 observation
- Feral pigeon: 11 observations
- Great black-backed gull: 12 observations
- Goosander: 5 observations
- Grey heron: 5 observations
- Herring gull: 35 observations
- Jackdaw: 2 observations
- Kestrel: 1 observation
- Lapwing: 3 observations
- Lesser black-backed gull: 12 observations
- Little grebe: 2 observations
- Mallard: 21 observations
- Magpie: 5 observations
- Oystercatcher: 2 observations
- Redwing: 1 observation
- Redshank: 15 observations
- Shelduck: 1 observation
- Skylark: 1 observation
- Woodpigeon: 6 observations
- Yellow-legged gull: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n
Herring gull: 35 observations
(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	24/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Overall utilisation distribution of bird species detected throughout the site extent.

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0201

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

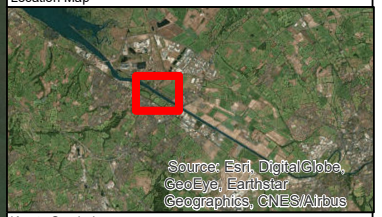
0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\24.06.19\Overall utilisation of bird species.mxd

6.2.2 A small-scale map showing the overall utilisation distribution of bird species detected in the north-west area of the site extent during the winter period.



Location Map



Key to Symbols

Species observed

- Barnacle goose: 3 observations
- Black-headed gull: 33 observations
- Buzzard: 3 observations
- Common gull: 4 observations
- Cormorant: 21 observations
- Curlew: 1 observation
- Fieldfare: 1 observation
- Goosander: 4 observations
- Great black-backed gull: 11 observations
- Grey heron: 2 observations
- Herring gull: 27 observations
- Jackdaw: 2 observations
- Lapwing: 2 observations
- Lesser black-backed gull: 8 observations
- Little grebe: 1 observations
- Mallard: 10 observations
- Magpie: 3 observations
- Oystercatcher: 2 observations
- Redshank: 10 observations
- Redwing: 1 observation
- Woodpigeon: 6 observations
- Yellow-legged gull: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n
Herring gull: 27 observations
(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Overall utilisation distribution of bird species detected in the north-west area of the site extent.

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:6,000	PRE	P01	STD

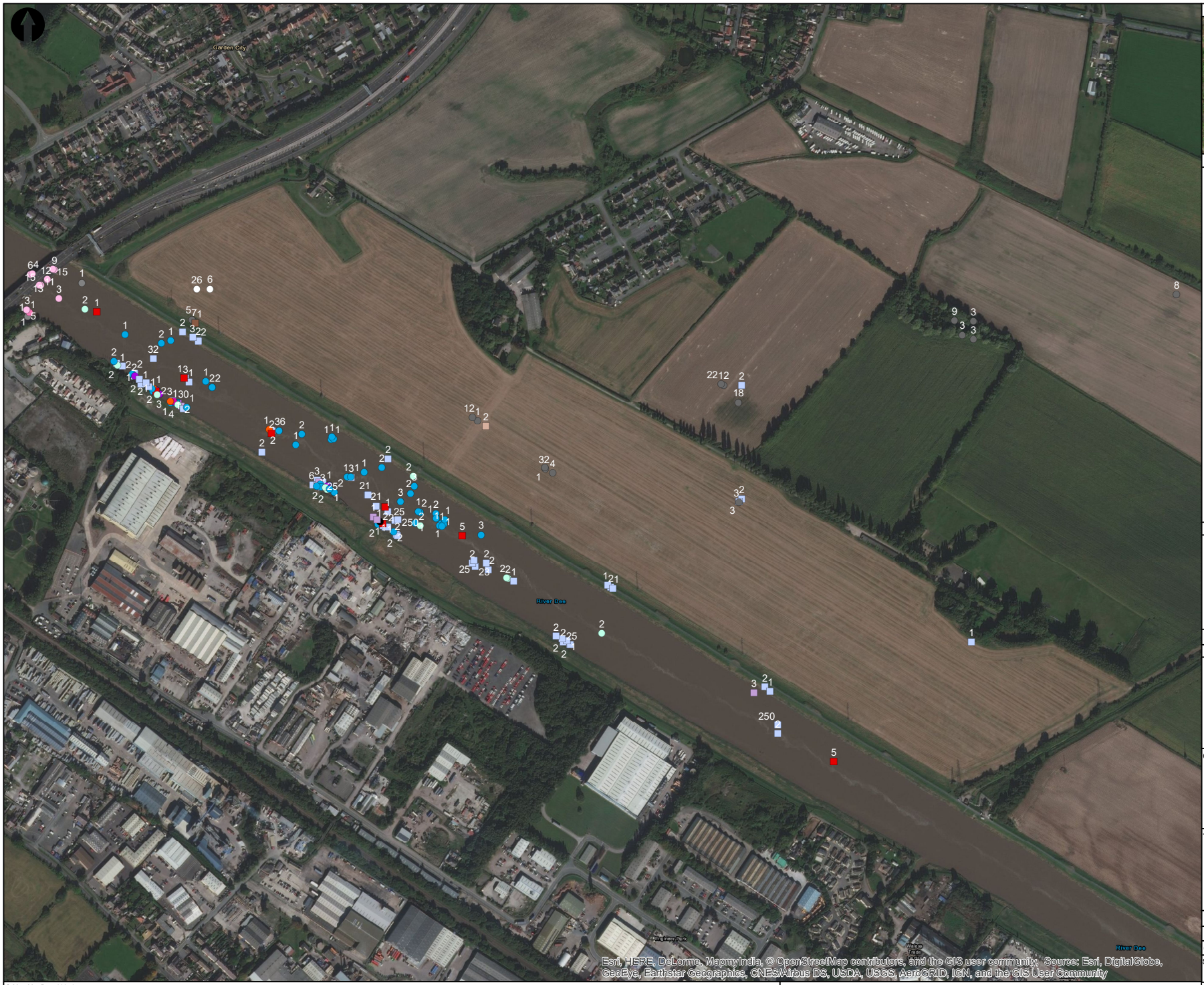
Drawing Number
395318-MMD-ZZ-XX-DR-0202

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 100 200 300 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\24.06.19\North-west utilisation of bird species.mxd

6.2.3 A small-scale map showing the overall utilisation distribution of bird species detected in the south-east area of the site extent during the winter period.



Location Map



Key to Symbols

Species observed

- Black-headed gull: 59 observations
- Carrion crow: 15 observations
- Common gull: 5 observations
- Cormorant: 46 observations
- Feral pigeon: 11 observations
- Goosander: 1 observation
- Great black-backed gull: 1 observation
- Grey heron: 3 observations
- Herring gull: 8 observations
- Kestrel: 1 observation
- Lapwing: 1 observation
- Lesser black-backed gull: 4 observations
- Little egret: 1 observation
- Little grebe: 1 observation
- Magpie: 2 observations
- Mallard: 11 observations
- Redshank: 6 observations
- Shelduck: 1 observation
- Skylark: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n
Herring gull: 8 observations

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Overall utilisation distribution of bird species detected in the south-east area of the site extent.

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:6,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0203

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

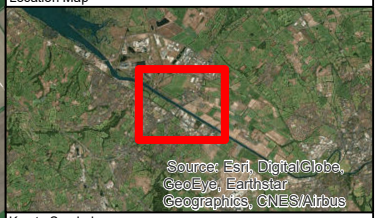
0 100 200 300 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\24.06.19\South-east utilisation of bird species.mxd

6.2.4 Utilisation distribution of Schedule I (Wales) species wintering.



Location Map



Key to Symbols

Species observed

- Fieldfare: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n
Fieldfare: 1 observation

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Fieldfare observation

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number
395318-MMD-ZZ-XX-DR-0206

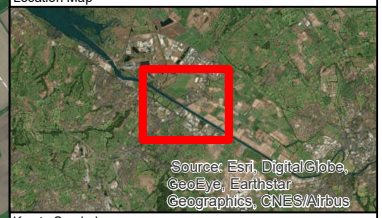
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Fieldfare.mxd



Location Map



Key to Symbols

Species observed

- Redwing: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n

Redwing: 1 observation

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Redwing observation

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0212

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

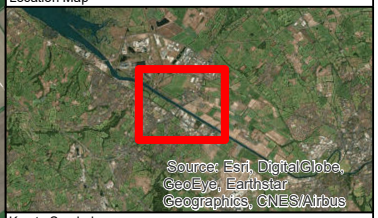
0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Redwing.mxd

6.2.5 Utilisation distribution of Section 7 (Wales) species wintering.



Location Map



Key to Symbols

Species observed

- Black-headed gull: 92 observations

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n

Black-headed gull: 92 observations

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Black-headed gull observations

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0204

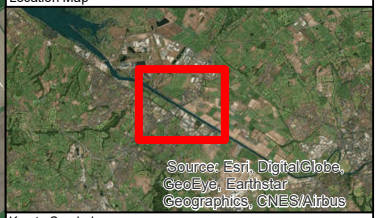
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Black-headed gull.mxd



Location Map



Key to Symbols

Species observed

- Herring gull: 35 observations

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n

Herring gull: 35 observations

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Herring gull observations

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0207

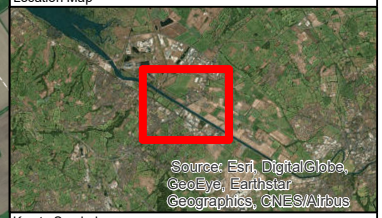
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Herring gull.mxd



Location Map



Key to Symbols

Species observed

- Kestrel: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n

Kestrel: 1 observation

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Kestrel observation

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0208

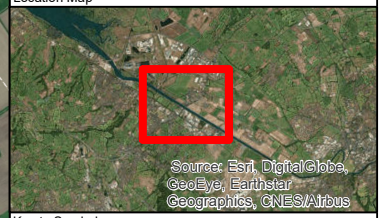
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Kestrel1.mxd



Location Map



Key to Symbols

Species observed

- Lapwing: 3 observations

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n

Lapwing: 3 observations

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	26/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Lapwing observations

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0209

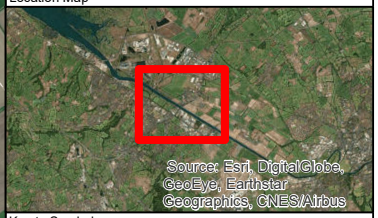
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Lapwing.mxd



Location Map



Key to Symbols

Species observed

- Skylark: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n

Skylark: 1 observation

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	26/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Skylark observation

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0214

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

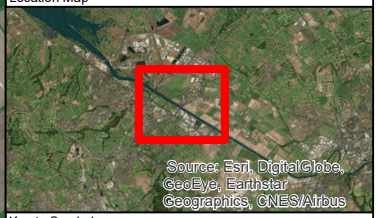
0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Skylark.mxd

6.2.6 Utilisation distribution of Section 41 (England) species wintering (not shown previously).



Location Map



Key to Symbols

Species observed

- Curlew: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n
Curlew: 1 observation
(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS (RML)	SB (RML)

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Curlew observation

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number
395318-MMD-ZZ-XX-DR-0205

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

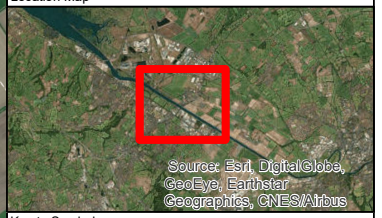
0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Curlew.mxd

6.2.7 Utilisation distribution of SPA species (River Dee) wintering (not shown previously).



Location Map



Key to Symbols

Species observed

- Redshank: 15 observations

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n
Redshank: 15 observations
(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	25/06/19	CJT	DRAFT	NS	SB (RML)

MOTT MACDONALD
RICHARDS MOORHOUSE & ALAIS LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Redshank observations

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number
395318-MMD-ZZ-XX-DR-0211

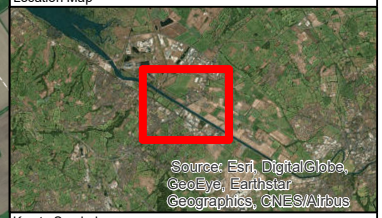
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Redshank.mxd



Location Map



Key to Symbols

Species observed

- Oystercatcher: 2 observations

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n
Oystercatcher: 2 observations
(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	26/06/19	CJT	DRAFT	NS	SB (RML)

MOTT MACDONALD
RICHARDS MACDONALD LAND LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Oystercatcher observations

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number
395318-MMD-ZZ-XX-DR-0210

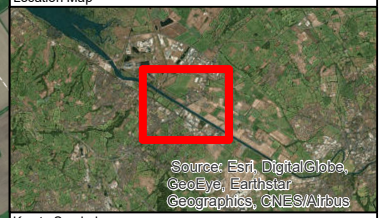
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Oystercatcher.mxd



Location Map



Key to Symbols

Species observed

- Shelduck: 1 observation

Notes

Numbers above each point on the map indicate numbers of individuals observed at that particular observation.
For example:

n

Shelduck: 1 observation

(n = number of individuals at each observation)

Contains OS data © Crown Copyright and database right 2018.

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	26/06/19	CJT	DRAFT	NS	SB (RML)

Mott MacDonald
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0) 1492 534601
F -
W www.mottmac.com

Client

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Title

A494 River Dee Bridge Improvement
Wintering bird survey
Shelduck observation

Designed	C. J. Taylor	CJT	Eng Check	N. Shelton	NS
Drawn	C. J. Taylor	CJT	Coordination	G. Morgan	GM
GIS Check	N. Shelton	NS	Approved	S. Blunt (RML)	SB (RML)

Scale at A3	Status	Rev	Security
1:12,000	PRE	P01	STD

Drawing Number: 395318-MMD-ZZ-XX-DR-0213

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 Metres

P:\Manchester\Northwest\General\Environmental\GIS\River Dee bird surveys\MXD\Species of importance\Shelduck.mxd

6.3 Photographs, notes and locations noted during surveys.

Table 6: Photographs taken during surveys

Photo	Surveyors notes	Approximate grid reference (6-figure)
	Two small to medium sized rocky bays exposed during low to mid tide, located >150m south-east of the A494 river Dee crossing. Black-headed, lesser black-backed, Great black-backed, Common, Herring gulls and Lapwings appeared to favour seen utilise these bays for roosting purposes only.	SJ326683
	Dense vegetation around the proposed works area. These areas and similar areas will require close attention if any vegetation clearances are scheduled during breeding season. Therefore, an authorised ecologist will need to do a nesting bird check 24-28 hours prior to any clearance. Furthermore, the arable field to the right of the vegetation is where one Kestrel was detected feeding and Skylarks were also recorded (heard and seen).	SJ325686
	Photograph of the grasslands south-west of work works, where Buzzard, Herring gull, Lesser black-backed gull, Oystercatcher, Fieldfare were detected throughout surveys during December 2018 to February 2019	SJ318686

Photo	Surveyors notes	Approximate grid reference (6-figure)
	Small jetty located just South of the A494 river Dee crossing. Grey heron and Little egret were commonly sighted here.	SJ323685
	Small, rocky bays and man-made structures located north-west of the river Dee crossing. Approximately 1.5km north-west of the proposed works area (A494 river Dee crossing) just beyond the white bridge in the photo (SJ307695), there were a heavy presence of bird species. Please note that the area beyond the white bridge was beyond the surveyor's view-shed. For this area in particular, Goosander, Barnacle geese were detected passing through this area heading north-west. Common redshank, Mallard, Black-headed gulls, Cormorants amongst others were seen utilising the small bays pictured to roost or feed. Most of the species listed above moved in the north-west direction.	SJ316689

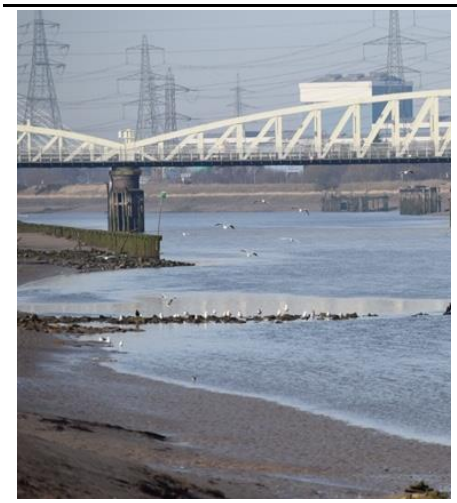
Photo	Surveyors notes	Approximate grid reference (6-figure)
	As mentioned above, many species of coastal birds preferred and were more present in the area located north-west of the river Dee crossing.	SJ311692
	Barnacle goose (one of five) heading north-west, coming from the south-east passing under the A494 river Dee crossing.	SJ320687
	Kestrel mobbing other bird species within the site extent.	SJ325685

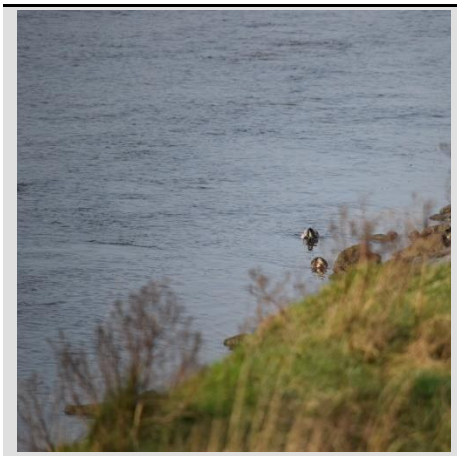
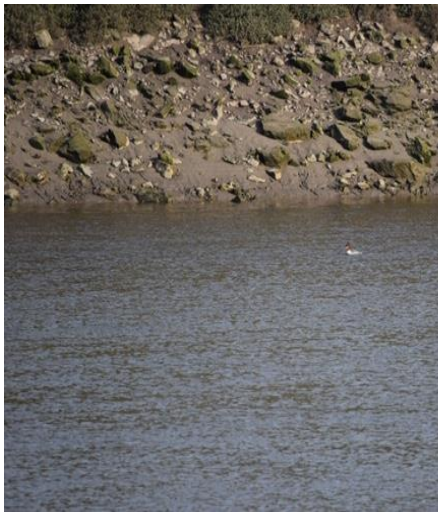
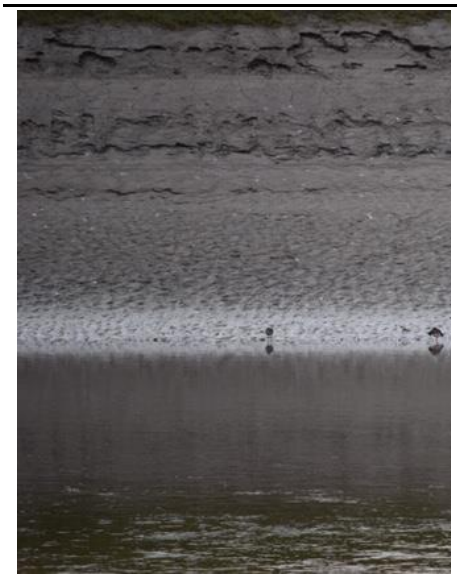
Photo	Surveyors notes	Approximate grid reference (6-figure)
	Mallards, usually in pairs (male and female) were commonly seen commuting and feeding up and down the river Dee throughout all surveys.	N/A
	Goosanders were detected in February only. This species was never detected upon the banks of the river and was only sighted commuting and feeding along the river (usually in pairs; male and female).	N/A

Photo	Surveyors notes	Approximate grid reference (6-figure)
 	Cormorants were seen very regularly across the survey area. Many birds took advantage of the man-made structures and small to medium sized bays south-east and north-west of the A494 crossing. Many were also seen commuting through the river and feeding. They appeared to feed well within the site.	N/A

Photo	Surveyors notes	Approximate grid reference (6-figure)
	Common redshanks were noted throughout all surveys feeding along the banks. However, this particular species was never recorded as using the site for roosting.	N/A

Source: Mott MacDonald, 2019

8.2 Breeding Bird Survey Report - September 2021

MOTT MACDONALD

A494 River Dee Bridge Improvement Scheme

Breeding Bird Survey Report

September 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

A494 River Dee Bridge Improvement Scheme

Breeding Bird Survey Report

September 2021

Mott MacDonald Limited. Registered in England and Wales no. 1243967.
Registered office: Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
1.0	17/09/2021	K. Doneo	A. L. Wilson	R. Purslow	First Issue

Document reference: 395318-0131-01

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary 1

1 Introduction 3
1.1 Project Background 3
1.2 Site Description 3
1.3 Aims and Objectives of this Report 4

2 Legislation and Policy 5
2.1 Wildlife and Countryside Act 1981 (as amended) 5
2.2 Local Biodiversity Action Plans 5
2.3 England 5
2.3.1 Natural Environment and Rural Communities Act 2006 5
2.3.2 Birds of Conservation Concern (BoCC4) 5
2.3.3 National Planning Policy (NPPF) 6
2.4 Wales 7
2.4.1 Birds of Conservation Concern Wales (BoCCW3) 7
2.4.2 Environment (Wales) Act 2016 7
2.4.3 Planning Policy Wales 8
2.4.4 Biodiversity Policy Wales 8

3 Methodology 9
3.1 Survey Area and Scope 9
3.2 Desk study 9
3.3 Field Survey 9
3.3.1 Survey Coverage 9
3.3.2 Visit Timings 10
3.4.1 Defining Notable Species 11
3.5 Mapping and Data Analysis 11
3.5.1 Assessment of the Overall Breeding Bird Communities Importance Within the Survey Area 12

4 Results 14
4.1 Desk Study Results 14
4.1.1 Historical Species Records 14
4.1.2 Habitat Context 15
4.2 Field Surveys 15
4.3 Valuable Features and Habitats for Breeding Birds 1
4.3.1 Buildings and Infrastructure 1
4.3.2 Shrub and Scrub Areas 1

4.3.3 Small Gulley Located South of the A494 bridge 1
4.3.4 Arable Land, North-West of the A494 bridge. 1
4.3.5 Breeding Bird Community Conservation Importance 2

5 Potential impacts on Breeding Birds 3
5.1 Construction Phase 3
5.1.1 Schedule 1 3
5.1.2 Damage and/or Destruction of Active Birds' Nests 4
5.1.3 Permanent and Temporary Loss and Fragmentation of Habitats 4
5.2 Operational Phase 5
5.2.1 Noise, lighting and air pollution 5
5.3 Summary 6

6 Recommendations, Mitigation and Enhancement 7
6.1 Opportunities for Enhancement 7
6.2 Schedule 1 species 7
6.3 A494 Bridge Works 8
6.4 Vegetation Clearance 8
6.5 Tree, Scrub and Treeline Replacement 8
6.6 Lighting 9
6.8 General Construction Safeguards 9
6.9 Further Surveys 10
6.10 Validity of the Survey Data and Assessment 10

7 References 11

A. Drawing – Proposed Scheme 14

B. Species List 15

C. Maps 17

Executive summary

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake breeding bird surveys in support of an on-line improvement of approximately 1.75 km of the A494 between the River Dee and the Queensferry Interchange (the “Scheme”).

The surveys were undertaken to provide information on the local breeding bird communities present and to highlight any potential for ornithological impacts and therefore constraints that may be imposed upon the proposed development.

The purpose of this report is to document the findings of the breeding bird surveys, to inform the proposed development and any mitigation requirements.

Historical records of 42 species of bird were returned within 2.0km of the Scheme from the Local Environment Records Centre (Cofnod).

Similarly, a total of 42 bird species were identified during the surveys, with 26 of these considered as notable species (i.e. those afforded special legal protection or those that are of conservation concern).

The survey methodology applied for the breeding bird surveys broadly followed that used for the Breeding Bird Survey (BBS), devised by the British Trust for Ornithology (BTO), Joint Nature Conservation Committee (JNCC) and the Royal Society for the Protection of Birds (RSPB). The BBS methodology uses a distance and mapping method in which a series of visits are made to a site during the breeding season, and observations of birds, by sight or sound are recorded. The surveys for this Scheme entailed birds recorded on large-scale map in accordance with the developmental project. Surveys included transect routes surveyed from April 2021 to June 2021.

The entire Scheme survey area was covered during the breeding period. Important habitat areas identified within the Scheme survey area for breeding birds include (distance from Scheme footprint):

- Industrial buildings (300m);
- Shrub and scrub area (0m);
- Small gulley located south of the A494 bridge (25.0m); and
- Arable land, north-west of the A494 bridge (50.0m).

The overall abundance of species was considered as low-moderate and consistent throughout surveys across the Scheme survey area but were typical of the landscape in relation to the habitats and current influences present (i.e. roads, industrial and residential areas).

It is likely that this is predominantly due to higher quality and extensive habitat available beyond the Scheme survey area, north and north-west of the Scheme towards the Dee Estuary and Burton Mere Wetlands nature reserve. Taking into account the size of the study area and the number of surveys undertaken, the species assemblages recorded are considered typical for the habitats present and, as such, the survey area is considered to be of County conservation importance for breeding birds.

The recommendations of this report are based upon the current proposed working options and provide general recommendations and mitigation regarding breeding birds in order to safeguard the key areas of greatest importance for this group. Limitations to the breeding surveys include

twilight and cryptic natured species potentially under-recorded due to surveys only being conducted during daylight hours only.

1 Introduction

1.1 Project Background

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake breeding bird surveys in support of an on-line improvement of approximately 1.75km of the A494 between the River Dee and the Queensferry Interchange.

In summary, the proposed scheme consists of two new bridges to carry eastbound and westbound traffic. The eastbound carriageway will make use of the current A494 bridge's supporting river piers combined with a new deck structure and abutments. The westbound carriageway will include a completely new river crossing bridge structure and highway construction constructed immediately to the south of the existing A494 (Appendix A).

Full details of the proposed scheme are described in the Scheme Assessment Report (ref: 36057/054). However the key elements of the proposed Scheme are as follows:

- A 1.4km long offline widening in order to create three lanes;
- A hard shoulder in each direction to increase safety and reduce the congestion associated with breakdowns;
- A new rail bridge to carry the Chester to Holyhead line over the proposed new A494 westbound carriageway;
- A new access road to connect Chemistry Lane with the area east of the A494 and west of the river. This has been provided to replace the current sub-standard access off the A494 which would be closed and,
- A shared path for pedestrians and cyclists alongside the westbound carriageway which will connect with the current Wales Coast Path.

1.2 Site Description

The site limits are between grid references SJ316679 and SJ327688, along the A494 dual carriageway in Queensferry, Wales. Central to the proposed works and where the breeding bird surveys were conducted is the River Dee crossing (central OS grid reference SJ 32373 68598).

The River Dee is fringed with intertidal mudflats, small rock revetments and is surrounded by industrial and residential buildings, farmlands and amenity grasslands. The River Dee has a total length of 110.0km and flows through both England and Wales, and forms part of the border between the two countries.

The river rises in Snowdonia in Wales, runs East through Chester (Wales) and England, it then discharges into the Dee Estuary between both Wales and the Wirral peninsula.

The Dee Estuary is a Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar site and is significantly important, specifically for over-wintering birds. The estuary contains vital intertidal mudflat and saltmarsh habitats that provide optimal feeding and roosting opportunities for large populations of coastal birds. In addition, the site is also particularly important during migration periods for bird species and supports breeding population of two species of terns of European importance: common tern (*Sterna hirundo*) and little tern (*Sternula albifrons*).

Due to the breeding bird surveys occurring between April and June, on passage species (for which the SPA is designated) have been included in this report:

- On passage:

- Sandwich tern (*Sterna sandvicensis*); and
- Common redshank (*Tringa totanus*).

1.3 Aims and Objectives of this Report

Richards Moorehead & Laing Ltd undertook a Preliminary Ecological Appraisal of the proposed route options and bridge during 2019, which identified presence of suitable habitat for breeding birds and recommended further surveys.

The aim of this report is to provide ecological advice of the protected and/or notable bird species which occur or have the potential to occur on or near the Scheme footprint and may be impacted by the proposed works.

The scope of this report is set out below:

- To present the results of the desk study and field surveys in respect of breeding birds;
- To identify potential constraints on the Scheme with regards to breeding birds;
- To make an assessment of the potential impacts of the Scheme on breeding birds; and
- To provide recommendations for further survey work and / or mitigation and licensing requirements.

The surveys provide a robust baseline of breeding bird data to enable any future impact assessment to be made and mitigation to be designed to lessen the impact on breeding birds within the Scheme area.

2 Legislation and Policy

For the purposes of this report, both English and Welsh legislation and policies will be cited due to the survey area closely dividing both countries and how highly mobile bird species are.

2.1 Wildlife and Countryside Act 1981 (as amended)

In the UK all wild birds, their nests and their eggs are protected by the Wildlife and Countryside Act 1981 (as amended), hereafter referred as the 1981 Act. Offences under the 1981 Act include:

- Intentionally killing injuring or taking any wild bird;
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built; and
- Intentionally taking or destroying the egg of any wild bird.

Birds listed on Schedule 1 of the 1981 Act have further protection making it an offence to intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or at/near a nest containing eggs or young, or to disturb the dependent young of such a bird

2.2 Local Biodiversity Action Plans

The UK Biodiversity Action Plan (UKBAP) 1994 – 2010 was superseded by the UK Post-2010 Biodiversity Framework and covered the period 2011 – 2020 (Biodiversity 2020). Whilst the BAP has largely been superseded, many of the tools and resources originally developed under the UK BAP still remain of use. Background information on UK BAP priority habitats and species form the basis of county level biodiversity protection initiatives such as Local Biodiversity Action Plans (LBAP). The Flintshire Authority area is partnered alongside three other counties making the North East Wales Biodiversity Network, the local BAP for these areas include all bird species listed as Section 7 species.

2.3 England

2.3.1 Natural Environment and Rural Communities Act 2006

The 1981 Act is also supplemented by the Natural Environment and Rural Communities Act 2006 (NERC), which enhances the protection to certain habitats and species and places a duty on governments and public bodies/authorities to have regard for nature conservation. The NERC Act 2006 requires public bodies, including local authorities, ‘to have regard to the conservation of biodiversity in England’ when carrying out their normal functions.

The list of species of ‘principal importance for the conservation of biodiversity in England’ (Section 41) guides public bodies in implementing their duty – the ‘Biodiversity Duty’. The Local Authority therefore must consider the impact on biodiversity of the proposed development. The recommendations section of this report illustrates ways in which this Biodiversity Duty can be met.

2.3.2 Birds of Conservation Concern (BoCC[4])

Also referred to as the UK Red List for birds, the fourth review of the status of wild birds within Great Britain was undertaken in 2015. 244 species were assessed and assigned to the Red, Amber or Green lists regarding conservation concerns (Eaton *et al*., 2015).

Focusing at a national level, the quantitative criteria assessed the historical and more recent trends in the population and range of each species, as well as its current population size, localised distribution and international importance.

Bird species in the red and amber lists will be subject to at least one of the relevant factors as listed below:

2.3.2.1 Red List Criteria

- Globally threatened;
- Historic population decline in UK during the period 1800-1995;
- Severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969); and
- Severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period.

2.3.2.2 Amber List Criteria

- Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern);
- Historical population decline during 1800-1995, but recovering; population size has more than doubled over last 25 years;
- Moderate (25-49%) decline in UK breeding population over last 25 years, or the longer-term period;
- Moderate (25-49%) contraction of UK breeding range over last 25 years, or the longer-term period;
- Moderate (25-49%) decline in UK non-breeding population over last 25 years, or the longer-term period;
- Rare breeder; 1-300 breeding pairs in UK;
- Rare non-breeders; less than 900 individuals;
- Localised at least 50% of UK breeding or non-breeding population in 10 or fewer sites, but not applied to rare breeders or non-breeder; and
- Internationally important; at least 20% of European breeding or non-breeding population in UK (NW European and East Atlantic Flyway populations used for non-breeding wildfowl and waders respectively).

2.3.2.3 Green List Criteria

- Species that occur regularly in the UK but do not qualify under any or the above criteria.

2.3.3 National Planning Policy (NPPF)

The NPPF (2019) aims to contribute to the achievement of sustainable development. One of the overarching objectives for achieving sustainable development is:

"*An environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and to protect and enhance biodiversity, plans should*:

- "*Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and*

areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and

- *Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity."*

When determining planning applications, local planning authorities should apply the following principles:

- "*If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused*;
- *Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
- *Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists*; and
- *Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity. "mitigating and adapting to climate change, including moving to a low carbon economy."*

2.4 Wales

2.4.1 Birds of Conservation Concern Wales (BoCCW3)

The fourth review of the status of wild birds within Great Britain was undertaken in 2015. 244 species were assessed and assigned to the Red, Amber or Green lists regarding conservation concerns2 . Criteria for assessment included the conservation status of these species on a global, European and national scales, as well as historical records and population trends. This list is complemented by the Birds of Conservation Concern Wales (BoCCW3) which reviews up to date information on the status of birds in Wales3 . Focusing at a Welsh level, the quantitative criteria assessed the historical and more recent trends in the population and range of each species, as well as its current population size, localised distribution and international importance. A total of 213 species were considered, of which 55 were listed as Red, 89 on Amber and 69 listed as Green. For this assessment, the BoCCW34 has been used to assess the status of birds recorded during the survey.

2.4.2 Environment (Wales) Act 2016

In considering how to construct the J4 road scheme, Welsh Government will be required to consider their general duty to enhance biodiversity.

The Environment (Wales) Act introduced a new, enhanced Biodiversity and Resilience of Ecosystem Duty on public bodies to ensure that biodiversity is an integral part of decision making. Public authorities will be required to report on the actions they are taking to improve biodiversity and promote ecosystem resilience.

Section 6 of the Act places a duty on public authorities to seek to maintain and enhance biological diversity (referred to as biodiversity). All public bodies, statutory undertakers,

Ministers of the Crown and other public office holders are required to apply the duty when they are carrying on any functions in Wales, or in relation to Wales.

Section 7 of the Act is similar to the duty in Section 42 of the NERC Act 2006 which it replaces. It places a duty on the Welsh Ministers to publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. There are currently 51 bird species on the priority species list.

2.4.3 Planning Policy Wales

Chapter 6 of Planning Policy Wales 11 (February, 2021): Distinctive and Natural Places details objectives in relation to nature conservation (which relates to conserving and enhancing the natural environment) requires Local Authorities to take measures to:

- Integrating Green Infrastructure and Development;
- Biodiversity and Resilience of Ecosystems Duty (Section 6 Duty);
- Protection and Management of Designated Sites;
- Protection for Non-statutory Designations;
- Maintaining and Enhancing Biodiversity;
- Protection of Species;
- Protection of Trees, Woodlands and Hedgerows; and
- Protection of Undeveloped Coastlines.

2.4.3.1 Technical Advice Note 5

Technical Advice Note (TAN) 5 relates to nature conservation and planning (Welsh Assembly Government 2009) and provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. The TAN provides advice for local planning authorities on:

- The key principles of positive planning for nature conservation;
- Nature conservation and Local Development Plans;
- Nature conservation in development management procedures;
- Development affecting protected internationally- and nationally- designated sites and habitats; and
- Development affecting protected and priority habitats and species.

2.4.4 Biodiversity Policy Wales

Biodiversity Partnership (WDP) has produced biodiversity checklists for local authority and public authority staff in Wales. The checklists will assist public and local authorities to take account of biodiversity in their operational activities and will help organisations to comply with the requirements of the Environment (Wales) Act (2016) Biodiversity Duty, The Conservation of Habitats and Species Regulations 2017 and other biodiversity related legislation. In addition, the implementation of the checklists and guidance will help build towards the biodiversity outcomes contained in the Environment Strategy for Wales.

3 Methodology

3.1 Survey Area and Scope

Ornithological baseline data regarding breeding birds was gathered by means of a desk study to gather third party data, with field surveys to collect contemporary and site-specific data.

The field survey comprised of all suitable habitats within 800m minimum of the Scheme footprint, hereafter referred to as the "survey area" within this report.

The choice of survey buffer used was based on Cooke *et al.* (2019), who found that the detectability of birds was influenced by distance to roads and that this effect was significant at smaller distances but could be measurable up to 2.1km.

These finding have two implications, (1) existing roads may have an impact on bird populations up to 2.1km and (2) surveys data may be influenced by existing roads because the detectability of species will be positively or negatively affected and therefore the determination of importance and impact magnitude may be under/overestimated.

3.2 Desk study

A desk study was undertaken and reported within the Preliminary Ecological Appraisal Report (Mott MacDonald, 2020) collating any breeding bird data within 2.0km of the Scheme. Only records less than 10 years old were considered valid and relevant due to changes to population and habitats over time.

The following sources were reviewed / consulted:

- Cofnod (https://www.cofnod.org.uk/Home);
- Previous survey data report (Mott MacDonald, 2019); and,
- eBird (https://ebird.org/home).

3.3 Field Survey

The survey methodology applied for the breeding bird surveys broadly followed that used for the Breeding Bird Survey (BBS), devised by the British Trust for Ornithology (BTO), Joint Nature Conservation Committee (JNCC) and the Royal Society for the Protection of Birds (RSPB). The BBS methodology uses a distance and mapping method in which a series of visits are made to a site during the breeding season, and observations of birds, by sight or sound are recorded. The surveys for this Scheme entailed birds recorded on large-scale map in accordance with the developmental project

The survey area was approximately 800m minimum, central of the Scheme footprint. Literature suggests that the maximum sensitivity to disturbance during construction activities for breeding species (peak sensitivity) is likely to be present within 750m (Whitfield *et al*, 2008), particularly in a rolling landscape. The survey area for this Scheme contains a variation of current disturbances and barriers such as major roads, infrastructure, residential and commercial sites already within and (or) crossing habitats classed as supporting SPA habitat, and these points were considered during the process of finalising the survey methodology details.

3.3.1 Survey Coverage

Survey coverage of the study area was based on the perimeter count methodology described by Atkinson *et al.* (2006). Survey routes were devised, where possible to:

- Include every accessible hedgerow, drain, and field boundary within the study area extent;
- Pass across the centre of fields larger than 25ha; and
- Pass within 50m of every part of any woodland present.

3.3.2 Visit Timings

Three survey visits of three days each (Table 3.1) were conducted within the breeding season survey period of 2020 (1 April to 31 July) defined by Gillings *et al.*, (2013).

The monthly surveys were split across two days and were carried out by two ecologists (at least one of whom was an experienced ornithologist). Each of the visits was carried out over a course of two days, during daylight hours only (Table 3.1).

The first hour after sunrise was avoided as there is generally heightened bird activity during this period that may lead to uneven coverage as a result of rapid changes in the detection of birds (Bibby *et al*, 2000).

In order to maintain a relatively consistent ability to detect breeding bird activity, the surveys were conducted where practicable in optimal or near optimal conditions and avoided periods of heavy rain and/or strong wind (above wind Force 4) wherever possible.

Table 3.1: Weather conditions

Date	Start Time	Finish Time	Temperature	Wind Direction and Speed (Beaufort scale)	Cloud cover (Okta)
07/04/21	07:30	11:43	14°C	S 1	4/8
08/04/21	07:28	11:24	16°C	SSW 1	3/8
06/05/21	06:25	10:31	13°C	SE 1	0/8
09/05/21	06:20	10:22	19°C	S 1	1/8
09/06/21	05:50	10:12	11°C	WNW 1	1/8
11/06/21	05:45	10:21	14°C	ENE 1	1/8

Source: Mott MacDonald, 2020.

3.4 Data Collection

Birds identified by sight or sound were registered electronically on a Samsung Galaxy Note 2 Tablet, using the ArcCollector application. The number of birds of each species were recorded with breeding evidence if displayed (Table 3.2) based on the standard list of conventions described by Sharrock (1974) and Gillings *et al.,* (2013).

Whilst the primary aim of the data collection is to support the planning process, Clause 6.4.7 of BS 42020:2013 (The British Standards Institute, 2013) recommends that data are collected in a way that facilitates the process of making the data available to local, county and/or national recording Schemes where this has the agreement with the project proponent. The data was collected so that it was compatible with Bird Track, a partnership between the BTO, the RSPB, Birdwatch Ireland, the Scottish Ornithologists' Club, and the Welsh Ornithological Society.

Table 3.2: Summary of breeding evidence categories

Confirmed	Probable	Possible
Distraction display or injury feigning.	Pair observed in suitable nesting habitat.	Observed in suitable nesting habitat.
Used nest or eggshell remains	Permanent territory presumed through registration of territorial behaviour (song etc.) from many individuals on one day.	Singing male in suitable breeding habitat.
Recently fledged young	Courtship and display.	
Adults entering or leaving nest site or adults seen incubating.	Visiting probable nest site.	
Adult carrying faecal sac or food for young.	Agitated behaviour or calls suggesting probable presence of nest or young nearby.	
Nest containing eggs.	Nest building or excavation.	
Nest with young.		

Source: Based on Sharrock, J.T.R., 1974.

3.4.1 Defining Notable Species

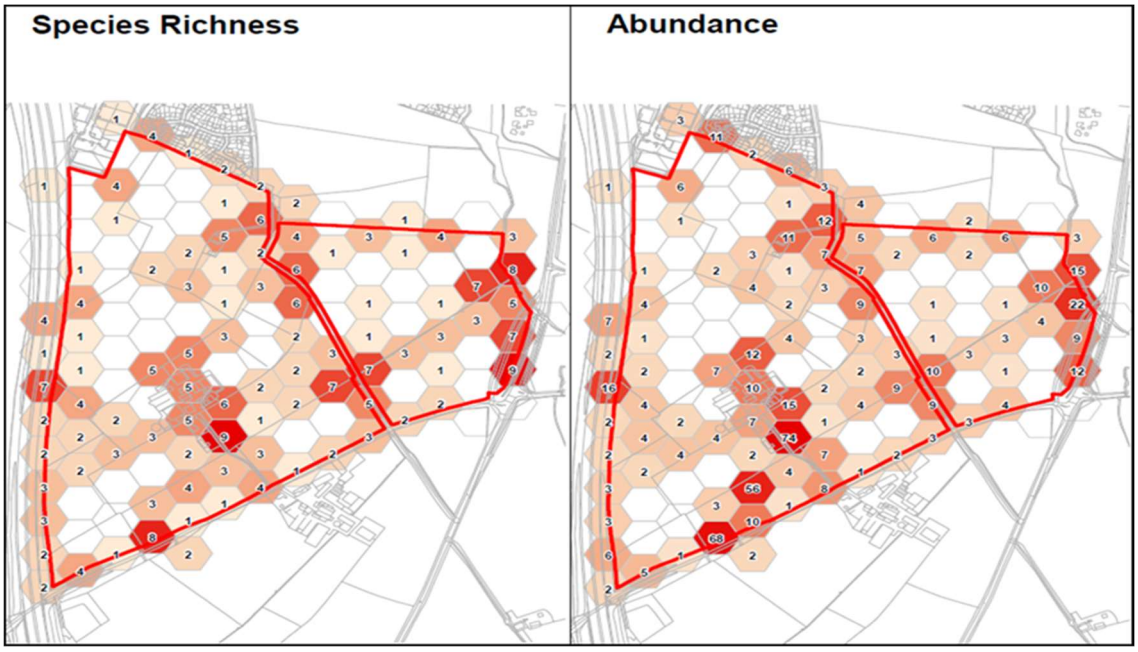
For the purpose of this report, notable bird species are defined as those which are either listed as Red or Amber BoCC, Section 41/Section 7 and (or) listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

It should be noted that a species' conservation status and level of the legal protection are not discrete categories and there is considerable overlap between them (i.e. a species may occur in more than one category). Therefore, the total number of species in each category does not relate to the total number of notable bird species recorded as present within the Scheme survey area during the breeding period.

3.5 Mapping and Data Analysis

Data were spatially analysed using ArcGIS 10.6 (ESRI, 2016). A hexagonal grid with 50m wide grid cells covering the full extent of the survey area was created using the generate tessellation tool. Individual maps are produced illustrating, on a grid cell basis, the spatial variation in the number of records, species richness, abundance, and the distribution of notable species across the survey area (Figure.3.1).

Figure 3.1: Example of distribution maps



Source: Mott MacDonald, 2020

3.5.1 Assessment of the Overall Breeding Bird Communities Importance Within the Survey Area

An assessment of the breeding bird communities recorded within the survey area was undertaken based on the methodology described by Fuller (1980) on the basis of species richness and the breeding bird communities quality. The conservation importance of the site with respect to species richness is set against the criteria in Table 3.3.

With respect to breeding bird communities quality, each breeding species is assigned a score (Table 3.4) based on its national breeding population (Holling *et al*., 2015). These scores are summed to produce an index value that is set against the criteria as shown in Table 3.5 to identify the conservation importance of the site in terms of breeding bird communities overall value of the survey area.

Table 3.6 presents an example of the overall calculation of breeding bird community index.

Table 3-3: Species richness criteria

Conservation importance	National	Regional	County	Local
Number of species	85+	70-84	50-69	25-49

Source: Based on Fuller, R., 1980.

Table 3-4: Breeding population status categories (breeding pairs per annum)

Very Rare (A)	Rare (B)	Scarce (C)	Less Scarce (D)	Not Scarce (E)
<30	30-300	301-1000	>1000*	>1000^

Source: Mott MacDonald, 2019. */^ Species assessed/not assessed by the Rare Birds Breeding Panel.

Table 3-5: Breeding bird communities quality criteria scores

Conservation importance	National	Regional	County	Local
Index	60+	40-59	20-39	10-19

Source: Based on Fuller, R., 1980.

Table 3-6: An example calculation of breeding bird communities index

Category (score per species)	A (5)	B (4)	C (3)	D (2)	E (1)	Index
Number of species	1	2	4	9	21	-
Category score totals	5	8	12	18	21	64

Source: Mott MacDonald, 2019.

3.6 Survey Limitations

- Biological records obtained from third parties and presented in the desk study do not represent a full and complete species list for the area. They are given voluntarily by individuals on an ad-hoc basis, often meaning there are areas of deficiency in the data;
- The absence of a species is not conclusive proof that a species is not present or that it will not be present in the future. However the desk data coupled with the field surveys provide a good comprehensive understanding of breeding bird species that exist within the Schemes footprint and surrounding areas which are likely to be impacted by the proposed works;
- The results presented in this report are a snapshot of the current breeding community within the survey area during summer 2021.
- Surveys were carried out in daylight hours only and therefore species most frequently observed during hours of darkness or twilight are also likely to have been under recorded; and
- The survey methodology does not detect all species evenly and it is known that cryptic species such as grey partridge (*Perdix perdix*), snipe (*Gallinago gallinago*) and skylark (*Alauda arvensis*) may not be recorded and/or under recorded.

3.7 Species Excluded from Analysis

Species excluded from the analysis include:

- Non-native species protected under the Game Act 1831 (as amended) but likely to be derived from a self-sustaining population; and
- New bird species encountered outside of the survey area.

3.8 Nomenclature

The English vernacular and scientific bird names used will follows that of the 9th Edition of the British Ornithologists' Union official list of species recorded in Great Britain (McInerny, 2017).

4 Results

4.1 Desk Study Results

4.1.1 Historical Species Records

Records of 42 notable species of bird were returned from within 2.0km of the Scheme. Notable bird species which could be encountered during the breeding period are listed in Table 4.1 below.

Table 4.1: Historical records of bird species returned within 2.0km of the Scheme footprint from Cofnod (cofnod.org.uk) and eBird (https://ebird.org), including bird species identified during surveys completed in winter 2018/19 (Mott MacDonald, 2019).

Species	Scientific name	Distance (m)
Avocet	*Recurvirostra avosetta*	1236
Barn owl	*Tyto alba*	1754
Barnacle goose	*Branta leucopsis*	0
Bewick's swan	*Cygnus columbianus*	562
Black-headed gull	*Chroicocephalus ridibundus*	165
Black-tailed godwit	*Limosa limosa*	1236
Bullfinch	*Pyrrhula pyrrhula*	1853
Common gull	*Larus canus*	200
Common redshank	*Tringa totanus*	60
Cormorant	*Phalacrocorax carbo*	0
Curlew	*Numenius arquata*	1236
Dotterel	*Charadrius morinellus*	1236
Dunnock	*Prunella modularis*	30
Fieldfare	*Turdus pilaris*	320
Firecrest	*Regulus ignicapilla*	1206
Garganey	*Anas querquedula*	1267
Grasshopper warbler	*Locustella naevia*	1233
Great-black backed gull	*Larus marinus*	100
Herring gull	*Larus argentatus*	165
House sparrow	*Passer domesticus*	1590
Kestrel	*Falco tinnunculus*	1360
Kingfisher	*Alcedo atthis*	1519
Lapwing	*Vanellus vanellus*	309
Lesser black-backed gull	*Larus fuscus*	250
Linnet	*Linaria cannabina*	717
Little egret	*Egretta garzetta*	30
Little ringed plover	*Charadrius dubius*	1921
Mallard	*Anas platyrhynchos*	0
Oystercatcher	*Haematopus ostralegus*	70
Peregrine	*Falco peregrinus*	290
Redwing	*Turdus iliacus*	320

Species	Scientific name	Distance (m)
Shelduck	*Tadorna tadorna*	250
Skylark	*Alauda arvensis*	692
Song thrush	*Turdus philomelos*	1530
Spotted flycatcher	*Muscicapa striata*	492
Starling	*Sturnus vulgaris*	165
Tree sparrow	*Passer montanus*	1233
Twite	*Linaria flavirostris*	1236
Whooper swan	*Cygnus cygnus*	562
Yellow wagtail	*Motacilla flava*	153
Yellowhammer	*Emberiza citrinella*	654
Yellow-legged gull	*Larus michahellis*	200

Source: Cofnod 2018; eBird 2021; Mott MacDonald, 2018/19.

Although records of Barn Owl and Peregrine (Schedule 1) were returned from within 2.0km of the Scheme, surveys for these species have not been undertaken within the Scheme survey area due to the lack of suitable nest sites (as noted within the PEA) and current disturbances within the survey area.

4.1.2 Habitat Context

Land within and surrounding the Scheme footprint comprises of a mosaic of farmlands (predominantly arable), residential, industrial, poor semi-improved grasslands, small rocky bays and banks fringing the River Dee and wooded areas.

The Scheme survey area is also intersected by a network of A and B roads.

4.2 Field Surveys

A total of 42 species were recorded during the surveys with a full species list and map are provided in Appendix B and C respectively. Observed notable species include the following:

- One Schedule 1 species;
- Eight Section 41 species;
- 10 Section 7 species;
- Eight Species on the Red List Birds of Conservation Concern (U.K.);
- 12 Species Amber List Birds of Conservation Concern (U.K.);
- 10 Species on the Red List Birds of Conservation Concern (Wales); and
- 14 Species on the Amber List Birds of Conservation Concern (Wales)

26 (Table 4.3) of the species recorded on site that are of conservation concern (i.e. Red or Amber List Birds of Conservation Concern) and are considered to be range restricted but are common and widespread in England and Wales (Balmer *et al*., 2013).

Table 4.2: Notable species, breeding status, conservation status, minimum, maximum and average count per survey and distribution within the Scheme survey area. *Schedule 1 species.

Vernacular Name	Scientific Name	Section 41 (England)	Section 7 (Wales)	UK BoCC (2015)	Wales BoCC (2010)	Rare Breeding Birds Panel	min	Avg.	Max	Breeding Status	Closest Distance	General distribution
Mallard	*Anas platyrhynchos*			Amber	Amber		2	2.2	4	Probable	0.03	Mallard were observed in pairs and in small groups during each survey. The majority of pairs were observed roosting on the banks and using the river for commuting. Nesting was not confirmed; however pairs were observed in suitable nesting habitat.
Grey heron	*Ardea cinerea*			Green/ Unlisted	Amber		0	0.25	2	N/A	0.03	Two single grey heron were observed feeding within the gulley south of the A494 bridge. It is unlikely that grey heron are nesting within the survey area and there are no known heronries within 2.0km of the A494 bridge. The closest heronry is approximately 5.0km away.
Little egret	*Egretta garzetta*			Green/Unlisted	Green /Unlisted	Less scarce	0	0.4	1	N/A	0.03	Little egret were observed foraging on the edge of the gulley south of the A494 bridge. Like grey heron, the closest breeding colony of little egret is 5.0km north west of A494 bridge, at the RSPB Burton Mere Wetlands nature reserve.
Oystercatcher	*Haematopus ostralegus*			Amber	Amber		1	1.5	2	Probable	0.02	Oystercatcher were seen in pairs scattered around the survey area usually upon the banks or on arable land. Nesting was not confirmed; however pairs were observed in suitable nesting habitat.
Lapwing	*Vanellus vanellus*	x	x	Red	Red		0	2.4	8	Probable	0.02	Single suitable males, including pairs were observed along the banks of the River Dee. Nesting was not confirmed; however pairs were observed in suitable nesting habitat.
Common sandpiper	*Actitis hypoleucos*			Amber	Red		0	1.5	4	Probable	0.02	Common sandpiper were often encountered in pairs and heard making agitated calls. No nests were detected.
Redshank	*Tringa totanus*			Amber	Red		0	0.8	2	Probable	0.05	Two pairs of common redshank were observed foraging upon the banks during April only. No nests were detected.

Vernacular Name	Scientific Name	Section 41 (England)	Section 7 (Wales)	UK BoCC (2015)	Wales BoCC (2010)	Rare Breeding Birds Panel	min	Avg.	Max	Breeding Status	Closest Distance	General distribution
Black-headed gull	*Chroicocephalus ridibundus*		x	Amber	Red		0	2.2	6	Possible	0.04	The majority of black-headed gulls appeared to be non-breeding and were utilising the Scheme area for loafing and passing through heading to their breeding grounds.
Great black-backed gull	*Larus marinus*			Amber	Red		0	0.25	1	Possible	0.41	One great black-backed gull was observed.
Herring gull	*Larus argentatus*	x	x	Red	Red		0	4.4	12	Confirmed	0.36	Herring gull were observed scattered around the survey area utilising the arable fields, banks and river itself. A minimum of 6 nests were identified upon the Scottish Power building south east of the A494 bridge. Nests were successful as fledglings were observed in the subsequent months.
Lesser black-backed gull	*Larus fuscus*			Amber	Amber		0	7.2	30	Confirmed	0.32	Lesser black-backed gulls were well scattered throughout the survey area utilising the arable lands and banks surrounding the River Dee. At least four pairs were observed in May building nests upon the Scottish Power building south of the A494, where young were observed in the subsequent months.
Kingfisher*	*Alcedo atthis*			Amber	Amber		0	0.25	1	Possible	0.03	One kingfisher was observed commuting through the small gulley south of the A494 bridge in July. Breeding behaviour was not identified, however the small gulley may pose a potential nesting area.
Kestrel	*Falco tinnunculus*		x	Amber	Red		0	0.4	1	Possible	0.38	A single kestrel was observed during the April survey.
Skylark	*Alauda arvensis*	x	x	Red	Amber		1	3.4	6	Probable	0.33	Skylark were heard singing and observed parachuting which typically suggests breeding. All observations were made on arable lands only, both east and west of the A494 bridge.
Swallow	*Hirundo rustica*			Green/Unlisted	Amber		0	2	4	Confirmed	0.27	Swallow were observed feeding along the grassy verges of the River Dee. Active nests were also identified within farm buildings located north west of the Jubilee bridge.
House martin	*Delichon urbicum*			Amber	Amber		0	13	50	Probable	0.32	House martin were observed in May feeding behind the Scottish Power building south east of the A494 bridge.

Vernacular Name	Scientific Name	Section 41 (England)	Section 7 (Wales)	UK BoCC (2015)	Wales BoCC (2010)	Rare Breeding Birds Panel	min	Avg.	Max	Breeding Status	Closest Distance	General distribution
Long-tailed tit	*Aegithalos caudatus*			Green/Unlisted	Amber		0	1.8	6	Confirmed	0.02	Active nests and pairs of long-tailed tits were identified in the shrub and scrub area east of the A494 bridge.
Whitethroat	*Sylvia communis*			Green/Unlisted	Red		0	1.4	4	Confirmed	0.01	Common whitethroat were observed building nests within the shrub and scrub area located east of the A494 bridge.
Goldcrest	*Regulus regulus*			Green/Unlisted	Amber		0	1	4	Probable	0.13	Goldcrest were identified calling within suitable nesting habitat (conifer *sp.*) in residential gardens fringing the A494 bridge area.
Starling	*Sturnus vulgaris*	x	x	Red	Red		12	15	24	Probable	0.16	Starling were observed close to the residential buildings fringing the river Dee. Active nests were also identified within some of the buildings.
Song thrush	*Turdus philomelos*	x	x	Red	Amber		0	0.6	1	Possible	0.25	Singing males were heard north and north west of the Jubilee bridge.
Mistle thrush	*Turdus viscivorus*			Red	Amber		0	0.25	1	Possible	0.66	One suitable male was seen and heard singing within a small copse east of the A494 bridge.
Dunnock	*Prunella modularis*	x	x	Amber	Green/Unlisted		0	1	2	Probable	0.26	Singing males in suitable nesting habitat north of Jubilee bridge were observed each month.
Grey wagtail	*Motacilla cinerea*			Red	Amber		0	0.8	2	Probable	0.3	One pair of grey wagtail were observed foraging and commuting along the banks. No nests were identified, however suitable nesting habitat exists within the survey area.
Meadow pipit	*Anthus pratensis*			Amber	Amber		0	0.5	2	Probable	0.83	One pair of meadow pipit were observed perched on a fence north west of the A494 bridge. No nests were identified, however suitable nesting habitat exists within the survey area.
Linnet	*Linaria cannabina*	x	x	Red	Red		0	1	2	Probable	0.2	Pairs of Linnet were observed in pairs upon and surrounding the arable land east of the A494 bridge. No nests were identified, however suitable nesting habitat exists within the survey area.
Reed bunting	*Emberiza schoeniclus*	x	x	Amber	Amber		0	0.6	2	Probable	0.19	Reed bunting were seen as singular males or in a pair. Reed bunting were only observed upon the arable lands east of the A494 bridge. No nests were identified, however suitable nesting habitat exists within the survey area.

4.3 Valuable Features and Habitats for Breeding Birds

The areas in which the highest numbers of observations of breeding birds were made correspond with the areas in which the greatest number of species and the highest abundance was recorded.

Species richness and abundance across the total survey area was considered as low to moderate, however there were distinct areas in which likely breeding birds did concentrate and (or) were successful rearing young. These notable areas include (including the distance from the Scheme footprint):

- Industrial buildings (300m);
- Shrubs and scrub area (0m);
- Small gulley located south of the A494 bridge (25.0m); and
- Arable land, north-west of the A494 bridge (50.0m)

4.3.1 Buildings and Infrastructure

Industrial buildings just south of the A494 bridge appeared to successfully support nesting Red and Amber listed gull species including herring and lesser black-backed gull. Up to a minimum of 10 nests could be observed from the ground during the May survey and fledglings were observed during the subsequent month.

The A494 bridge contained several nesting feral pigeon, with up to four nests with young recorded. During the breeding bird surveys, feral pigeon were only identified as breeding within the structure, however views to this bridge are obstructed in some areas particularly in northern and southern extents, where young could be heard but not seen.

There are also suitable nesting features for small passerine species, however none were identified during the surveys.

4.3.2 Shrub and Scrub Areas

Shrub and scrub areas located north east and west of the A494 bridge and upon arable land appeared to support a number of nesting warblers including sedge warbler (*Acrocephalus schoenobaenus*), blackcap (*Sylvia atricapilla*) and common whitethroat (*Curruca communis*). The areas also appeared to support linnet, reed bunting, long-tailed tit (Amber Listed) and other Green Listed species such as wren, robin, blackbird and dunnock.

4.3.3 Small Gulley Located South of the A494 bridge

The small gulley south of the A494 appeared to support pairs of common sandpiper, common redshank, mallard and a single kingfisher. No active nests were identified; however breeding behaviour was observed between a pair of common sandpiper in this area.

It should be noted that visual and physical access to this area was limited and it is therefore uncertain whether this area is suitable for nesting kingfisher or whether it is used for feeding and/or foraging purposes only.

4.3.4 Arable Land, North-West of the A494 bridge.

Arable lands both east and west of the A494 bridge supported pairs of oystercatcher, reed bunting, skylark and linnet. Birds were seen in pairs, but no nests were identified.

4.3.5 Breeding Bird Community Conservation Importance

The number of species recorded as possible, probable or confirmed breeding within the survey area (*n*=25) is considered to be of "County" importance with an overall score of 25.
However, it should be noted that all breeding birds with additional protection and (or) those that are considered of "conservation concern" have been included in this assessment, and therefore this score is a broad assessment.
In addition, due to the large area and spectrum of habitats surveyed during the breeding season, it is likely that species that are common and widespread are picked up and therefore increase the overall score.

Table 4.3: Breeding Bird Community Index Score

Category (score per species)	A (5)	B (4)	C (3)	D (2)	E (1)	Index
Number of species	0	0	0	0	25	-
Category score totals	0	0	0	0	25	**25**

Source: Mott MacDonald, 2020

5 Potential impacts on Breeding Birds

The potential impacts of the development on breeding birds may include, but are not limited to:

- Damage and/or destruction of active birds' nests;
- Loss of habitats utilised during breeding season;
- Fragmentation of foraging and commuting habitat;
- Increased mortality during and post construction; and
- Increased levels of disturbance resulting from noise, light and the presence of people. Those species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), (see below).

The resulting effects may include:

- A reduction in species richness and/or abundance; and,
- Displacement of birds from areas used for breeding.

Impacts may occur during the creation of compounds, excavation or vegetation/bank clearance in order to widen or place new crossings and the presence of humans and (or) machinery travelling through the Scheme footprint.

Impacts are likely to occur during the construction phase of the proposed Scheme.

5.1 Construction Phase

Potential construction impacts could include:

- Damage and/or destruction of active birds' nests;
- Permanent and temporary loss and fragmentation of habitats;
- Disturbance and (or) damage of a Schedule 1 species nesting location and their young;
- Noise pollution; and
- Light pollution.

The above points are discussed further in the sections below.

5.1.1 Schedule 1

5.1.1.1 Kingfisher

A total of two sightings of a single kingfisher were made during the over wintering and breeding period, however no breeding activity or nest sites were confirmed during the breeding bird surveys due to obstructed views to the small gulley area south of the A494 bridge, where the initial observations were made.

From what could be observed within the gulley area, the banks along the gulley appear to vary in nesting suitability where substrate ranges between mud, wood and sand. However, these areas could change per annum (except for the areas of bank which are built with boards of wood).

Kingfishers are a highly sensitive species due to their reclusive nature, particularly when breeding. Kingfisher are predominantly found nesting along riverbanks; however they can also take a novel approach to nesting and have been found nesting in a variety of areas, including

sand pits, excavated land, roots and in crevices of walls up to 250m away from water (Environment Agency, 2001).

Impacts to this species from this Scheme are likely to be indirect such as disturbance from operating plant, works to the bridge and personnel, particularly those in unmanaged areas. Impacts such as the above can affect the integrity of a local species population.

5.1.2 Damage and/or Destruction of Active Birds' Nests

Construction activities have the potential to damage and/or destroy active birds' nest through building and infrastructure decommissioning or placement, vegetation removal, bank excavation, placements of compounds, access routes, laydown areas and footfall through an unmanaged area.

These activities could constitute an offence under the Wildlife and Countryside Act 1981 (as amended).

The destruction and (or) damage of nests could cause severe impacts to populations of bird species at a county level. These include the local species found in this area such as common sandpiper, oystercatcher, linnet, reed bunting, meadow pipit and warbler species amongst others.

It should be noted that some bird species can extend and (or) commence breeding beyond the typical nesting guidance (Massimino & Gillings, 2018). For instance, mistle thrush, a species recorded within the survey area, can begin nesting as early as February. Consideration must be given when clearing vegetation just outside of the breeding bird season and reasonable measures should be put in place, such as a tool box talk for clearance teams.

5.1.3 Permanent and Temporary Loss and Fragmentation of Habitats

As the proposed development will potentially require the removal or impact of banks, scrub grassland, farmland and wooded areas, there will likely be a reduction of nesting, foraging and roosting habitats for breeding birds.

The new road widening coupled with the new crossing over the watercourses may change the ability of some species to move through the landscape due to a new barrier and increased disturbance.

The loss and fragmentation of breeding bird habitat has the potential to have a wide-ranging impact with approximately half of all the species recorded utilising these habitats within the survey area. The importance of riverbanks, scrub and shrub areas are especially pertinent considering the species identified as present and breeding within the survey area.

Bird species including (but not limited to) long-tailed tit, sedge warbler, chiffchaff, common whitethroat and blackcap amongst others have the potential to be affected by the loss of scrub and shrub areas.

Aquatic dependant bird species such as kingfisher, common redshank, common sandpiper, duck and goose species will be affected by barrier effects from visual and physical disturbance, and loss of riverbanks, particularly those with suitable foraging and nesting substrate.

Section 4.3 highlights the areas of high richness and abundance which are also likely to be impacted by the Scheme due to the areas being within 50m of the Scheme footprint. All of which contained species such as kingfisher, common sandpiper, common redshank, duck species. and warbler species. all of which can be potentially disturbed and (or) obstructed to nest sites by machinery, humans, and the placement of the road during the breeding season i.e. during and post construction (operational).

5.1.4 Noise pollution

Noise pollution has been found to have a fundamental influence on the population density of breeding birds (Ortega, 2012). This not only has consequences for individual species but also impacts on the composition of bird communities. The impact of noise varies between species and the adverse effects are not universal.

It has been found that in one study (Brumm, 2004), that males in noisier environments sing at higher sound levels than males in quieter territories. The perceived energy cost of singing louder may be relatively small but the increased rate of detection by predators may be more significant.

It is not known exactly what the impacts of noise are likely to be on the local breeding bird population due to the already current disturbances experienced within the area. However, for the majority of the species recorded during the survey (songbirds) the potential for noise impact upon their territorial and advertorial (i.e. singing) behaviour is wide ranging.

The impacts are most likely to be significant in areas where bird abundance and richness is highest.

5.1.5 Light Pollution

Artificial light effects on bird species is an area of ongoing research with studies demonstrating that artificial lighting at night affects bird behaviours in a variety of ways:

- Orientation and navigation during dispersal and migration (Poot et al., 2008);
- Nest provision rates (Titulaer *et al*., 2012); and
- Seasonal rhythms on songbirds (Dominoni, 2016)

All of the above points can negatively impact populations of bird species or cause localised losses. However, artificial light can also offer opportunities to some bird species by extending foraging time in a number of diurnal species (Russ et al., 2015) and illuminate areas for hunting owl species. The impacts of lighting on birds' prey items and the wider ecosystem is also documented (for example Boyes *et al.* 2021).

5.2 Operational Phase

Potential operation impacts could include:

- Increased noise;
- Increased lighting; and
- Air pollution impacts

5.2.1 Noise, lighting and air pollution

The noise levels which will be introduced when the new crossing is placed within the survey area which adds an extra lane onto the current road will most likely have an effect on local bird populations.

Studies have often cited that road noise can cause bird populations to decline. For instance, Ware *et al*., (2015) used traffic noise playback, creating a phantom road in a road-free area. Overall, the number of birds reduced by 31% and bird species which did remain, were found to have a lower body condition score due to higher vigilance, thus decreased overall fitness levels.

Artificial light has been found to impact on birds in several ways. Artificial light can extend the number of hours available for feeding which could be conceived as a positive impact, however it

could potentially have an adverse impact on prey populations and result in food shortages for the bird species concerned.

Furthermore, research by Lofts and Merton (1968) identified 60 species brought in to breeding condition prematurely by artificially long days in winter. Early breeding attempts could potentially fail if there is insufficient food to feed young or if weather conditions prove too adverse for young birds to survive.

Birds may be directly and indirectly affected by air pollution. Changes in plant and invertebrate communities are well documented and these may have secondary effects on some bird species. Studies on both point source (industrial) and diffuse source (traffic exhaust) pollution have found direct impacts on birds (Eeva *et al*.,1998). The level of the problem from traffic exhaust emissions in the UK is not yet fully understood, though it is documented that impacts on vegetation and habitats within proximity of roads occurs (Forman and Alexander, 1998).

5.3 Summary

In the absence of mitigation and compensation, there are potentially wide-ranging impacts of the Scheme on local breeding birds due to the loss of foraging and nesting habitats, and due to the barrier to avian movement that is likely to occur. There is likely to be fragmentation of hedgerows, riverbanks, farmland, marshy areas and scrub habitats, all used by bird species.

The presence of the in-situ road suggests that the local avian populations have adapted to this structure and its use, with the most detrimental impacts likely to occur during construction.

6 Recommendations, Mitigation and Enhancement

6.1 Opportunities for Enhancement

There is a duty placed on public authorities under Section 6 of the Environment (Wales) Act 2016 to seek to maintain and enhancement biodiversity and promote the resilience of ecosystems, in so far as it is possible.

The Environment (Wales) Act 2016 ensures that wildlife and habitats are gained and (or) enhanced compared to the pre-development baseline.

This means the local planning authorities will have a duty to ensure that any plans or projects provide biodiversity net gains, as opposed to 'no net loss'.

In line with this, opportunities for ecological enhancement to benefit breeding birds under the Scheme have been highlighted below:

- The enhancement of existing suitable habitats to increase species diversity; and
- The creation of new habitats and the connection of suitable habitats with the use of planting, such as native species rich scrub and broadleaved trees.

6.2 Schedule 1 species

Temporary screening should be provided around the immediate Scheme footprint to lessen visual impacts and dampen acoustic disturbance during the breeding season for potential kingfisher (March to September). The type and location of the screening should be agreed with a suitably experienced ornithologist once the construction activities and footprint have been confirmed.

If the works timings are to encroach in to breeding season, then it is advised that screening is erected prior to March and remains throughout, in order for birds to become habituated and establish flight paths before breeding commences.

Should the works impact the banks of the River Dee between March and the end of the breeding period (August 31st), then it is advised that preconstruction nesting bird checks specifically for kingfisher are completed by a suitably experienced ornithologist prior to the works taking place.

If an active nest is identified then a protection buffer will be placed around the nest site, which will be set at the discretion of an experienced ornithologist, and remain in place until the young have fledged.

It is also important that any proposed works activities do not inadvertently create suitable nesting sites during the mitigation application phase, such as the creation of vertical earth banks or stockpile felled trees with exposed roots. This is especially important during February and March when kingfishers begin establishing territories and searching for suitable nesting sites. If this does occur then it is advised that an experienced ornithologist is sought for advice.

If bank loss is anticipated and (or) are likely to be impacted, it advised that artificial nesting banks are installed in order to compensate for the loss of habitat during construction and potential disturbance during the construction and operational phase. Furthermore, the additional artificial banks may also encourage sand martin and could increase the local population.

It is recommended that permanent kingfisher nesting banks are placed at a sufficient distance from the proposed works in order to compensate any losses and to prevent any disturbance during the construction and operational phase

6.3 A494 Bridge Works

Due to feral pigeons identified as nesting throughout the year within the A494 bridge, it is advised that the decommissioning of the current deck structure is done during the core wintering (December and January) period when breeding activity will be at is lowest. However, it is important to note that nests may still remain as a risk as feral pigeon can nest all year round and these are still protected under the Wildlife and Countryside Act1981 (as amended),

It is advised that a suitably experienced ornithologist checks the bridge structure prior to the works at any point of the year in order to confirm whether any nesting birds are present.

Should an active nest be found, then an appropriate exclusion area around the nest site should be established and the works within that area must be ceased until all young birds are fledged and appropriate deterrents are put into place in order to prevent further nesting.

Please also note that individual and (or) general licences to remove nests cannot be applied for due to the location of the works which are within 300m of a SSSI. It is advised that an audit trail is kept at all times.

6.4 Vegetation Clearance

It is advised that the clearance and removal of tree, scrub and shrub habitat are avoided and/or minimised where possible. If this is not possible, then it is recommended that any vegetation clearance as part of the Scheme should be undertaken outside of the main breeding bird season (September to February) (Natural England, 2015). However, it should be noted that birds can extend and (or) commence breeding beyond the typical nesting guidance (Massimino & Gillings, 2018). Species found within this area which can nest outside of the breeding window including mistle thrush, mallard and feral pigeon.

If clearance outside of March to August is not achievable, suitable nesting habitat should be checked immediately prior to removal by a suitably experienced ornithologist (no more than 48 hours) in order to confirm no nesting birds are present.

Should an active nest be found, then an appropriate exclusion area around the nest site should be established in liaison with the ornithologist, and the works within that area must be ceased until all young birds are fledged. The exclusion zone will vary depending on species. Compensation nesting opportunities will be required to be installed should any Schedule 1 bird species be found, and is recommended to ensure no long-term impact on any bird species.

Records of such checks should be made and retained during and post works.

6.5 Tree, Scrub and Treeline Replacement

Scrub and shrub (currently used by a range of birds including Amber-listed species), particularly those areas along the coastal path fringing the River Dee should be compensated offsite, away from the Scheme footprint.

These habitats are anticipated to be lost and (or) become unsuitable once the road is in full operation and therefore will impact the local breeding populations.

If practicable any existing treeline to be removed should be translocated to a nearby location or incorporated into the planned landscaping. Where removal is to enable temporary works, replanting of lost habitat should be undertaken.

Where translocation is not possible, and for any other tree removal, losses should be compensated by the planting of new native species trees, in accordance with Herbert *et al*., (1999), should be planted as part of the landscape design.

6.6 Lighting

To minimise light emissions, full cut off high pressure sodium lights that direct light downwards to the carriageway should be used.

However, if LED lights are likely to be installed as opposed to sodium lights, then it is advised that light spill should be minimised outside of the road area, LEDs will be mounted on the horizontal, with no upward light spill andthere should be no illuminance of any vegetated habitats (new or retained) or watercourses. It is recommended that lighting is of a warm colour temperature (ideally <2700K) to mitigate impacts on other species and avian prey items (invertebrates).

If this is not possible, then temporary screening should be used to alleviate/direct the light pollution

6.7 Nest Boxes

The installation of nest boxes on retained trees will mitigate for the loss of nesting habitats such as trees, shrub and scrub. It is recommended that between 1 and 40 nest boxes be installed per hectare in mitigation areas (Schwegler, 2021). The types of nest boxes should be distributed as follows:

- 60% with 32mm entrance hole;
- 20% with 26/25mm entrance hole; and
- 20% should be boxes suitable for species which nest in recesses or cavities.

The nest boxes should ideally be made of durable materials (for example woodcrete) to increase their longevity.

Please note that nest boxes will not compensate for species such as warbler, linnet, reed bunting and long-tailed tit. However, habitat enhancement, compensation and management will.

6.8 General Construction Safeguards

In addition to the specific measures outlined above, general construction safeguards can be implemented to avoid the risk of birds using vehicles and other machinery for nesting. These are as follows:

- Avoid leaving vehicles and machines parked near boundary fences, walls and close to vegetation;
- Any gaps in excess of 22mm in diameter may be sufficient for birds to enter. Where possible, vehicles and other machinery that is not in use can have any holes and ledges temporarily blocked with soft packaging materials;
- As set out above, daily checks of vehicles and other machinery, for nests should be undertaken before any vehicles or machines are started; and
- Any stockpiles onsite should be securely netted to avoid bird species using gaps within the stockpiles.
- Should any nests be found, the ornithologist will be immediately contacted for advice with this advice acted upon.

6.9 Further Surveys

If vegetation and (or) bank removal/excavation is required during breeding season, then it is advised that a nesting bird check is completed 24-48 hours prior to the proposed works.

6.10 Validity of the Survey Data and Assessment

In line with CIEEM guidance on the lifespan of ecological surveys, the survey results are considered valid for up to 18 months. Following this, the survey data should be reviewed and, if appropriate, updated to ensure any assessment and mitigation approach remains valid.

7 References

Balmer, D., Gillings, S., Caffrey, B., Swann, B., Downie, I & Fuller, R., 2013. Bird Atlas 2007-11: The Breeding and Wintering Birds of Britain and Ireland. British Trust for Ornithology, Thetford.

BirdLife International 2019. Charadrius dubius (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2019: e.T22693770A155486463. [online] available at: https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T22693770A155486463.en. [accessed on June 2021]

Boyes, D.H., Evans, D.M., Fox, R., Parsons, M.S. and Pocock, M.J., 2021. Street lighting has detrimental impacts on local insect populations. *Science Advances*, *7*(35), p.eabi8322.

Brumm, H. (2001). The impact of environmental noise on song amplitude in a territorial bird. Journal of Animal Ecology 73: pp. 434-440.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2016). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. 2nd Edition.

CIEEM (2019). On the Lifespan of Ecological Reports and Surveys.

RSPB Burton Mere Wetlands (2021) [online] available at: Dee Estuary Bird Sightings | Burton Mere, Parkgate, Point of Ayr - RSPB [accessed on June 2021].

Dominoni, D. M., Borniger, J. C., and Nelson, R. J. (2016). Light at night, clocks and health: from humans to wild organisms. *Biol. Lett.* 12:20160015. doi: 10.1098/rsbl.2016.0015

Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D. & Gregory, R.D., 2015. Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds, 108, 708–746.

Eeva, T., Lehikoinen and Ronka, M. (1996). Air pollution fades the plumage of the Great tit. Functional Ecology 12: pp. 607-612.

Forman, R.T. and Alexander, L.E., 1998. Roads and their major ecological effects. Annual review of ecology and systematics, 29(1), pp.207-231.

Environment Agency (2001) Best Practice Guidelines- Artificial Bank Creation for Sand Martins and Kingfishers.

Erritzoe J., Mazgajski T. D., Rejt Ł. 2003. Bird casualties on European roads — a review. Acta Ornithol. 38: 77–93.

Fuller, R., 1980. A method for assessing the ornithological interest of sites for conservation. Biological Conservation, 17. pp. 229-239.

Gillings, S., Balmer, D. E., Caffrey, B. J. & Swann, B., 2013. Survey methods and data sources. In: Balmer, D. E., Gillings, S., Caffrey, B. J., Swann, R. L., Downie, I. S. & Fuller, R. J. (eds), 2013. Bird Atlas 2007–11: The Breeding and Wintering Birds of Britain and Ireland. BTO Books, Thetford, UK. pp.34–45.

Hagemeijer, E.J.M. and Blair, M.J. 1997. The EBCC atlas of European breeding birds: their distribution and abundance. T. and A. D. Poyser, London.

Herbert, R., Samuel, C.J.A. and Patterson, G. 1999 Using local stock for planting native trees and shrubs. Forestry Commission Practice Note No. 8. Forestry Commission, Edinburgh.

Holling and the Rare Breeding Bird Panel, 2015. Rare breeding birds in the United Kingdom in 2013. British Birds, 108: pp. 373-422.

Ilner, H. (1992) Road deaths of Westphalian owl. In: The ecology and conservation of European owls, eds. C.A. Galbraith, I.R. Taylor and S.M. Percival, 94-100. Perterborough Joint Nature Conservation Committee, Peterborough.

International Finance Committee (2012). Guidance Note 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. International Finance Corporation. Washington DC, USA.

Lofts, C. and Merton, D. (1968) Photoperiodic and Physiological Adaptations Regulating Avian Breeding Cycles and their Ecological Significance. Journal of Zoological Society of London 155, pp. 327-394.

Madadi, Hossein, et al. "Degradation of natural habitats by roads: comparing land-take and noise effect zone." Environmental Impact Assessment Review 65 (2017): pp. 147-155.

Madden, B. and Newton, S.F. 2004. Herring Gull Larus argentatus. In: Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. (eds.) 2004. Seabird Populations of Britain and Ireland: 242-262. Poyser, London.

Marchant, J.H., 1983. Common Birds Census Instructions. Tring: British Trust for Ornithology.

Massimino and Gillings (2018), *Updating information on the period of reproduction and prenuptial migration for UK and Irish species included on Annex II of the EU Birds Directive*. BTO, The Nunnery, Thetford, Norfolk IP24 2PU. [online] Available at: https://www.bto.org/sites/default/files/publications/bto_rr_711_massimino_gillings_2018_final_draft.pdf. [Last accessed on June 2021]

McInery, C. J., Musgrove, A. J., Stoddart, A., Harrop, A.H.J., and Dudley, S.P. (2017) The british List: A Checklist of Birds of Britain (9th Edition). The British Ornithologists' Union Records Committee.

Mehta, S., 2012. Create Hexagons. [online] Available at: http://www.arcgis.com/home/item.html?id=7fa102df350f40a087816b93e862e21f [Accessed on June 2021].

Milsom, T.P., Hart, J.D., Parkin, W.K. & Peel, S. 2002. Management of coastal grazing marshes for breeding waders: the importance of surface topography and wetness. Biol. Conserv. 103: pp. 199–207.

Mott MacDonald (2019) River Dee Wintering bird survey data report. Reference: 395318-0070

Natural England, 2015. Planning and development – guidance. Wild birds: surveys and mitigation for development projects. [online] Available at: https://www.gov.uk/wild-birds-surveys-and-mitigation-for-development-projects [Accessed on June 2021].

Ortega, C. P. (2012). Effects of noise pollution on birds: a brief review of our knowledge. Ornithological Monographs 74, pp. 6–22

Poot, H., Ens, B. J., De Vries, H., Donners, M. A. H., Wernand, M. R., Marquenie, J. M., et al. (2008). Green light for nocturnally migrating birds. *Ecol. Soc.* 13, 1–14. doi: 10.5751/es-02720-130247

RSPB (2019). Reed buntings in brief. [online] Available at: https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/farming/advice/helping-species/reed-bunting/. [accessed on June 2021].

RSPB, NRA & the Wildlife Trusts (1994) The New

Schwegler (2021) Schwegler catalogue issue 1 [online] available at: https://view.pagetiger.com/SchweglerCatalogue/issue1/page5.htm. Last accessed September 2021.

Titulaer, M., Spoelstra, K., Lange, C. Y., and Visser, M. E. (2012). Activity patterns during food provisioning are affected by artificial light in free living Great Tits (*Parus major*). *PLoS ONE* 7:e37377. doi: 10.1371/journal.pone.0037377.

Ware HE, McClure CJW, Carlisle JD, Baber JR. (2015) A phantom road experiment reveals traffic noise is an invisible source of habitat degradation. Proc Natl Acad Sci USA **112**:12105–1210.

A. Drawing – Proposed Scheme

The Proposed Scheme

Deeside Leisure Centre

B5129 Chester Road East

Section of existing channel retained for highway drainage

Army Reserve centre

Replacement of the existing bridge for eastbound traffic

Existing gravel path to be resurfaced & widened to 1.5m

B5441 Welsh Road

Garden City

Proposed gantry to replace existing

B5441 Station Road

Existing Network Rail bridge

Asda Superstore

Proposed retaining wall to minimise impact on adjacent land

Western crossover

Wall to be relocated approx. 0.5m to accommodate proposed alignment

Proposed river crossing for westbound traffic with shared use path

Wall to remain

Foxes Lane

Proposed drainage outlet to the River Dee

On slip from Queensferry Junction

Riverside Gypsy traveller's site

Location of new pumping station and substation

Queensferry Junction

Proposed retaining wall

Manor Road

Sealand Manor Estate

Area of land for temporary tree mounted bat boxes during the works

Proposed Network Rail bridge

Welsh Water Treatment Works

North Wales Coast Line (CNH3)

Shared use path for cyclists and pedestrians

Proposed maintenance access bridge

Makro Wholesalers Queensferry

Proposed new access road with a shared use path

River Dee / Afon Dyfrdwy

Wales Coast Path

Off-slip to Queensferry realigned

Poplar trees along existing boundary pruned or removed by agreement with appropriate permissions

Proposed Queensferry Drain open channel

B5129 Chester Road East

Factory Road

Chemistry Lane

Pentre

On road improvements for cyclists and pedestrians

1:2500 0 125m 250m

Reproduced by permission of Ordnance Survey on behalf of the controller of HMSO. © Crown copyright and database rights (2021) Ordnance Survey Licence number 0100031673

© 2020 Microsoft Corporation © DigitalGlobe © CNES (2020) Distribution Airbus DS

- Post & 4 rail fence
- Noise barrier fence
- Pallisade fence
- Existing fence
- Pedestrian guardrail
- Brick wall to remain
- Relocated brick wall
- Site boundary (currently under development)
- Proposed N2/W4 Propriety Steel Barrier
- Proposed N2/W3 Propriety Steel Barrier
- Proposed H2/W2 Concrete Step Barrier
- Proposed N2/W3 Bridge Parapet
- Proposed N2/W2 Steel Step Barrier
- Proposed Terminal
- Existing Terminal to Remain

- Existing footway to be maintained
- Shared use cycle track (for use by cyclists and pedestrians)
- Proposed maintenance access road / area
- Proposed carriageway
- Proposed paved verge
- Earthworks slope / verge (Top / Bottom)
- Proposed footpath
- Integral pedestrian path of the Trunk Road
- Proposed footway
- Proposed footway improvement works
- Proposed access stairway
- Proposed retaining wall
- Existing culvert
- Proposed culvert
- Proposed drainage headwall

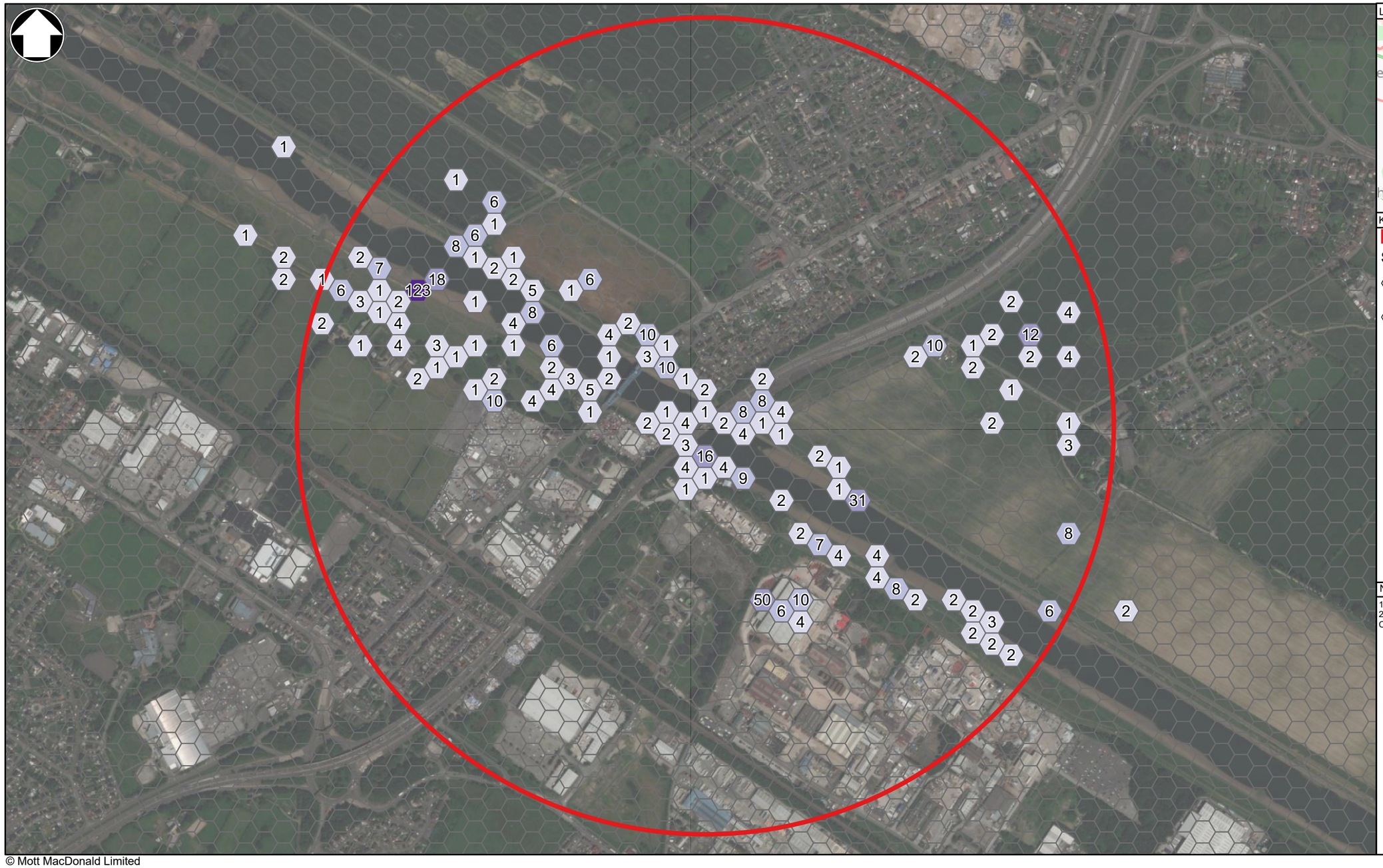
B. Species List

Table B.1: Full Species List

Vernacular Name	Scientific Name
Blackbird	*Turdus merula*
Blackcap	*Sylvia atricapilla*
Black-headed gull	*Chroicocephalus ridibundus*
Canada Goose	*Branta canadensis*
Carrion crow	*Corvus corone*
Chaffinch	*Fringilla coelebs*
Chiffchaff	*Phylloscopus collybita*
Collared dove	*Streptopelia decaocto*
Common sandpiper	*Actitis hypoleucos*
Dunnock	*Prunella modularis*
Feral pigeon	*#N/A*
Feral/hybrid mallard type	*#N/A*
Goldcrest	*Regulus regulus*
Goldfinch	*Carduelis carduelis*
Great Black-backed Gull	*Larus marinus*
Great Spotted Woodpecker	*Dendrocopos major*
Grey Heron	*Ardea cinerea*
Grey Wagtail	*Motacilla cinerea*
Herring Gull	*Larus argentatus*
House Martin	*Delichon urbicum*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo atthis*
Lapwing	*Vanellus vanellus*
Lesser Black-backed Gull	*Larus fuscus*
Linnet	*Linaria cannabina*
Little Egret	*Egretta garzetta*
Long-tailed Tit	*Aegithalos caudatus*
Mallard	*Anas platyrhynchos*
Meadow Pipit	*Anthus pratensis*
Mistle Thrush	*Turdus viscivorus*

Vernacular Name	Scientific Name
Oystercatcher	*Haematopus ostralegus*
Pied Wagtail	*Motacilla alba*
Redshank	*Tringa totanus*
Reed Bunting	*Emberiza schoeniclus*
Robin	*Erithacus rubecula*
Sedge Warbler	*Acrocephalus schoenobaenus*
Skylark	*Alauda arvensis*
Song Thrush	*Turdus philomelos*
Starling	*Sturnus vulgaris*
Swallow	*Hirundo rustica*
Whitethroat	*Sylvia communis*
Wren	*Troglodytes troglodytes*

C. Maps



© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp: NOT FOR CONSTRUCTION

Title: A494 River Dee Bridge Improvement
Breeding Birds Survey
Species Abundance

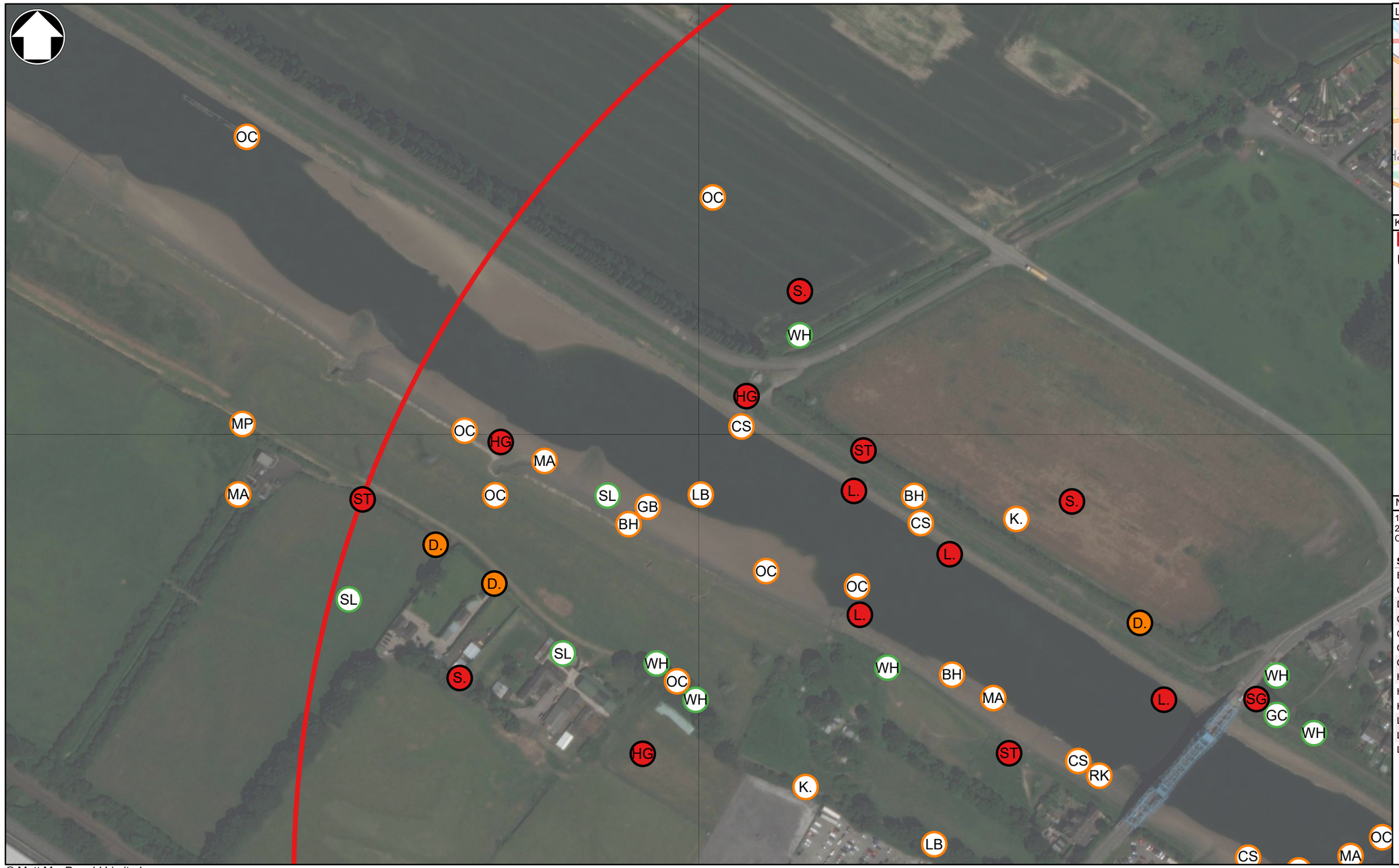
Suitability Description: Suitable for Information

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0001

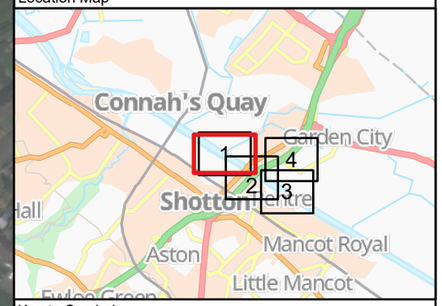
Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:8,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

Survey extent (800m)

UK BoCC status

- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 41)
- Amber BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOOREHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran **Llywodraeth Cymru**
Working on behalf of the **Welsh Government**

Status Stamp: NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title: A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - UK BoCC status
Page 1 of 4

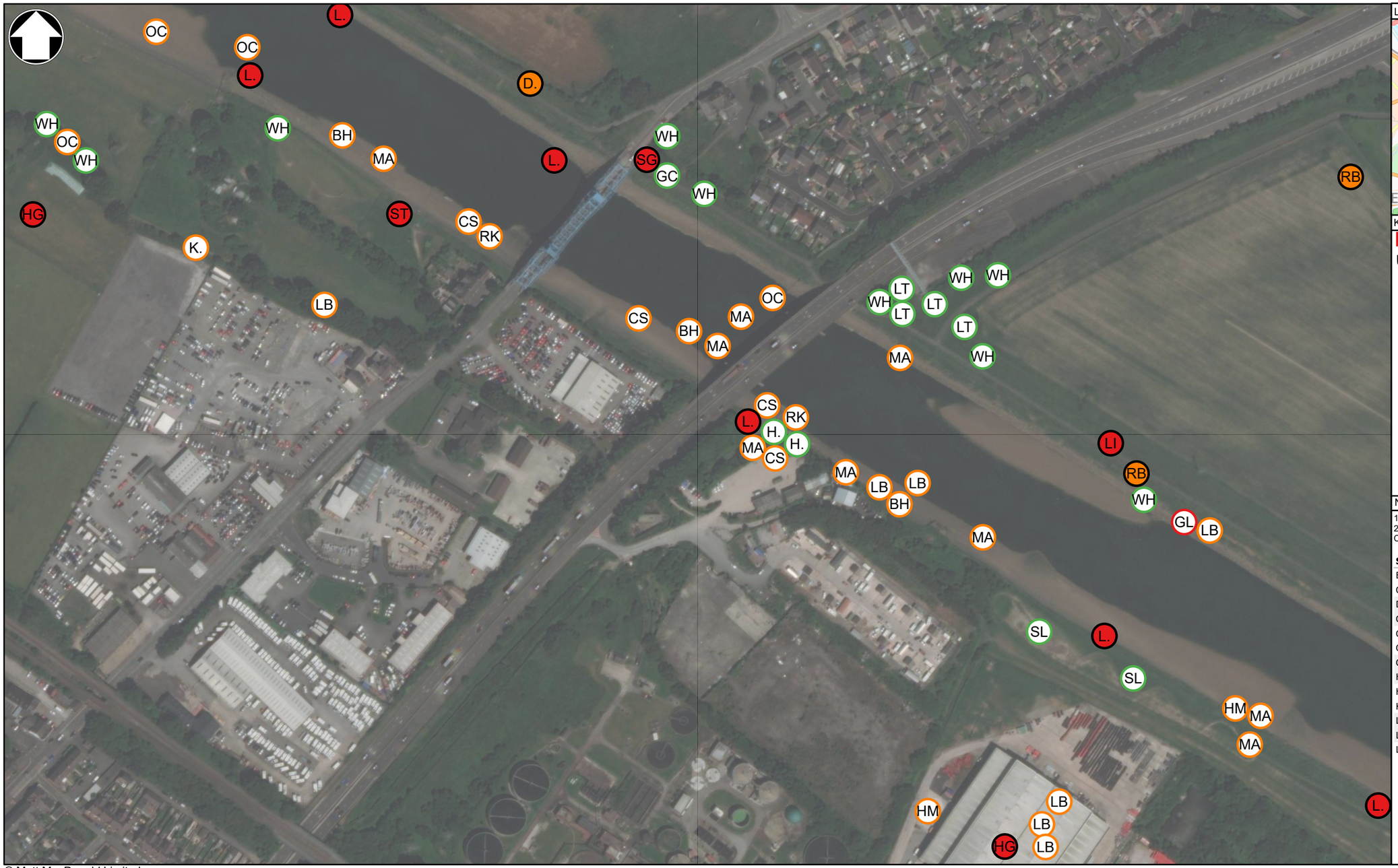
Suitability Description: Suitable for Information

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0003

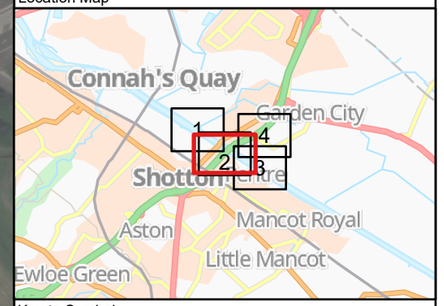
Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:3,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

UK BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 41)
- Amber BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

Metres
0 20 40 60 80 100

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Status Stamp
NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

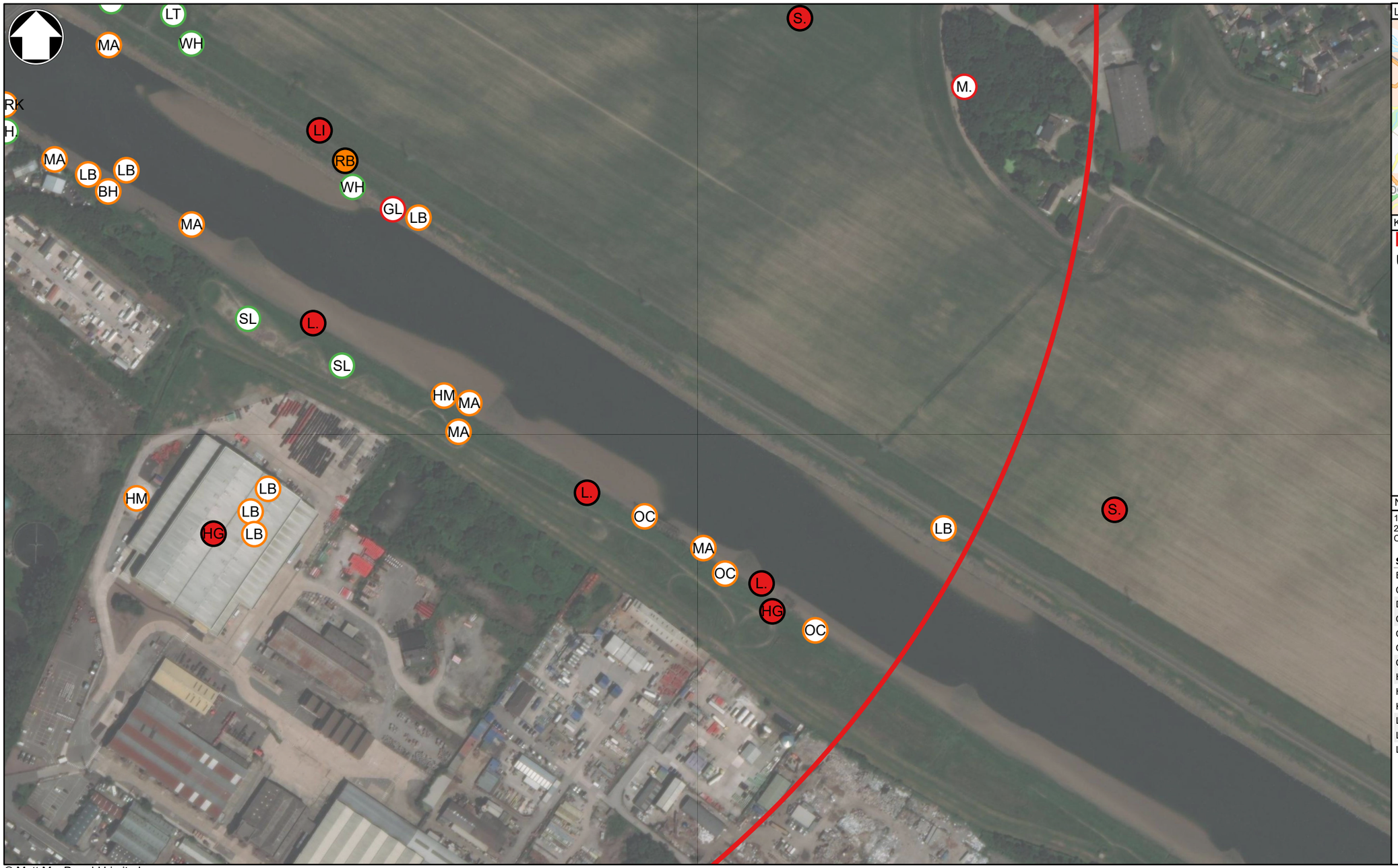
Title
A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - UK BoCC status
Page 2 of 4

Suitability Description
Suitable for Information

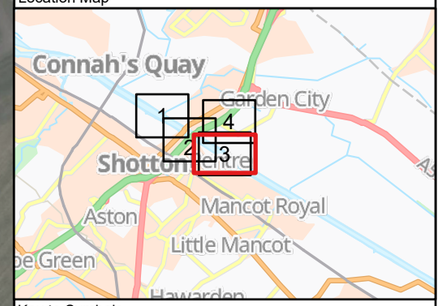
Drawing Number
395318-MMD-ZZ-XX-DR-Y-0003

Designed	K Doneo	KD	
Drawn	S Li	SL	
Dwg Check	E Wibberley	EW	
Eng Check	K Doneo	KD	
Coordination	A L Wilson	ALW	
Approved	R Purslow	RP	
Scale at A3	1:3,000		
MMD Num.	395318		
Revision	Suit. Code	Security	
P01	INF	STD	

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

UK BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 41)
- Amber BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp: NOT FOR CONSTRUCTION

Title: A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - UK BoCC status
Page 3 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

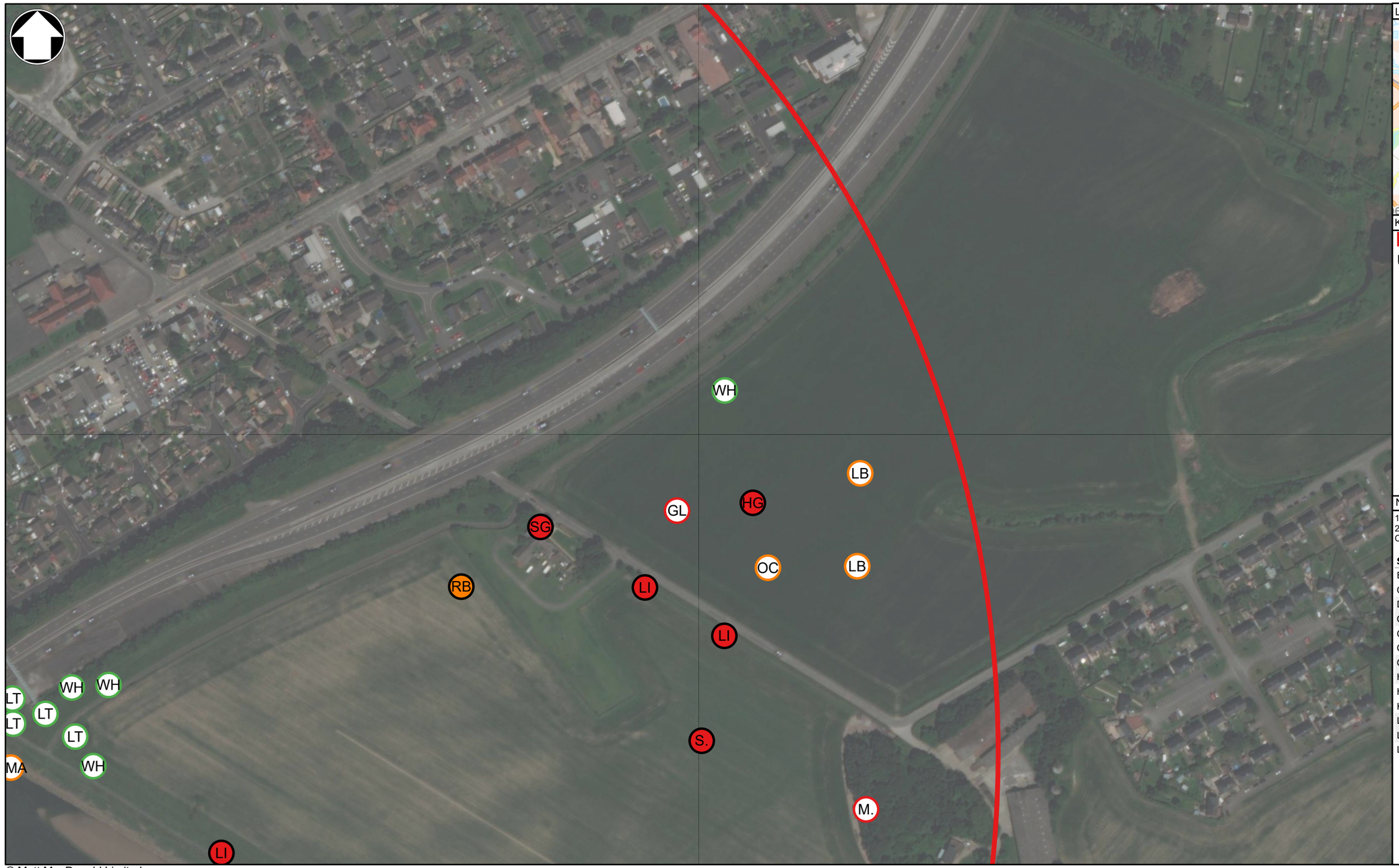
Suitability Description: Suitable for Information

Scale at A3: 1:3,000
MMD Num.: 395318

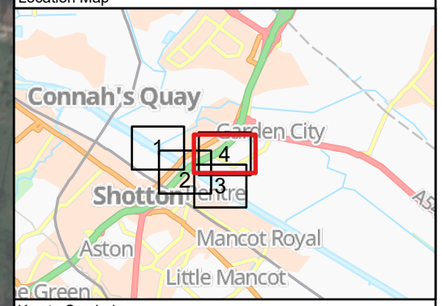
Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0003

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

UK BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 41)
- Amber BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran **Llywodraeth Cymru**
Working on behalf of the **Welsh Government**

Status Stamp
NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title
A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - UK BoCC status
Page 4 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

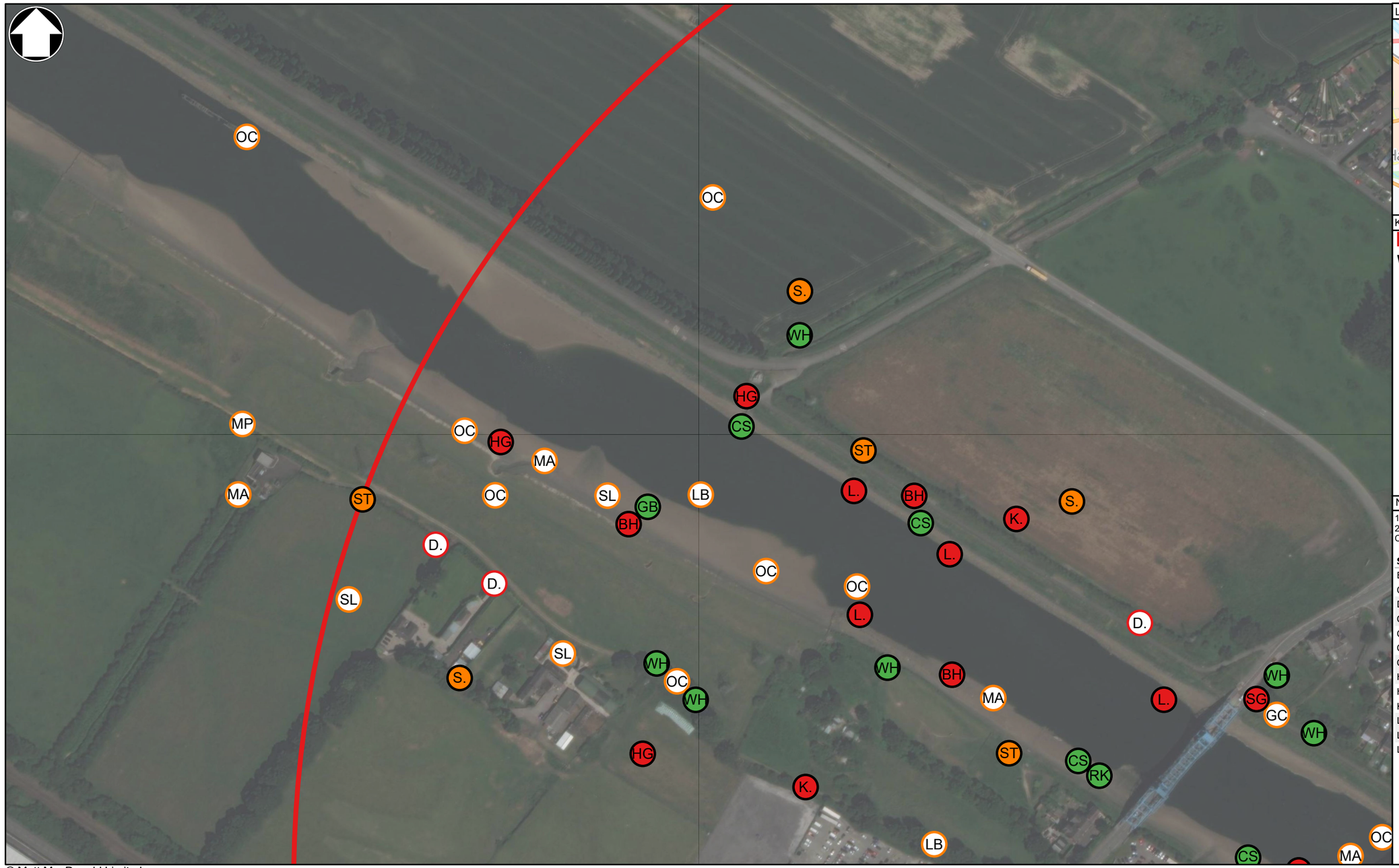
Suitability Description
Suitable for Information

Scale at A3	1:3,000
MMD Num.	395318

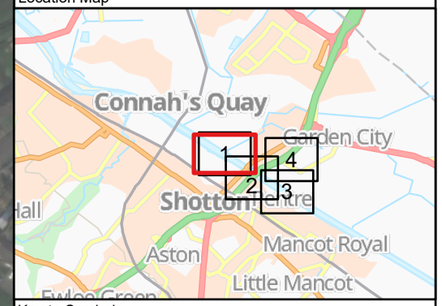
Drawing Number
395318-MMD-ZZ-XX-DR-Y-0003

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

Wales BoCC status

- Red BoCC status
- Amber BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOOREHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Status Stamp
NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title
A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - Wales BoCC status
Page 1 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

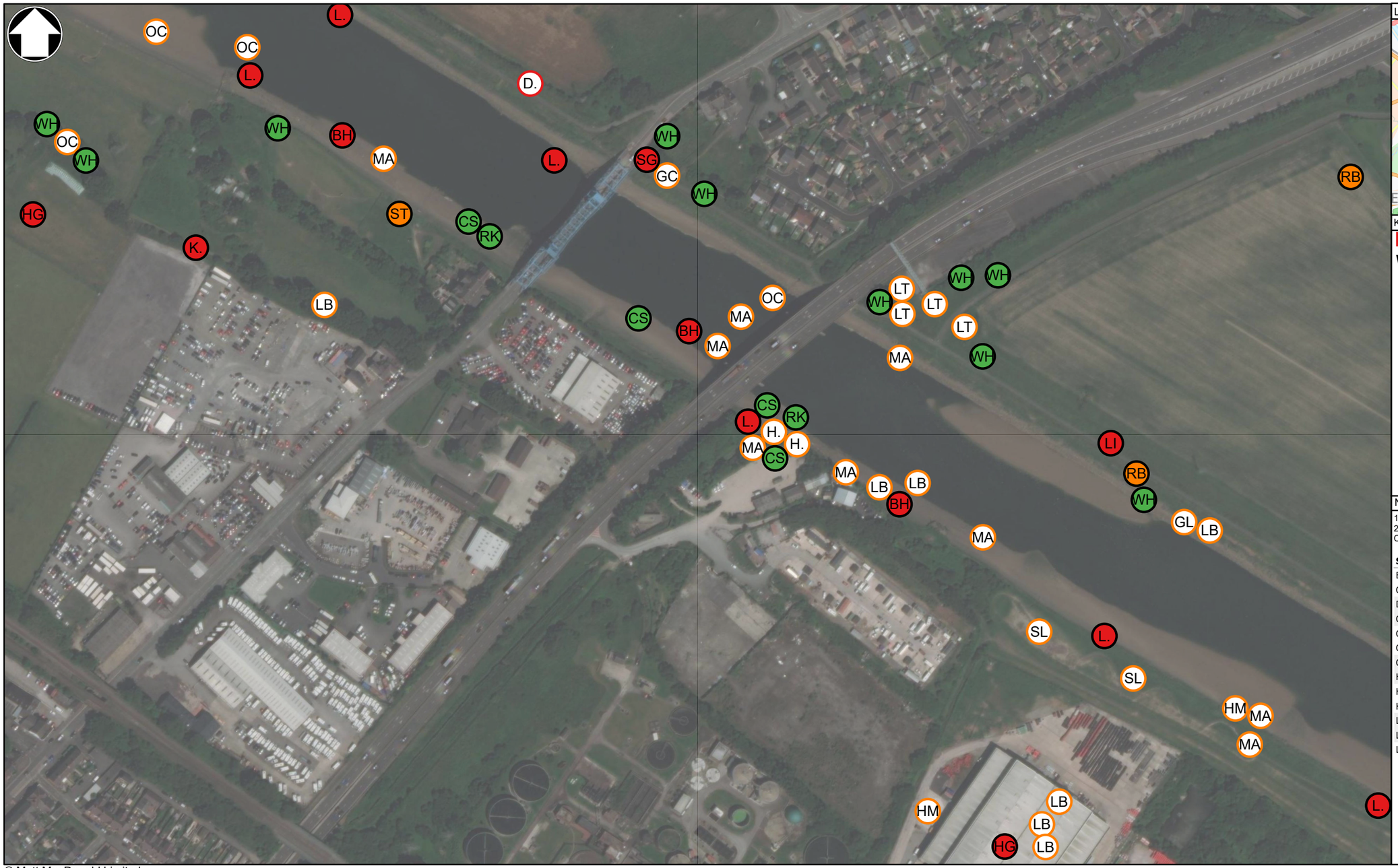
Suitability Description
Suitable for Information

Scale at A3	1:3,000
MMD Num.	395318

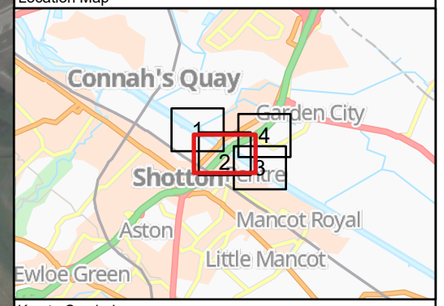
Drawing Number
395318-MMD-ZZ-XX-DR-Y-0004

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

Wales BoCC status

- Red BoCC status
- Amber BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp
NOT FOR CONSTRUCTION

Title
A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - Wales BoCC status
Page 2 of 4

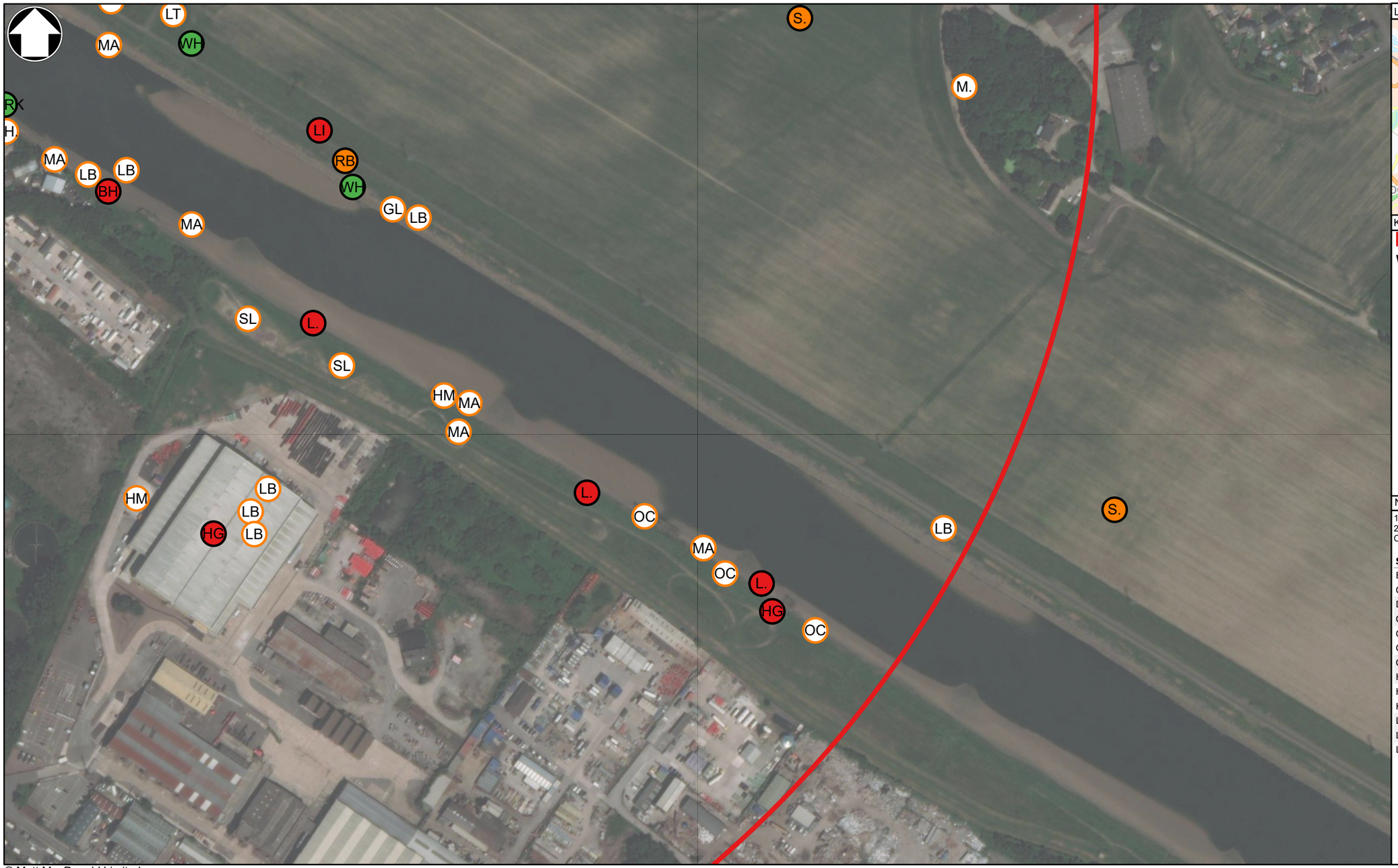
Suitability Description
Suitable for Information

Drawing Number
395318-MMD-ZZ-XX-DR-Y-0004

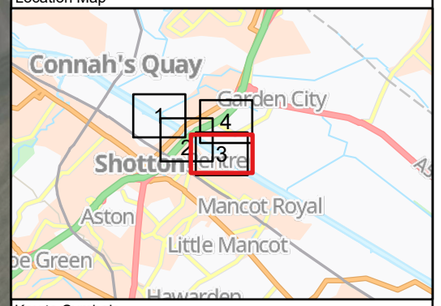
Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:3,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

Wales BoCC status

- Amber BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp: NOT FOR CONSTRUCTION

Title: A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - Wales BoCC status
Page 3 of 4

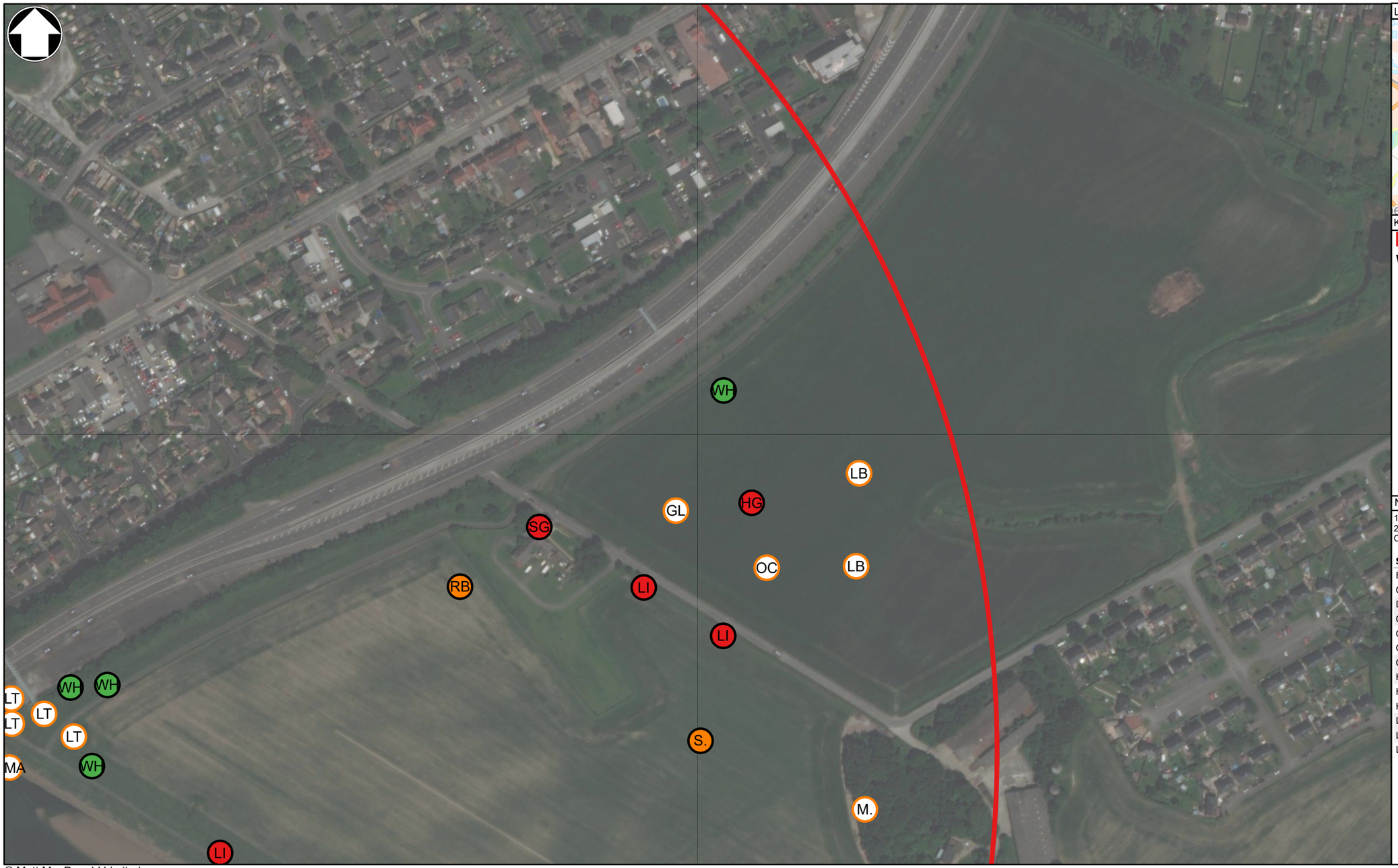
Suitability Description: Suitable for Information

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0004

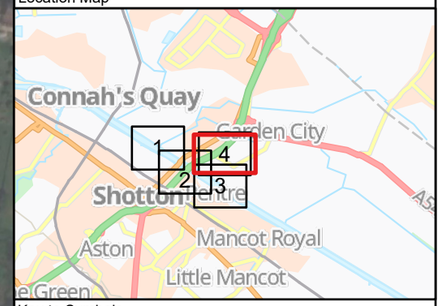
Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:3,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

Survey extent (800m)

Wales BoCC status

- Amber BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Long-tailed Tit	LT
Common Sandpiper	CS	Mallard	MA
Dunnock	D.	Meadow Pipit	MP
Goldcrest	GC	Mistle Thrush	M.
Great Black-backed Gull	GB	Oystercatcher	OC
Grey Heron	H.	Redshank	RK
Grey Wagtail	GL	Reed Bunting	RB
Herring Gull	HG	Skylark	S.
House Martin	HM	Song Thrush	ST
Kestrel	K.	Starling	SG
Lapwing	L.	Swallow	SL
Lesser Black-backed Gull	LB	Whitethroat	WH
Linnet	LI		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOOREHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran **Llywodraeth Cymru**
Working on behalf of the **Welsh Government**

Status Stamp: NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title: A494 River Dee Bridge Improvement
Breeding Birds Survey
General Distribution - Wales BoCC status
Page 4 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

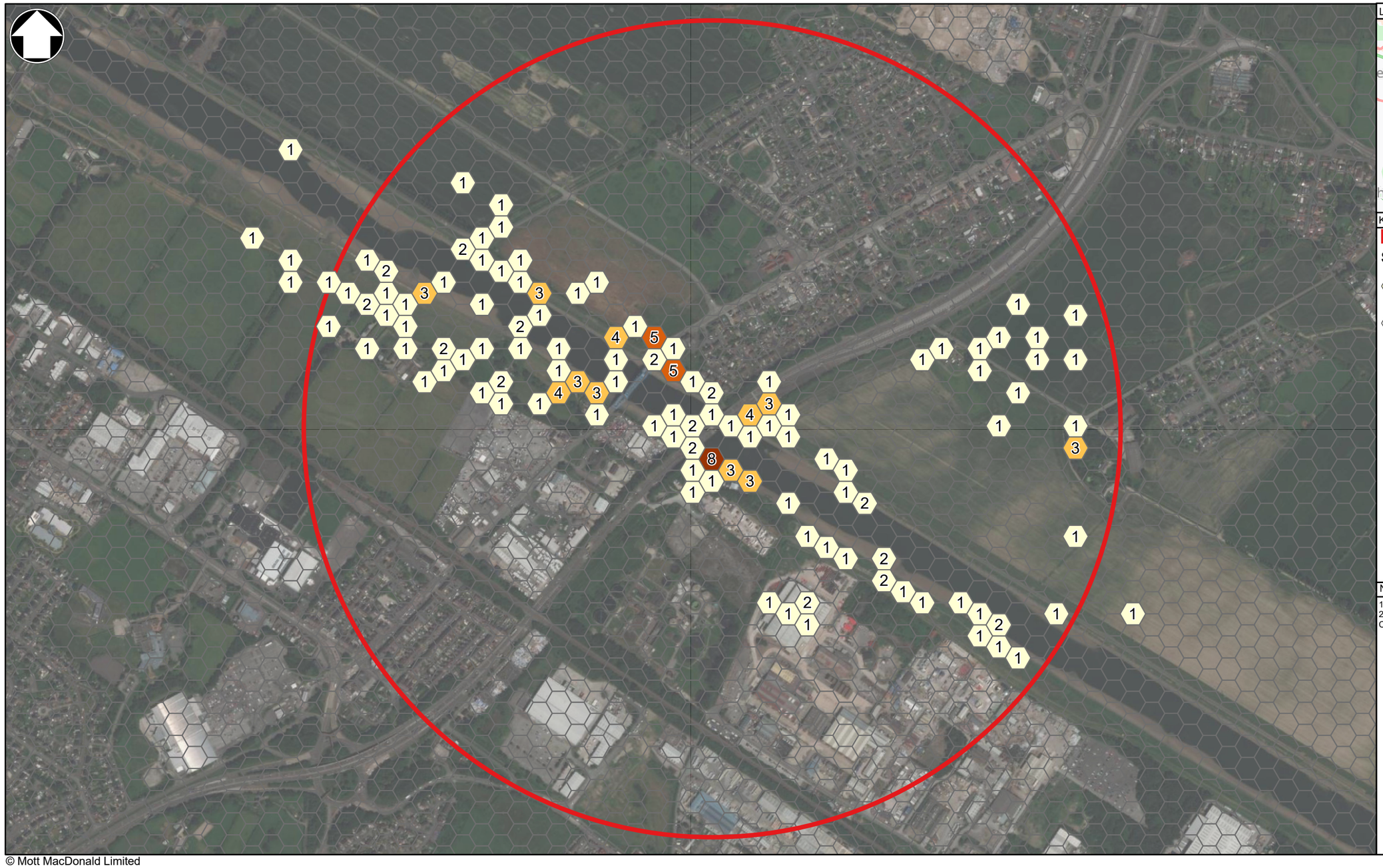
Suitability Description: Suitable for Information

Scale at A3	1:3,000	
MMD Num.	395318	

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0004

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp: NOT FOR CONSTRUCTION

Title: A494 River Dee Bridge Improvement
Breeding Birds Survey
Species Richness

Suitability Description: Suitable for Information

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0002

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:8,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx

8.3 Over Wintering Bird Survey Report - October 2021

MOTT MACDONALD

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran
Llywodraeth Cymru
Working on behalf of the
Welsh Government

A494 River Dee Bridge Improvement Scheme

Over Wintering Bird Survey Report

October 2021

Mott MacDonald
Mott MacDonald House
5 Woodland Road West
Colwyn Bay LL29 7DH
United Kingdom

T +44 (0)1492 534601
mottmac.com

A494 River Dee Bridge Improvement Scheme

Over Wintering Bird Survey Report

October 2021

Mott MacDonald Limited. Registered in England and Wales no. 1243967.
Registered office: Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
01	07/10/2022	K. Doneo	A. L. Wilson	R Purslow	First revision
		Kim Doneo	Alex Wilson	R Purslow	

Document reference: 395318-0132-01

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary 1

1 Introduction 2
1.1 Project Background 2
1.2 Site Description 2
1.3 Aims and Objectives of this Report 3

2 Legislation and Policy 4
2.1 Wildlife and Countryside Act 1981 (as amended) 4
2.2 Local Biodiversity Action Plans 4
2.3 England 4
2.3.1 Natural Environment and Rural Communities Act 2006 4
2.3.2 Birds of Conservation Concern (BoCC[4]) 4
2.3.3 National Planning Policy (NPPF) 5
2.4 Wales 6
2.4.1 Birds of Conservation Concern Wales (BoCCW[3]) 6
2.4.2 Environment (Wales) Act 2016 6
2.4.3 Planning Policy Wales 7
2.4.4 Biodiversity Policy Wales 7

3 Methodology 8
3.1 Survey Area and Scope 8
3.2 Desk study 8
3.3 Field Survey 8
3.3.1 High Tide 9
3.3.2 Low Tide 9
3.4.1 Defining Notable Species 10
3.5.1 Assessment of the Overall Breeding Bird Communities Importance Within the Survey Area 11

4 Results 12
4.1 Desk Study Results 12
4.1.1 Historical Species Records 12
4.1.2 Habitat Context 13
4.2 Field Surveys 13
4.3 Valuable Features and Habitats for Wintering Birds 17
4.3.1 Running Watercourse 17
4.3.2 Rocky Embankments 17
4.3.3 Riverbanks 17

4.3.4 Arable land, north-west of the A494 bridge 17
4.3.5 Treeline, Shrub and Scrub 17

5 Assessment and Recommendations 19
5.1 Assessment 19
5.1.1 Assessment of Potential Impacts on Overwintering Birds 19
5.1.2 River and Associated Banks 20
5.1.3 Farmland and Grassland Habitat 20
5.1.4 Woodland, Treeline, and Hedgerow Habitat 20
5.2 Opportunities for Enhancement 21
5.3 Validity of the Survey Data and Assessment 21

6 References 22

A. Drawing – Proposed Scheme 24

B. Species List 25

C. Maps 27

Executive summary

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake wintering bird surveys in support of an on-line improvement of approximately 1.75 km of the A494 between the River Dee and the Queensferry Interchange (the “Scheme”).

The surveys were undertaken to provide information on the local wintering bird communities present and to highlight any potential for ornithological impacts and therefore constraints that may be imposed upon the proposed development.

The purpose of this report is to document the findings of the wintering bird surveys, to inform the proposed development and any mitigation requirements.

Historical records of 42 species of bird were returned within 2.0km of the Scheme from the Cofnod records.

A total of 46 bird species were identified during the surveys, with 30 of these considered as notable species (i.e. those afforded special legal protection or those that are of conservation concern).

The survey method applied to the field surveys followed broadly the Wetland Bird Survey (WeBS) methodology in conjunction with the ‘look-see’ method described by Bibby *et al* (1992; 2000). Surveys included transect routes with vantage points along the river surveyed between November 2020 to February 2021.

The entire Scheme survey area was covered during the wintering period. Important habitat areas identified within the Scheme survey area for wintering birds include (distance from Scheme footprint):

- Running watercourse (River Dee) (0m);
- Rocky embankments exposed during low tide (220m);
- Riverbanks (0m); and
- Arable land, north-west of the A494 bridge (50.0m).

The overall abundance of species was relatively moderate and consistent throughout surveys across the Scheme survey area but were typical of the landscape in relation to the habitats and current influences present (i.e. roads, industrial and residential areas).

It is likely that this is predominantly due to higher quality and extensive habitat available beyond the Scheme survey area, north and north-west of the Scheme towards the Dee Estuary and Burton Mere Wetlands nature reserve.

Taking into account the size of the study area and the number of surveys undertaken, the species assemblages recorded are considered typical for the habitats present.

The recommendations of this report are based upon the current proposed working options and provide general recommendations and mitigation regarding breeding birds in order to safeguard the key areas of greatest importance for this group. Limitations to the wintering bird surveys include twilight and cryptic natured species potentially under-recorded due to surveys only being conducted during daylight hours only.

1 Introduction

1.1 Project Background

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake wintering bird surveys in support of an on-line improvement of approximately 1.75km of the A494 between the River Dee and the Queensferry Interchange.

In summary, the proposed scheme consists of two new bridges to carry eastbound and westbound traffic. The eastbound carriageway will make use of the current A494 bridge's supporting river piers combined with a new deck structure and abutments. The westbound carriageway will include a completely new river crossing bridge structure and highway construction constructed immediately to the south of the existing A494 (Appendix **Error! Reference source not found.**).

Full details of the proposed scheme are described in the Scheme Assessment Report (ref: 395318-0031). However the key elements of the proposed Scheme are as follows:

- A 1.5km long offline widening in order to create three lanes and hard shoulder in each direction;
- Three new main structures ae required – Westbound River Dee Bridge; Eastbound River Dee Bridge and Westbound Railway Under Bridge; and
- A shared path for pedestrians and cyclists with new connections including to the Wales Coastal Path, NCN Route 568, Garden City, Chemistry Lane/Factory Road, and Station Road.

1.2 Site Description

The site limits are between grid references SJ316679 and SJ327688, along the A494 dual carriageway in Queensferry, Wales. Central to the proposed works and where the over-wintering bird surveys were conducted is the River Dee crossing (central OS grid reference SJ 32373 68598).

The River Dee is fringed with intertidal mudflats, small rock revetments and is surrounded by industrial and residential buildings, farmlands and amenity grasslands. The River Dee has a total length of 110.0km and flows through both England and Wales, and forms part of the border between the two countries.

The river rises in Snowdonia in Wales, runs East through Chester (Wales) and England, it then discharges into the Dee Estuary between both Wales and the Wirral peninsula.

The Dee estuary is a Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar site and is significantly important, specifically for over-wintering birds. The estuary contains vital intertidal mudflat and saltmarsh habitats that provide optimal feeding and roosting opportunities for large populations of coastal birds. In addition, the site is also particularly important during migration periods for bird species and supports breeding population of two species of terns of European importance: Common tern (*Sterna hirundo*) and little tern (*Sternula albifrons*).

- On passage:
  - Sandwich tern (*Sterna sandvicensis*); and
  - Redshank (*Tringa totanus*).

- Over winter:
  - Bar-tailed godwit (*Limosa lapponica*);
  - Curlew (*Numenius arquata*);
  - Black-tailed godwit (*Limosa limosa islandica*);
  - Dunlin (*Calidris alpina*);
  - Grey plover (*Pluvialis squatarola*);
  - Knot (*Calidris canutus*);
  - Oystercatcher (*Haematopus ostralegus*);
  - Pintail (*Anas acuta*);
  - Redshank (*Tringa totanus*);
  - Shelduck (*Tadorna totanus*); and
  - Teal (*Anas crecca*).

Nationally important populations within the internationally important assemblage of waterbirds of the Dee Estuary SPA include the following:

- Great crested grebe (*Podiceps cristatus*);
- Cormorant (*Phalacrocorax carbo*);
- Sanderling (*Calidris alba*); and
- Wigeon (*Anas penelope*).

1.3 Aims and Objectives of this Report

Richards, Moorehead & Laing Ltd undertook a Preliminary Ecological Appraisal of the proposed route options during 2019, which identified presence of suitable habitat for overwintering birds and recommended further surveys.

The aim of this report is to provide ecological advice of the protected and/or notable bird species which occur or have the potential to occur on or near the Scheme footprint and may be impacted by the proposed works.

The scope of this report is set out below:

- To present the results of the desk study and field surveys in respect of overwintering birds;
- To identify potential constraints on the Scheme with regards to overwintering birds;
- To make an assessment of the potential impacts of the Scheme on overwintering birds; and
- To provide recommendations for further survey work and / or mitigation and licensing requirements.

The surveys provide a robust baseline of overwintering bird data to enable any future impact assessment to be made and mitigation to be designed to lessen the impact on overwintering birds within the Scheme area.

2 Legislation and Policy

For the purposes of this report, both English and Welsh legislation and Policies will be cited due to the survey area closely dividing both countries and the high mobility of birds.

2.1 Wildlife and Countryside Act 1981 (as amended)

In the UK (United Kingdom) all wild birds, their nests and their eggs are protected by the Wildlife and Countryside Act 1981 (as amended), hereafter referred as the 1981 Act. Offences under the 1981 Act include:

- Intentionally killing injuring or taking any wild bird;
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built; and
- Intentionally taking or destroying the egg of any wild bird.

Birds listed on Schedule 1 of the 1981 Act have further protection making it an offence to intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or at/near a nest containing eggs or young, or to disturb the dependent young of such a bird

2.2 Local Biodiversity Action Plans

The UK Biodiversity Action Plan (UKBAP) 1994 – 2010 was superseded by the UK Post-2010 Biodiversity Framework and covered the period 2011 – 2020 (Biodiversity 2020). Whilst the BAP (Biodiversity Action Plan) has largely been superseded, many of the tools and resources originally developed under the UK BAP still remain of use. Background information on UK BAP priority habitats and species form the basis of county level biodiversity protection initiatives such as Local Biodiversity Action Plans (LBAP). The Flintshire Authority area is partnered alongside three other counties making the North East Wales Biodiversity Network, the local BAP for these areas include all bird species listed as Section 42 species.

2.3 England

2.3.1 Natural Environment and Rural Communities Act 2006

The 1981 Act is also supplemented by the Natural Environment and Rural Communities Act 2006 (NERC), which enhances the protection to certain habitats and species and places a duty on governments and public bodies/authorities to have regard for nature conservation. The NERC Act 2006 requires public bodies, including local authorities, ‘to have regard to the conservation of biodiversity in England’ when carrying out their normal functions.

The list of species of ‘principal importance for the conservation of biodiversity in England’ (Section 41) guides public bodies in implementing their duty – the ‘Biodiversity Duty’. The Local Authority therefore must consider the impact on biodiversity of the proposed development. The recommendations section of this report illustrates ways in which this Biodiversity Duty can be met.

2.3.2 Birds of Conservation Concern (BoCC[4])

Also referred to as the UK Red List for birds, the fourth review of the status of wild birds within Great Britain was undertaken in 2015. 244 species were assessed and assigned to the Red, Amber or Green lists regarding conservation concerns (Eaton *et al*., 2015).

Focusing at a national level, the quantitative criteria assessed the historical and more recent trends in the population and range of each species, as well as its current population size, localised distribution and international importance.

Bird species in the red and amber lists will be subject to at least one of the relevant factors as listed below:

2.3.2.1 Red List Criteria

- Globally threatened;
- Historic population decline in UK during the period 1800-1995;
- Severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969); and
- Severe (at least 50%) contraction of UK breeding range over last 25 years, or the longer-term period.

2.3.2.2 Amber List Criteria

- Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern);
- Historical population decline during 1800-1995, but recovering; population size has more than doubled over last 25 years;
- Moderate (25-49%) decline in UK breeding population over last 25 years, or the longer-term period;
- Moderate (25-49%) contraction of UK breeding range over last 25 years, or the longer-term period;
- Moderate (25-49%) decline in UK non-breeding population over last 25 years, or the longer-term period;
- Rare breeder; 1-300 breeding pairs in UK;
- Rare non-breeders; less than 900 individuals;
- Localised at least 50% of UK breeding or non-breeding population in 10 or fewer sites, but not applied to rare breeders or non-breeder; and
- Internationally important; at least 20% of European breeding or non-breeding population in UK (NW European and East Atlantic Flyway populations used for non-breeding wildfowl and waders respectively).

2.3.2.3 Green List Criteria

- Species that occur regularly in the UK but do not qualify under any or the above criteria.

2.3.3 National Planning Policy (NPPF)

The NPPF (2019) aims to contribute to the achievement of sustainable development. One of the overarching objectives for achieving sustainable development is:

"*An environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and to protect and enhance biodiversity, plans should*:

- "*Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and*

areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and

- *Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity."*

When determining planning applications, local planning authorities should apply the following principles:

- "*If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused*;
- *Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;*
- *Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists*; and
- *Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity. "mitigating and adapting to climate change, including moving to a low carbon economy."*

2.4 Wales

2.4.1 Birds of Conservation Concern Wales (BoCCW[3])

The fourth review of the status of wild birds within Great Britain was undertaken in 2015. 244 species were assessed and assigned to the Red, Amber or Green lists regarding conservation concerns . Criteria for assessment included the conservation status of these species on a global, European and national scales, as well as historical records and population trends. This list is complemented by the Birds of Conservation Concern Wales (BoCCW3) which reviews up to date information on the status of birds in Wales . Focusing at a Welsh level, the quantitative criteria assessed the historical and more recent trends in the population and range of each species, as well as its current population size, localised distribution and international importance. A total of 213 species were considered, of which 55 were listed as Red, 89 on Amber and 69 listed as Green. For this assessment, the BoCCW34 has been used to assess the status of birds recorded during the survey.

2.4.2 Environment (Wales) Act 2016

In considering how to construct the J4 road scheme, Welsh Government will be required to consider their general duty to enhance biodiversity.

The Environment (Wales) Act introduced a new, enhanced Biodiversity and Resilience of Ecosystem Duty on public bodies to ensure that biodiversity is an integral part of decision making. Public authorities will be required to report on the actions they are taking to improve biodiversity and promote ecosystem resilience.

Section 6 of the Act places a duty on public authorities to seek to maintain and enhance biological diversity (referred to as biodiversity). All public bodies, statutory undertakers,

Ministers of the Crown and other public office holders are required to apply the duty when they are carrying on any functions in Wales, or in relation to Wales.

Section 7 of the Act is similar to the duty in section 42 of the NERC Act 2006 which it replaces. It places a duty on the Welsh Ministers to publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. There are currently 51 bird species on the priority species list.

2.4.3 Planning Policy Wales

Chapter 6 of Planning Policy Wales 11 5 (2021): Distinctive and Natural Places details objectives in relation to nature conservation (which relates to conserving and enhancing the natural environment) requires Local Authorities to take measures to:

- Integrating Green Infrastructure and Development;
- Biodiversity and Resilience of Ecosystems Duty (Section 6 Duty);
- Protection and Management of Designated Sites;
- Protection for Non-statutory Designations;
- Maintaining and Enhancing Biodiversity;
- Protection of Species;
- Protection of Trees, Woodlands and Hedgerows; and
- Protection of Undeveloped Coastlines.

2.4.3.1 Technical Advice Note 5

Technical Advice Note (TAN) 5 relates to nature conservation and planning (Welsh Assembly Government 2009)5 and provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. The TAN provides advice for local planning authorities on:

- The key principles of positive planning for nature conservation;
- Nature conservation and Local Development Plans;
- Nature conservation in development management procedures;
- Development affecting protected internationally- and nationally- designated sites and habitats; and
- Development affecting protected and priority habitats and species.

2.4.4 Biodiversity Policy Wales

Biodiversity Partnership (WDP) has produced biodiversity checklists for local authority and public authority staff in Wales. The checklists will assist public and local authorities to take account of biodiversity in their operational activities and will help organisations to comply with the requirements of the Environment (Wales) Act (2016) Biodiversity Duty, The Conservation of Habitats and Species Regulations 2017 and other biodiversity related legislation. In addition, the implementation of the checklists and guidance will help build towards the biodiversity outcomes contained in the Environment Strategy for Wales.

3 Methodology

3.1 Survey Area and Scope

Ornithological baseline data regarding wintering birds was gathered by means of a desk study to gather third party data, with field surveys to collect contemporary and site-specific data.

The field survey comprised of all suitable habitats within 500m of the Scheme footprint, hereafter referred to as the “survey area” within this report.

3.2 Desk study

A desk study was undertaken and reported within the Preliminary Ecological Appraisal Report (Mott MacDonald, 2020) to collate any overwintering bird data within 2.0km of the Scheme. Only records less than 10 years old were considered valid and relevant due to the potential changes a landscape may experience in a particular length of time.

The following sources were reviewed / consulted:

- Cofnod (https://www.cofnod.org.uk);
- Previous survey data report (Mott MacDonald, 2019); and,
- eBird (https://ebird.org/).

3.3 Field Survey

Surveyors followed a combination of the Wetland Bird Survey (WeBS) and the ‘look- see’ method as described by Bibby *et al* (1992; 2000). One survey transect route and three vantage points were devised to enable the surveyors to access a representative sample of the habitats and included all running watercourse (River Dee), drains, wooded areas and farmlands (arable) within the survey area boundary.

The surveys were carried out during the core overwintering period (November-February) to capture a representative sample of the current overwintering birds present and due to previous overwintering bird surveys completed during 2018 and 2019 (Mott MacDonald, 2020- 395318-0070), where there were not a significant number of SPA designated species present during the overwintering period.

In addition, the survey area for this Scheme is considered to contain a low amount of supporting habitat available and is also considered as non-priority in regard to the BTO (British Trust for Ornithology) Wetland Bird survey (WeBS) areas (BTO, 2021).

The survey area was approximately 800m, central of the Scheme footprint. Literature suggests that the maximum sensitivity to disturbance during construction activities for breeding species (peak sensitivity) is likely to be present within 750m (Whitfield *et al*, 2008), particularly in a rolling landscape. The survey area for this Scheme contains a variation of current disturbances such as major roads, residential and commercial sites already within or crossing habitats classed as supporting SPA habitat, and these points were considered during the process of finalising the survey methodology details.

The monthly surveys were carried out by two ecologists (at least one of whom was an experienced ornithologist). Each of the visits was carried out over a course of two days, during daylight hours only.

Monthly surveys were split across two days where one day consisted of surveying during low tide where particular attention was paid to the banks of the River Dee and how they were utilised by bird species. The subsequent survey was completed during high tide where there was a special focus on the fields surrounding the River Dee.

In order to maintain a relatively consistent ability to detect overwintering bird activity, the surveys were conducted where practicable in optimal or near optimal conditions and avoided periods of heavy rain and/or strong wind (above Force 4) wherever possible. The weather conditions for each survey are presented in Table. 3.1.

3.3.1 High Tide

Predetermined transects were completed two hours either side of high tide and the starting point and direction was reversed on alternate visits to avoid potential temporal bias (Marchant, 1983).

Surveyors walked at a constant pace and all species of birds observed within and considered to be utilising the study area were recorded. Particular attention was paid to the area ahead of the observer to ensure, where possible, that birds were recorded before they were flushed (e.g. small duck and skulking wader species). Surveyors stopped periodically at certain locations to listen for calls and observe any bird behaviour.

3.3.2 Low Tide

The continuous stretch of the River Dee was scanned for two hours either side of low tide, from three predetermined, accessible and elevated points (a form of vantage point) such as the Jubilee Bridge and elevated banks fringing the River Dee. A minimum of 30 minutes were spent at each point and were revisited until the survey had ended.

Table 3.1: Weather Conditions

Date	Start Time	Finish Time	Temperature	Wind Direction and Speed (Beaufort scale)	Cloud cover (Okta)
17/11/2020	10:05	14:30	15°C	SW 1	4/8
27/11/2020	12:00	16:23	7°C	SE 2	3/8
09/12/2020	09:00	13:45	5°C	SSW 1	0/8
10/12/2020	11:00	15:42	8°C	SSE 1	1/8
08/01/2020	12:13	16:24	3°C	N 1	8/8
13/01/2020	09:25	14:02	10°C	SSW 1	6/8
04/02/2020	13:20	17:35	8°C	SSE 3	5/8
05/02/2020	09:02	14:03	9°C	SE 3	6/8

Source: Mott MacDonald, 2020.

3.4 Data Collection

Birds identified by sight or sound were registered electronically on a Samsung Galaxy Note 2 Tablet, using the ArcCollector application.

The identification, numbers of each bird species and activities were noted throughout the data collection period.

Schedule 1 species have been included during the data collection period due to suitable breeding habitat available within the survey area and to accompany the breeding bird report, undertaken during summer 2021 (Mott MacDonald, 2021[1]).

3.4.1 Defining Notable Species

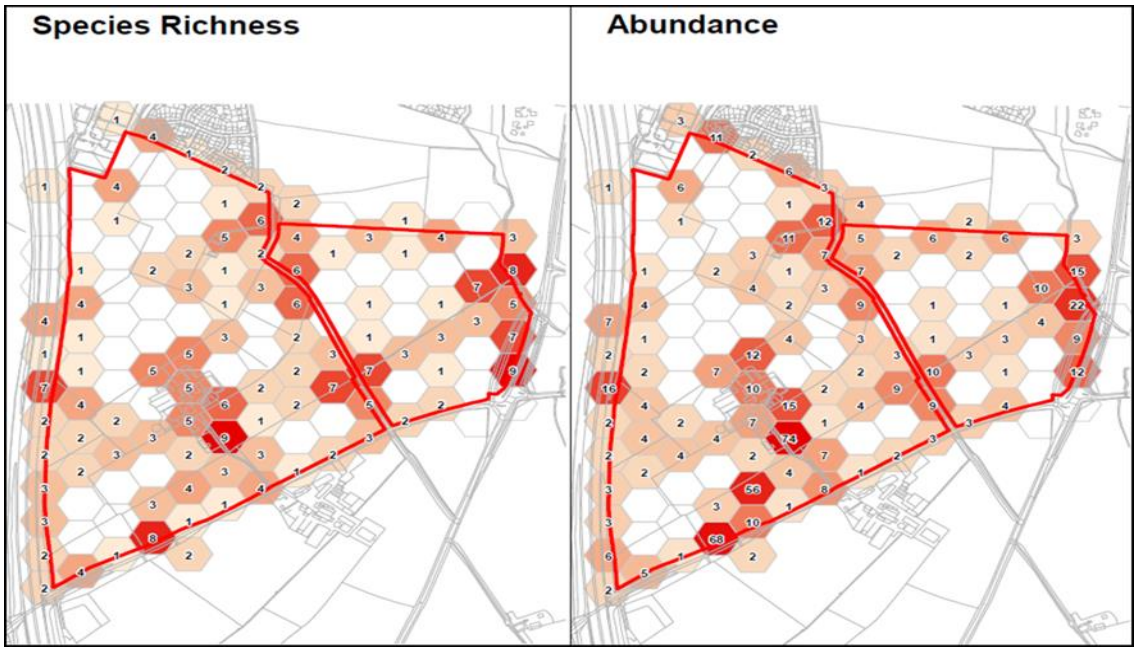
For the purpose of this report, notable bird species are defined as those which are either listed as an SPA designated species, Red or Amber BoCC, Section 41 and species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).

It should be noted that a species' conservation status and level of the legal protection are not discrete categories and there is considerable overlap between them (i.e. a species may occur in more than one category).

3.5 Data Analysis

Data were spatially analysed using ArcGIS 10.6 (ESRI, 2016). A hexagonal grid with 50m wide grid cells covering the full extent of the survey area was created using the generate tessellation tool. Individual maps are produced illustrating, on a grid cell basis, the spatial variation in the number of records, species richness, abundance, and the distribution of notable species across the survey area (Figure.3.1).

Figure 3.1: Example of distribution maps



Source: Mott MacDonald, 2020

[1] Mott MacDonald Limited, September 2021. A494 River Dee Bridge Improvement Scheme - Breeding Bird Report 395318-0131-01.

3.5.1 Assessment of the Overall Breeding Bird Communities Importance Within the Survey Area

An assessment of the winter bird community was undertaken based on the methodology described by Fuller (1980). The wintering bird community was assessed on the basis of species richness (**Table 3.2**).

Table 3.2. Species Richness Criteria

Conservation Importance	National	Regional	County	Local
Number of species	115+	114-85	84-55	54-25

Source: Based on Fuller, 1980

3.6 Personnel

Each of the surveys were undertaken by a competent ornithological surveyor and ecologist in accordance with the requirements of BS42020:2013 (The British Standards Institute, 2013).

3.7 Survey Limitations

- Biological records obtained from third parties and presented in the desk study do not represent a full and complete species list for the area. They are given voluntarily by individuals on an ad-hoc basis, often meaning there are areas of deficiency in the data;
- The absence of a species is not conclusive proof that a species is not present or that it will not be present in the future. However, the desk data coupled with the field surveys provide a good comprehensive understanding of wintering bird species that exist within the Schemes footprint and surrounding areas which are likely to be impacted by the proposed works;
- Surveys were carried out in daylight hours only and therefore species most frequently observed during hours of darkness or twilight are also likely to have been under recorded; and
- The survey methodology does not detect all species evenly and it is known that cryptic species such as grey partridge (*Perdix perdix*), snipe (*Gallinago gallinago*) and skylark (*Alauda arvensis*) may not be recorded and/or under recorded.

3.8 Species Excluded from Analysis

Species excluded from the analysis include:

- Non-native species protected under the Game Act 1831 (as amended) but likely to be derived from a self-sustaining population; and
- New bird species encountered outside of the survey area.

3.9 Nomenclature

The English vernacular and scientific bird names used will follows that of the 9th Edition of the British Ornithologists' Union official list of species recorded in Great Britain (McInerny, 2017).

4 Results

4.1 Desk Study Results

4.1.1 Historical Species Records

Records of 42 notable species of bird were returned from within 2.0km of the Scheme. Notable bird species which could be encountered during the overwintering period are listed in **Error! Reference source not found.**1 below.

Table 4.1: Historical records of bird species returned within 2.0km of the Scheme footprint from Cofnod and eBird, including bird species identified during surveys completed during winter 2018/19 (Mott MacDonald, 2019).

Species	Scientific name	Distance (m)
Avocet	*Recurvirostra avosetta*	1236
Barn owl	*Tyto alba*	1754
Barnacle goose	*Branta leucopsis*	0
Bewick's swan	*Cygnus columbianus*	562
Black-headed gull	*Chroicocephalus ridibundus*	165
Black-tailed godwit	*Limosa limosa*	1236
Bullfinch	*Pyrrhula pyrrhula*	1853
Common gull	*Larus canus*	200
Common redshank	*Tringa totanus*	60
Cormorant	*Phalacrocorax carbo*	0
Curlew	*Numenius arquata*	1236
Dotterel	*Charadrius morinellus*	1236
Dunnock	*Prunella modularis*	30
Fieldfare	*Turdus pilaris*	320
Firecrest	*Regulus ignicapilla*	1206
Garganey	*Anas querquedula*	1267
Grasshopper warbler	*Locustella naevia*	1233
Great-black backed gull	*Larus marinus*	100
Herring gull	*Larus argentatus*	165
House sparrow	*Passer domesticus*	1590
Kestrel	*Falco tinnunculus*	1360
Kingfisher	*Alcedo atthis*	1519
Lapwing	*Vanellus vanellus*	309
Lesser Black-backed gull	*Larus fuscus*	250
Linnet	*Linaria cannabina*	717
Little egret	*Egretta garzetta*	30
Little ringed plover	*Charadrius dubius*	1921
Mallard	*Anas platyrhynchos*	0
Oystercatcher	*Haematopus ostralegus*	70
Peregrine	*Falco peregrinus*	290
Redwing	*Turdus iliacus*	320

Species	Scientific name	Distance (m)
Shelduck	*Tadorna tadorna*	250
Skylark	*Alauda arvensis*	692
Song thrush	*Turdus philomelos*	1530
Spotted flycatcher	*Muscicapa striata*	492
Starling	*Sturnus vulgaris*	165
Tree sparrow	*Passer montanus*	1233
Twite	*Linaria flavirostris*	1236
Whooper swan	*Cygnus cygnus*	562
Yellow wagtail	*Motacilla flava*	153
Yellowhammer	*Emberiza citrinella*	654
Yellow-legged gull	*Larus michahellis*	200

Source: Cofnod 2018; Mott MacDonald, 2018/19.

Although records of barn owl and peregrine (Schedule 1) were returned from within 2.0km of the Scheme. Barn owl and peregrine surveys have not been undertaken within the Scheme survey area, due to the lack of suitable nest sites and existing activities (disturbance) within 150m of the Scheme works area.

Kingfisher will be closely monitored during the wintering bird surveys as this species does not typically move far from its wintering grounds for the breeding season.

4.1.2 Habitat Context

Land within and surrounding the Scheme footprint comprises of a mosaic of farmlands (predominantly arable), residential, industrial, poor semi-improved grasslands, small rocky bays and banks fringing the River Dee, and wooded areas.

The Scheme survey area is also intersected by a network of A and B roads.

4.2 Field Surveys

A total of 46 species were recorded during the surveys with a full species list and map provided in the Appendices. Records of notable species include the following:

- Three Schedule 1 species;
- Six SPA species;
- Seven Section 41 species;
- 10 Section 7 species;
- Nine Species on the Red List Birds of Conservation Concern (U.K.);
- 18 Species Amber List Birds of Conservation Concern (U.K.);
- 12 Species on the Red List Birds of Conservation Concern (Wales); and
- 13 Species on the Amber List Birds of Conservation Concern (Wales)

30 of the species recorded on site that are of conservation concern (i.e., Red or Amber List Birds of Conservation Concern) and are considered to be range restricted but are common and widespread in England and Wales (Balmer *et al*., 2013).

It should be noted that a species' conservation status and level of the legal protection are not discrete categories and there is considerable overlap between them (i.e. a species may occur in more than one category). Therefore, the total number of species in each category does not relate to the total number of notable bird species recorded as present within the Scheme survey area during the breeding period.

Table 4.2: Notable species, conservation status, minimum, maximum and average count per survey and distribution within the Scheme survey area.

Species	Scientific Name	Section 41 (England)	Section 7 (Wales)	UK BoCC (2015)	Wales BoCC3 (2015)	Closest point to the Scheme (m)	Min	Avg.	Max	Description
Greylag goose	*Anser anser*			Amber	Green/Unlisted	200	0	0.7	1	Individuals were observed either alone or mixed with pink-footed geese. All individuals were observed flying over the survey area, particularly in the west direction towards the Dee estuary.
Pink-footed goose	*Anser brachyrhynchus*			Amber	Green/Unlisted	0	0	120.5	399	Pink-footed goose were generally observed flying over the survey area, particularly heading from east to west during high tide.
Shelduck	*Tadorna tadorna*			Amber	Amber	600	0	0.25	1	One Shelduck was observed commuting via the river Dee from west to east.
Mallard	*Anas platyrhynchos*			Amber	Amber	200	1	3.5	18	Mallard were consistently observed as a pair or of more individuals. One moderate sized roost of 18 was observed on the small rocky embankments during low tide. Most pairs were either seen commuting through the river during high tide or utilising the grassy and rocky embankments east and west of the A494 during high tide.
Grey heron	*Ardea cinerea*			Green/Unlisted	Amber	30	0	0.75	1	One grey heron was observed foraging within the small gulley south of the A494 bridge.
Cormorant	*Phalacrocorax carbo*			Green/Unlisted	Amber	140	4	8.8	12	Cormorants were predominantly observed foraging along the River Dee and loafing and/or roosting upon the small rocky areas at low tide.
Oystercatcher	*Haematopus ostralegus*			Amber	Amber	600	0	3	12	Oystercatchers were observed during mid to low tide and were found loafing and foraging along the small rocky embankments west of the A494 bridge.
Lapwing	*Vanellus vanellus*	x	x	Red	Red	200	1	35.5	115	Lapwing were mainly observed roosting upon the arable fields located east of the A494 during high tide. During low tide, lapwing were observed loafing upon the small rocky areas fringing the River Dee.
Common ringed plover	*Charadrius hiaticula*		x	Red	Red	60	0	0.8	3	Common ringed plover were observed during November only. A Maximum of three individuals were observed feeling along the intertidal area travelling northwest.
Curlew	*Numenius arquata*	x	x	Red	Red	770	0	0.25	1	An individual was observed flying over the survey area heading west during the December survey.

Species	Scientific Name	Section 41 (England)	Section 7 (Wales)	UK BoCC (2015)	Wales BoCC3 (2015)	Closest point to the Scheme (m)	Min	Avg.	Max	Description
Dunlin	*Calidris alpina*			Amber	Red	400	0	2	8	Eight dunlin were observed loafing on the riverbank for a short period of time 50m from the A494 bridge. The same group were subsequently observed travelling northwest following the River Dee.
Common sandpiper	*Actitis hypoleucos*			Amber	Red	500	0	1	2	Although commonly known as a summer visitor to the U.K. There have been historical records of a small number of individuals which stay during the overwintering period. A minimum of two individuals were observed throughout the overwintering period.
Common redshank	*Tringa totanus*			Amber	Red	30	1	2.2	12	Common redshank were a common species observed foraging along the small intertidal area available during low tide. A maximum of 12 individuals were observed roosting upon a grass verge 200m northwest of the A494 bridge.
Black-headed gull	*Chroicocephalus ridibundus*		x	Amber	Red	150	1	90.3	500	Black-headed gull were encountered during all surveys and were commonly observed roosting upon the small rocky areas that fringe the River Dee during low tide and loafing about the river. Furthermore, large groups of up to 500 could be seen commuting over the survey area.
Mediterranean gull	*Ichthyaetus melanocephalus*			Amber	Green/Unlisted	640	0	0.25	1	An individual Mediterranean Gull was observed amongst a group of black-headed gulls roosting on the small rocky embankment south of the A494 bridge.
Great black-backed gull	*Larus marinus*			Amber	Red	200	0	1.25	4	Great black-backed gull were observed loafing and roosting amongst herring and black-headed gulls.
Herring gull	*Larus argentatus*	x	x	Red	Red	100	1	14.5	100	Herring gull were predominantly observed roosting upon the small rocky bays that appear during low tide, with many individuals observed flying over the survey area and loafing upon large buildings.
Lesser black-backed gull	*Larus fuscus*			Amber	Amber	140	1	1.5	4	Lesser black-backed gulls were observed foraging and roosting upon the arable fields located east of the A494 during high tide usually mixed with herring gull, black-headed gull and lapwing. Individuals were also encountered in mixed species gull groups loafing upon small rocky embankments at low tide.
Stock dove	*Columba oenas*			Amber	Green/Unlisted	540	0	0.8	2	Stock dove were observed foraging on the arable fields located east and northeast of the A494 bridge.

Species	Scientific Name	Section 41 (England)	Section 7 (Wales)	UK BoCC (2015)	Wales BoCC3 (2015)	Closest point to the Scheme (m)	Min	Avg.	Max	Description
Kingfisher	*Alcedo atthis*			Amber	Amber	30	0	0.5	1	Kingfisher were observed on two occasions during the December surveys. On both occasions one individual was seen flying southwest along the gulley south of A494.
Kestrel	*Falco tinnunculus*		x	Amber	Red	300	0	0.8	1	Individual kestrel were observed hunting eastern and western sides of the A494 bridge.
Long-tailed tit	*Aegithalos caudatus*			Green/Unlisted	Amber	10	0	9	22	Usually seen in flocks. Long-tailed tits were observed utilising the tree, shrub and scrub lines that fringe the River Dee.
Starling	*Sturnus vulgaris*	x	x	Red	Red	40	4	14.3	34	Starlings were commonly encountered roosting on pylons which run parallel to the A494 and Jubilee Bridges.
Redwing	*Turdus iliacus*			Red	Amber	250	0	3.3	15	Redwing were seen and heard foraging and commuting through the survey area, particularly throughout the shrub and treelines bordering the A494 Bridge and Jubilee Bridge.
Mistle thrush	*Turdus viscivorus*			Red	Amber	270	0	1	2	Mistle thrush were seen and heard foraging and commuting throughout the tree lines which intersect the survey area.
House sparrow	*Passer domesticus*	x	x	Red	Amber	130	0	4.4	10	The majority of house sparrow were observed within and close to residential areas which border the survey area.
Dunnock	*Prunella modularis*	x	x	Amber	Green/Unlisted	170	0	1	4	Dunnock were seen and heard foraging and commuting through the survey area, particularly throughout the shrub and treelines bordering the A494 bridge.
Grey wagtail	*Motacilla cinerea*			Red	Amber	300	0	0.6	1	Individual grey wagtails were observed feeding along the riverbanks particularly during low tide.
Pied wagtail	*Motacilla alba*			Green/Unlisted	Green/Unlisted	700	0	4	16	Pied wagtails were often observed foraging and in groups of up to 16 upon the arable fields northeast of the A494 Bridge.
Meadow pipit	*Anthus pratensis*			Amber	Amber	500	0	5.3	10	Meadow pipit were seen and heard in the arable fields located east of the A494.
Bullfinch	*Pyrrhula pyrrhula*	x	x	Amber	Red	200	0	0.5	2	Bullfinch were seen and heard commuting through treelines west of the A494 Bridge.

4.3 Valuable Features and Habitats for Wintering Birds

The areas in which the highest numbers of observations were made correspond with the areas in which the greatest number of species and the highest abundance was recorded.

Species richness across the total survey area was considered to be at a “local” level based on Fullers (1980) species richness criteria, however there were distinct areas in which species did concentrate and appeared to be of more value than others.

These notable areas include the following (including the distance from the Scheme footprint):

- Running watercourse (River Dee) (0m);
- Rocky embankments exposed during low tide (220m);
- Riverbanks (0m); and
- Arable land, north-west of the A494 bridge (50m).

4.3.1 Running Watercourse

The River Dee which intersects the Scheme survey area and footprint appears to support a moderate number (>40) of species including common sandpiper, oystercatcher, dunlin, common ringed plover, common redshank, duck, grebe, goose and gull species. The number of bird species at which this particular section of watercourse supports is considered as moderate, however the number of individuals or the number of birds which remain in the area is considered as low overall.

It is likely that the River Dee acts as a vital corridor to the wider landscape, particularly to migratory species (including species moving locally).

4.3.2 Rocky Embankments

Small rocky embankments which became exposed during low tide only were considered to be of importance to roosting lapwing (30-60), common redshank (1-12), cormorant (1-2), oystercatcher (1-12), mallard (2-8) and gull species, including herring (1-20), Mediterranean (1), black-headed (50-100), lesser (1-2) and greater black-backed gull (1-2).

Based on the availability of the rocky embankments within the survey area and the number in which they supported, it is likely that these are at maximum capacity.

4.3.3 Riverbanks

The intertidal soft sediment fringing the River Dee are small to moderate sized banks ranging approximately between 1-50m. During low tide, the banks are utilised by a range of bird species mainly for feeding and/or commuting purposes including small and non-significant numbers (1-6) of common ringed plover, common sandpiper, common redshank, mallard, cormorant, moorhen and kingfisher.

4.3.4 Arable land, north-west of the A494 bridge

During high tide, the arable lands located north-west of the A494 bridge, were utilised by moderate numbers of lapwing (1-70), black-headed gull (1-160) and smaller numbers (1-10) of meadow pipit, stock dove, kestrel, starling, wagtail species, herring, lesser and greater black-backed gull.

4.3.5 Treeline, Shrub and Scrub

Farmlands, open grasslands and their associated field margins and small patches of scrub and woodland copses appear to provide suitable commuting and foraging habitat to over wintering species such as long-tailed tit, redwing, starling, bullfinch, house sparrow, dunnock, long-tailed tit and mistle thrush within the survey area.

Treelines and patches of scrub appeared to support numbers of thrush species including mistle thrush and redwing (1-15) and passerine species including starling (1-34), bullfinch (1-2), house sparrow (1-10) and dunnock (1-4). In addition, residential houses which fringe the River Dee also appear to provide valuable supplementary feeding and roosting locations.

Hedgerow and treelines are considered to be one of the most important habitats within the survey area. It is also likely that they provide important commuting networks to migratory species throughout the wider landscape.

5 Assessment and Recommendations

5.1 Assessment

Wintering bird surveys undertaken monthly between November 2020 and February 2021 have identified the presence of 46 species, of which 30 of those are considered to be of conservation importance and could constitute a constraint to the Scheme. These are of material consideration during the planning decision process.

The current proposals for the Scheme involve the permanent and temporary loss as well as fragmentation of several habitats of value to over wintering birds identified within the survey area– these being the River Dee and banks, treeline and scrub, pastoral and arable farmlands all of which were considered as suitable for the utilisation by both migratory and overwintering birds.

The River Dee and its associated banks including small rocky embankments were considered as important to foraging, roosting and commuting bird species. Although the number of bird species and the number of birds present including those that are designated were not significant, it is likely that the area is heavily utilised throughout the year as a vital passage route and valuable network to the wider landscape particularly to the Dee Estuary.

It is not yet known whether the River Dee and (or) the banks will be impacted by the works; however, it is likely that the works to the bridge will create a barrier to movement, both visually and acoustically to bird species which use the area, fragmenting the existing habitats available for use.

Arable farmland located northwest of the A494 bridge and associated land margins appeared to be of greatest value to thrush species, gull species, kestrel and passerine species including starling, long-tailed tit, bullfinch, house sparrow and dunnock in combination with associated roost features and habitats. These could be lost and (or) fragmented during the construction phase.

Based on the results of this report, recommendations are included below to avoid key habitats identified as important for overwintering birds or mitigate for effects:

5.1.1 Assessment of Potential Impacts on Overwintering Birds

The potential impacts of the Scheme on overwintering birds may include but are not limited to:

- Loss of foraging habitat;
- Fragmentation of foraging habitat;
- Increased road mortality; and
- Increased levels of disturbance resulting from noise and light (vehicles).

The resulting effects may include:

- A reduction in species richness and/or abundance;
- Loss of local populations;
- Displacement of birds from foraging sites; and
- A reduction in overwinter survival.

5.1.2 River and Associated Banks

The construction phase of the Scheme works is likely to create a temporary barrier effect both visually and acoustically (fragmented habitat and connectivity loss) for species such as common sandpiper, common redshank, dunlin, common ringed plover, gull, grebe, duck and goose species.

To reduce disturbance and displacement during the construction phase, it is advised that the works should take place during high tide in order for all species to utilise the banks/river section during low tide in order to both commute and/or forage.

In addition, it is also advised that acoustic and visual bunds are placed to alleviate visual and noise disturbance to the foraging and (or) species listed above.

However, due to the current crossing in place, it is unlikely that the additional road will cause any significant impact during the operational phase.

5.1.3 Farmland and Grassland Habitat

The Scheme works are likely to create loss of and habitat fragmentation for species such as starling, redwing, meadow pipit, skylark, bullfinch, herring gull, black-headed gull and lapwing which were identified on open grassland and farmland habitats during the surveys.

However, due to the existing and similar rolling habitat available outside of the Scheme survey, it is likely that these species will become locally displaced from their current areas within the survey area and will move to other areas which are of higher and/or of similar quality habitat.

To reduce disturbance and displacement during the construction phase, it is advised that acoustic and visual bunds are placed to alleviate visual and noise disturbance to the foraging and (or) species listed above.

To reduce disturbance and displacement during operation, it is advised native treelines and hedges are planted to create natural visual screening and sound barriers surrounding the new/widening of the A494 road. This is of particular importance alongside the westbound carriageway to compensate for the loss of the current tree and shrub line.

In addition to this, the new plantings (with appropriate management) will also create new habitats and linkages and elevate flight paths to aid the reduction of road mortality.

5.1.4 Woodland, Treeline, and Hedgerow Habitat

Any vegetation clearance should be carefully considered to try to avoid or minimise the removal and/or the disconnection of scrub and treelines, particularly those that fringe the River Dee and the westbound carriageway as these were identified as important commuting and foraging networks for kestrel, redwing, meadow pipit, long-tailed tit, mistle thrush, house sparrow, dunnock and bullfinch.

It is advised that all tree and (or) scrub losses are compensated with native species plantings (of local provenance, with a minimum ratio of two new for every one lost (for trees) and 1.5m for every 1m of scrub lost. Where trees are being planted, a minimum of heavy standard is recommended.

A mix of native species including hawthorn, blackthorn, hornbeam, hazel, rowan and guelder rose should be used during planting, to form a species-rich resilient tree/hedgerow.

Trees and (or) scrub are advised to be planted before or during the constructional phase due to the time it can take for them to reach a good height/maturity. Prior to their reaching the desired heights, fencing can be used to promote elevated flight heights, as necessary.

Management will be required during the operational phase, during the winter period (i.e. to avoid impacts on any nesting species within them).

5.2 Opportunities for Enhancement

There is a duty placed on public authorities under Section 6 of the Environment (Wales) Act 2016 to seek to maintain and enhancement biodiversity and promote the resilience of ecosystems, as far as it is possible.

The Environment (Wales) Act 2016 ensures that wildlife and habitats are gained and (or) enhanced compared to the pre-development baseline.

This means the local planning authorities will have a duty to ensure that any plans or projects provide biodiversity net gains, as opposed to ‘no net loss’.

In line with this, opportunities for ecological enhancement to benefit overwintering birds under the Scheme have been highlighted below:

- The enhancement of existing suitable habitats to increase species diversity; and
- The creation of new habitats and the connection of suitable habitats with the use of planting, such as native species-rich scrub and broadleaved trees.

5.3 Validity of the Survey Data and Assessment

In line with CIEEM guidance on the lifespan of ecological surveys, the survey results are considered valid for up to 18 months. Following this, the survey data should be reviewed and, if appropriate, updated to ensure any assessment and mitigation approach remains valid.

6 References

Balmer, D., Gillings, S., Caffrey, B., Swann, B., Downie, I & Fuller, R., 2013. Bird Atlas 2007-11: The Breeding and Wintering Birds of Britain and Ireland. British Trust for Ornithology, Thetford.

BirdLife International 2019. Charadrius dubius (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2019: e.T22693770A155486463. [online] available at: https://dx.doi.org/10.2305/IUCN.UK.2019-3.RLTS.T22693770A155486463.en. [accessed on June 2021]

Brumm, H. (2001). The impact of environmental noise on song amplitude in a territorial bird. Journal of Animal Ecology 73: pp. 434-440.

Chartered Institute of Ecology and Environmental Management (CIEEM) (2016). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. 2nd Edition.

RSPB Burton Mere Wetlands (2021) [online] available at: Dee Estuary Bird Sightings | Burton Mere, Parkgate, Point of Ayr - RSPB [accessed on June 2021].

Dominoni, D. M., Borniger, J. C., and Nelson, R. J. (2016). Light at night, clocks and health: from humans to wild organisms. *Biol. Lett.* 12:20160015. doi: 10.1098/rsbl.2016.0015

Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D. & Gregory, R.D., 2015. Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds, 108, 708–746.

Eeva, T., Lehikoinen and Ronka, M. (1996). Air pollution fades the plumage of the Great tit. Functional Ecology 12: pp. 607-612.

Environment Agency (2001) Best Practice Guidelines- Artificial Bank Creation for Sand Martins and Kingfishers.

Erritzoe J., Mazgajski T. D., Rejt Ł. 2003. Bird casualties on European roads — a review. Acta Ornithol. 38: 77–93.

Fuller, R., 1980. A method for assessing the ornithological interest of sites for conservation. Biological Conservation, 17. pp. 229-239.

Gillings, S., Balmer, D. E., Caffrey, B. J. & Swann, B., 2013. Survey methods and data sources. In: Balmer, D. E., Gillings, S., Caffrey, B. J., Swann, R. L., Downie, I. S. & Fuller, R. J. (eds), 2013. Bird Atlas 2007–11: The Breeding and Wintering Birds of Britain and Ireland. BTO Books, Thetford, UK. pp.34–45.

Hagemeijer, E.J.M. and Blair, M.J. 1997. The EBCC atlas of European breeding birds: their distribution and abundance. T. and A. D. Poyser, London.

Herbert, R., Samuel, C.J.A. and Patterson, G. 1999 Using local stock for planting native trees and shrubs. Forestry Commission Practice Note No. 8. Forestry Commission, Edinburgh.

Ilner, H. (1992) Road deaths of Westphalian owl. In: The ecology and conservation of European owls, eds. C.A. Galbraith, I.R. Taylor and S.M. Percival, 94-100. Perterborough Joint Nature Conservation Committee, Peterborough.

International Finance Committee (2012). Guidance Note 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources. International Finance Corporation. Washington DC, USA.

Madadi, Hossein, et al. "Degradation of natural habitats by roads: comparing land-take and noise effect zone." Environmental Impact Assessment Review 65 (2017): pp. 147-155.

Madden, B. and Newton, S.F. 2004. Herring Gull Larus argentatus. In: Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. (eds.) 2004. Seabird Populations of Britain and Ireland: 242-262. Poyser, London.

Marchant, J.H., 1983. Common Birds Census Instructions. Tring: British Trust for Ornithology.

McInery, C. J., Musgrove, A. J., Stoddart, A., Harrop, A.H.J., and Dudley, S.P. (2017) The british List: A Checklist of Birds of Britain (9th Edition). The British Ornithologists' Union Records Committee.

Mehta, S., 2012. Create Hexagons. [online] Available at: http://www.arcgis.com/home/item.html?id=7fa102df350f40a087816b93e862e21f [Accessed on June 2021].

Milsom, T.P., Hart, J.D., Parkin, W.K. & Peel, S. 2002. Management of coastal grazing marshes for breeding waders: the importance of surface topography and wetness. Biol. Conserv. 103: pp. 199–207.

Mott MacDonald (2019) River Dee Wintering bird survey data report. Reference: 395318-0070

Natural England, 2015. Planning and development – guidance. Wild birds: surveys and mitigation for development projects. [online] Available at: https://www.gov.uk/wild-birds-surveys-and-mitigation-for-development-projects [Accessed on June 2021].

Ortega, C. P. (2012). Effects of noise pollution on birds: a brief review of our knowledge. Ornithological Monographs 74, pp. 6–22

Poot, H., Ens, B. J., De Vries, H., Donners, M. A. H., Wernand, M. R., Marquenie, J. M., et al. (2008). Green light for nocturnally migrating birds. *Ecol. Soc.* 13, 1–14. doi: 10.5751/es-02720-130247

RSPB, NRA & the Wildlife Trusts (1994) The New Rivers and Wildlife Handbook RSPB.

Ware HE, McClure CJW, Carlisle JD, Baber JR. (2015) A phantom road experiment reveals traffic noise is an invisible source of habitat degradation. Proc Natl Acad Sci USA **112**:12105–1210.

A. Drawing – Proposed Scheme

The Proposed Scheme

Deeside Leisure Centre

B5129 Chester Road East

Section of existing channel retained for highway drainage

Army Reserve centre

Replacement of the existing bridge for eastbound traffic

Existing gravel path to be resurfaced & widened to 1.5m

B5441 Welsh Road

Garden City

Proposed gantry to replace existing

B5441 Station Road

Existing Network Rail bridge

Asda Superstore

Proposed retaining wall to minimise impact on adjacent land

Western crossover

Wall to be relocated approx. 0.5m to accommodate proposed alignment

Proposed river crossing for westbound traffic with shared use path

Wall to remain

Foxes Lane

Proposed drainage outlet to the River Dee

On slip from Queensferry Junction

Riverside Gypsy traveller's site

Location of new pumping station and substation

Queensferry Junction

Proposed retaining wall

Manor Road

Sealand Manor Estate

Area of land for temporary tree mounted bat boxes during the works

Proposed Network Rail bridge

Welsh Water Treatment Works

North Wales Coast Line (CNH3)

Shared use path for cyclists and pedestrians

Proposed maintenance access bridge

Makro Wholesalers Queensferry

Proposed new access road with a shared use path

River Dee / Afon Dyfrdwy

Wales Coast Path

Off-slip to Queensferry realigned

Poplar trees along existing boundary pruned or removed by agreement with appropriate permissions

Proposed Queensferry Drain open channel

B5129 Chester Road East

Factory Road

Chemistry Lane

Pentre

On road improvements for cyclists and pedestrians

1:2500 0 125m 250m

Reproduced by permission of Ordnance Survey on behalf of the controller of HMSO. © Crown copyright and database rights (2021) Ordnance Survey Licence number 0100031673

© 2020 Microsoft Corporation © DigitalGlobe © CNES (2020) Distribution Airbus DS

- Post & 4 rail fence
- Noise barrier fence
- Pallisade fence
- Existing fence
- Pedestrian guardrail
- Brick wall to remain
- Relocated brick wall
- Site boundary (currently under development)
- Proposed N2/W4 Propriety Steel Barrier
- Proposed N2/W3 Propriety Steel Barrier
- Proposed H2/W2 Concrete Step Barrier
- Proposed N2/W3 Bridge Parapet
- Proposed N2/W2 Steel Step Barrier
- Proposed Terminal
- Existing Terminal to Remain

- Existing footway to be maintained
- Shared use cycle track (for use by cyclists and pedestrians)
- Proposed maintenance access road / area
- Proposed carriageway
- Proposed paved verge
- Earthworks slope / verge (Top / Bottom)
- Proposed footpath
- Integral pedestrian path of the Trunk Road
- Proposed footway
- Proposed footway improvement works
- Proposed access stairway
- Proposed retaining wall
- Existing culvert
- Proposed culvert
- Proposed drainage headwall

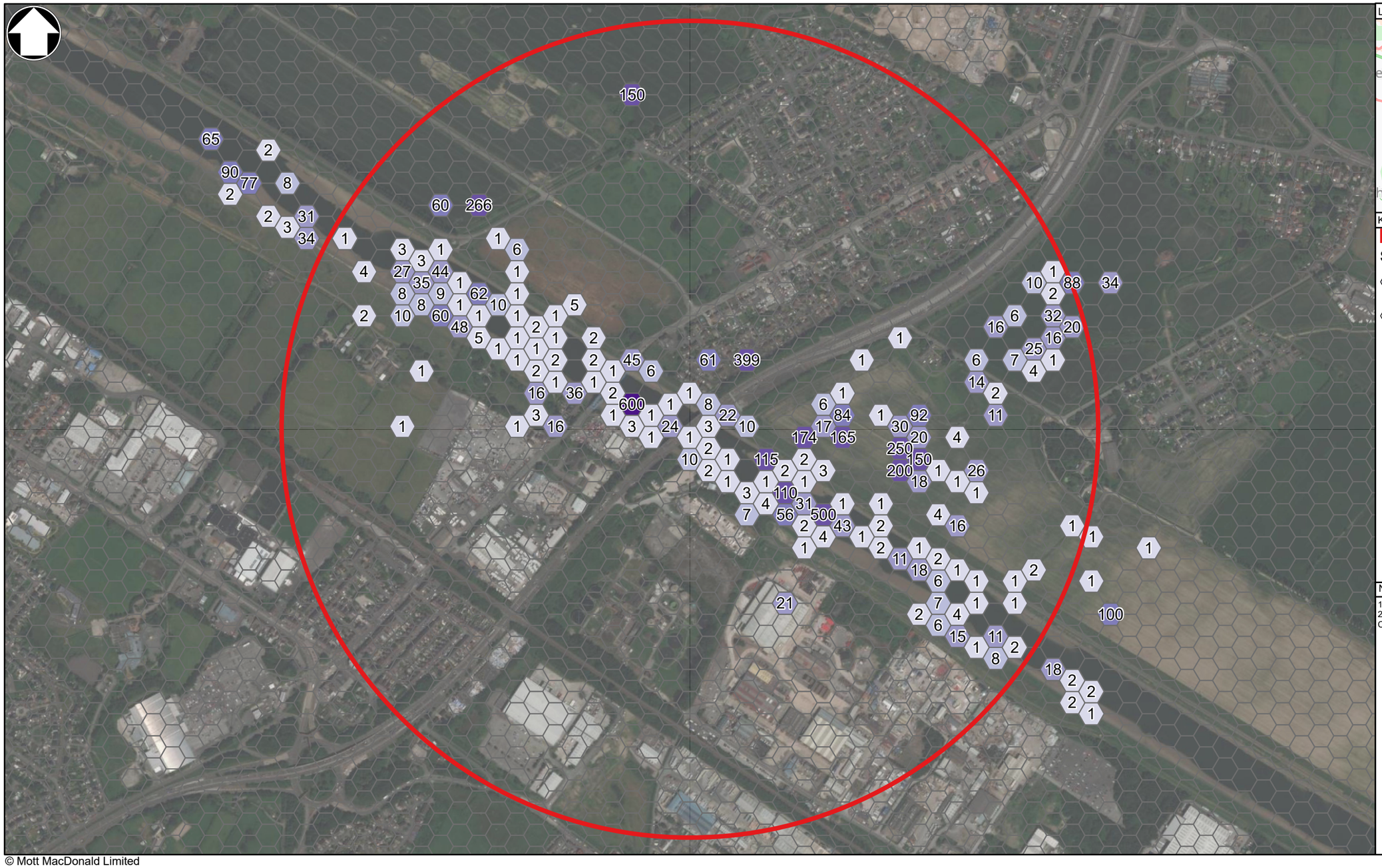
B. Species List

Table B.1: Full Species List

Vernacular Name	Scientific Name
Blackbird	*Turdus merula*
Blackcap	*Sylvia atricapilla*
Black-headed gull	*Chroicocephalus ridibundus*
Canada Goose	*Branta canadensis*
Carrion crow	*Corvus corone*
Chaffinch	*Fringilla coelebs*
Chiffchaff	*Phylloscopus collybita*
Collared dove	*Streptopelia decaocto*
Common sandpiper	*Actitis hypoleucos*
Dunnock	*Prunella modularis*
Feral pigeon	*#N/A*
Feral/hybrid mallard type	*#N/A*
Goldcrest	*Regulus regulus*
Goldfinch	*Carduelis carduelis*
Great Black-backed Gull	*Larus marinus*
Great Spotted Woodpecker	*Dendrocopos major*
Grey Heron	*Ardea cinerea*
Grey Wagtail	*Motacilla cinerea*
Herring Gull	*Larus argentatus*
House Martin	*Delichon urbicum*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo atthis*
Lapwing	*Vanellus vanellus*
Lesser Black-backed Gull	*Larus fuscus*
Linnet	*Linaria cannabina*
Little Egret	*Egretta garzetta*
Long-tailed Tit	*Aegithalos caudatus*
Mallard	*Anas platyrhynchos*
Meadow Pipit	*Anthus pratensis*
Mistle Thrush	*Turdus viscivorus*
Oystercatcher	*Haematopus ostralegus*
Pied Wagtail	*Motacilla alba*
Redshank	*Tringa totanus*

Vernacular Name	Scientific Name
Reed Bunting	*Emberiza schoeniclus*
Robin	*Erithacus rubecula*
Sedge Warbler	*Acrocephalus schoenobaenus*
Skylark	*Alauda arvensis*
Song Thrush	*Turdus philomelos*
Starling	*Sturnus vulgaris*
Swallow	*Hirundo rustica*
Whitethroat	*Sylvia communis*
Wren	*Troglodytes troglodytes*

C. Maps



Location Map



Key to Symbols

Survey extent (800m)

Species abundance

1 Number of individuals within hex

Area surveyed, but no individuals recorded

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

0 50 100 150 200 250 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp: NOT FOR CONSTRUCTION

Title: A494 River Dee Bridge Improvement
Wintering Birds Survey
Species Abundance

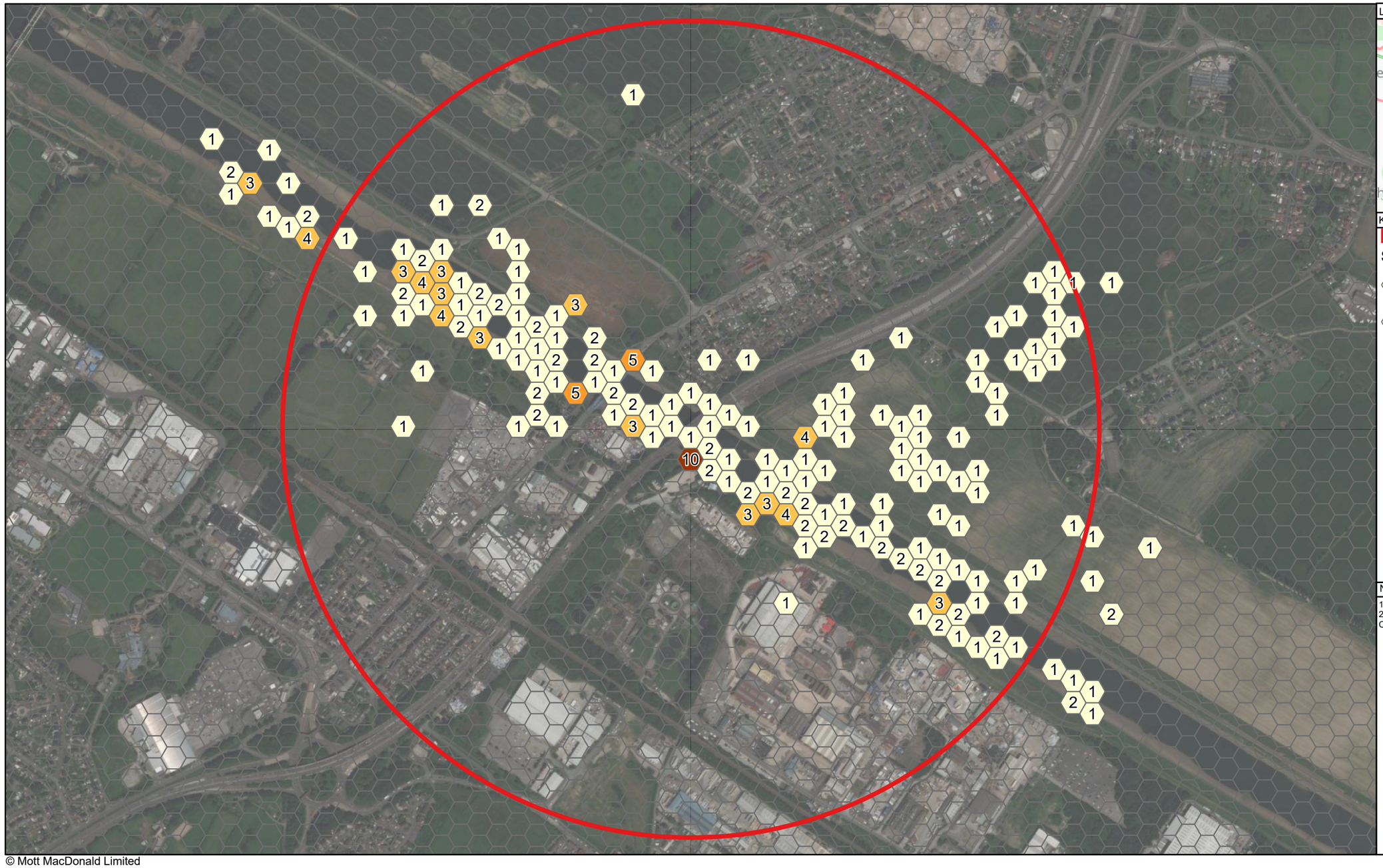
Suitability Description: Suitable for Information

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0005

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:8,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

Survey extent (800m)

Species richness

1 Number of unique species within hex

Area surveyed, but no individuals recorded

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

0 50 100 150 200 250 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD

RICHARDS MOORHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom

T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Status Stamp

NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title: A494 River Dee Bridge Improvement
Wintering Birds Survey
Species Richness

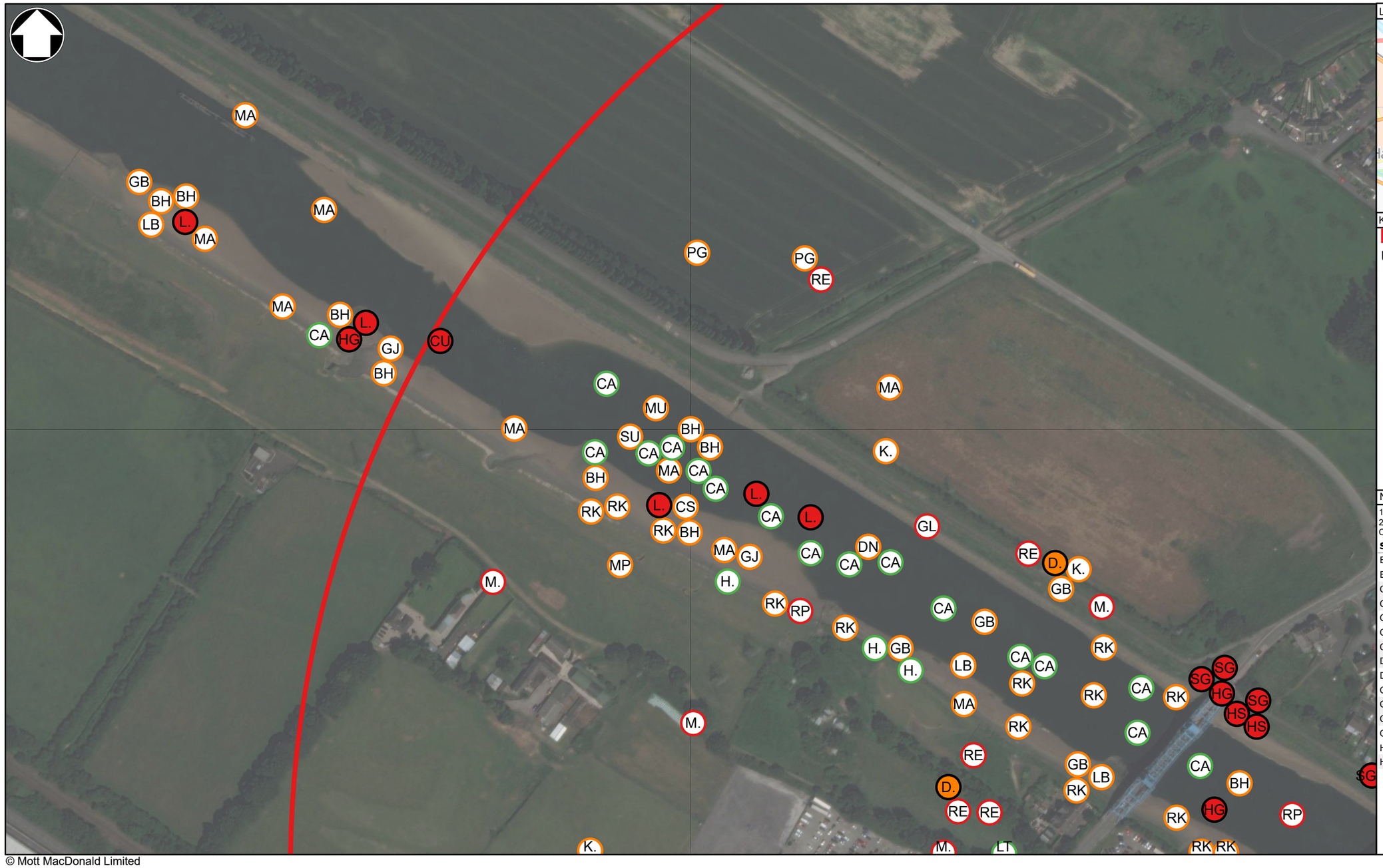
Suitability Description: Suitable for Information

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0006

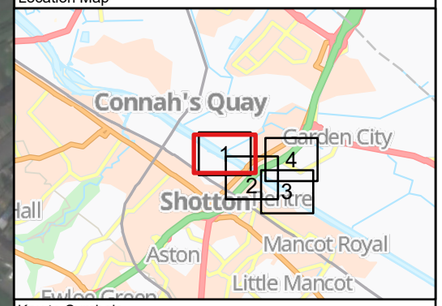
Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:8,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

UK BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 41)
- Amber BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOOREHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran
Llywodraeth Cymru
Working on behalf of the
Welsh Government

Status Stamp
NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title
A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - UK BoCC status
Page 1 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

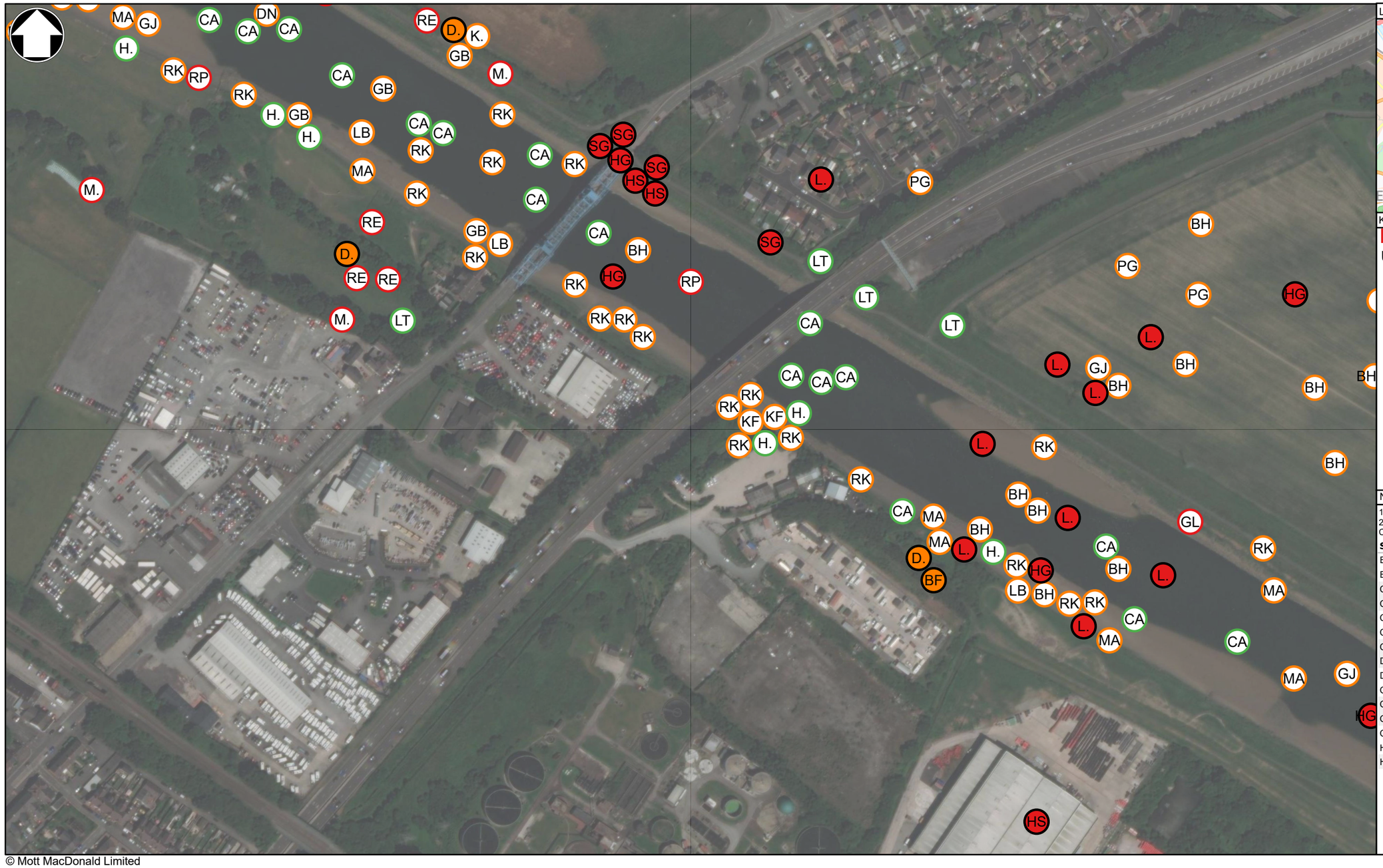
Suitability Description
Suitable for Information

Scale at A3	1:3,000	
MMD Num.	395318	

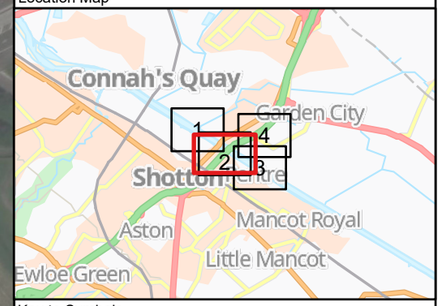
Drawing Number
395318-MMD-ZZ-XX-DR-Y-0007

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

UK BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 41)
- Amber BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

Metres: 0 20 40 60 80 100

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Status Stamp: NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title: A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - UK BoCC status
Page 2 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

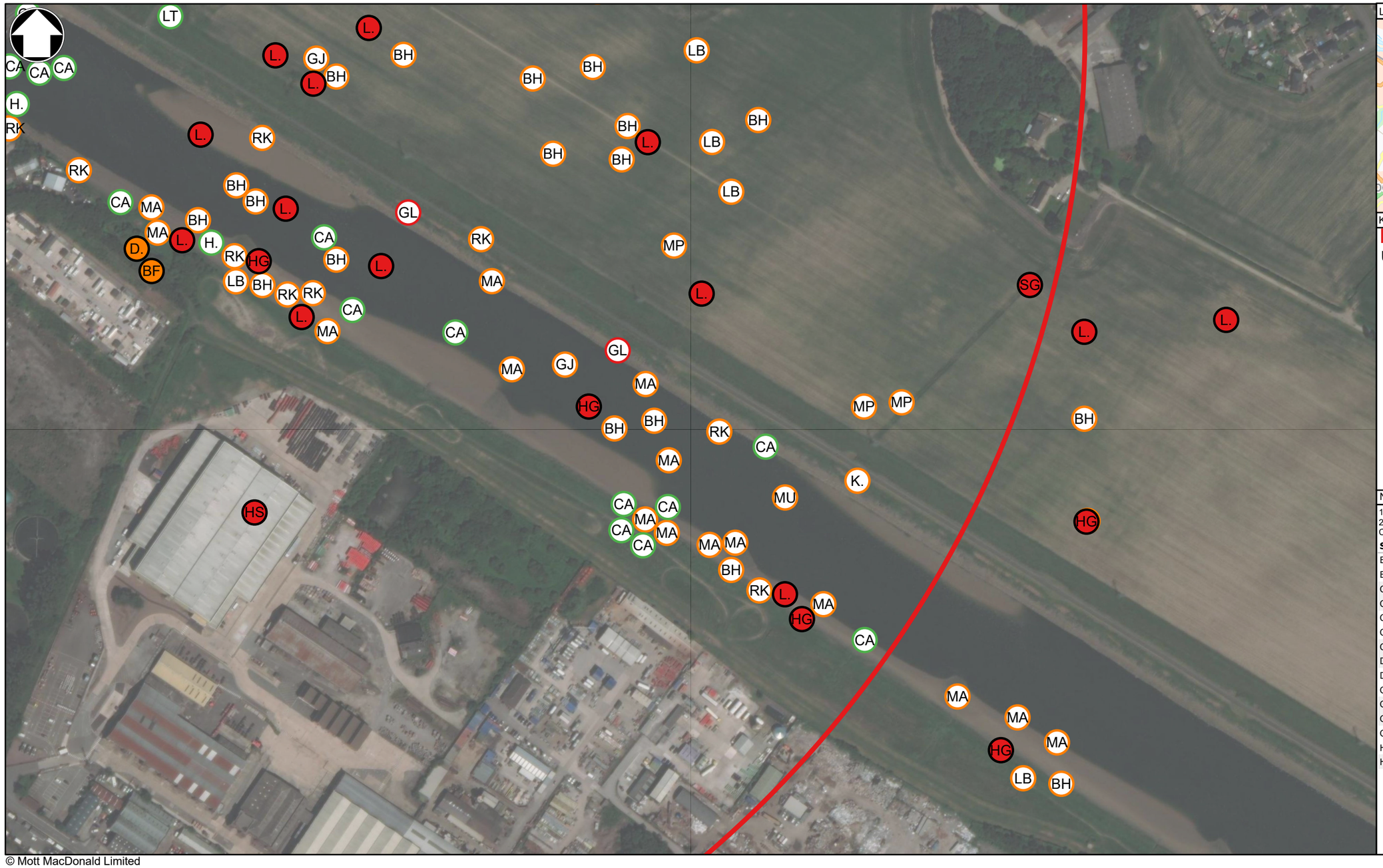
Suitability Description: Suitable for Information

Scale at A3	1:3,000	
MMD Num.	395318	

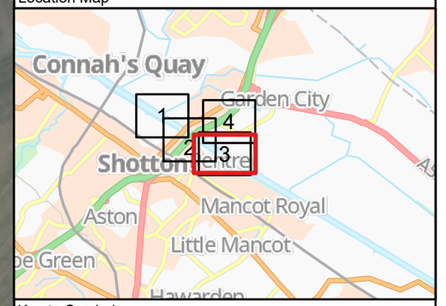
Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0007

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

Survey extent (800m)

UK BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 41)
- Amber BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

Metres
0 20 40 60 80 100

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title
A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - UK BoCC status
Page 3 of 4

Suitability Description
Suitable for Information

Status Stamp
NOT FOR CONSTRUCTION

Drawing Number
395318-MMD-ZZ-XX-DR-Y-0007

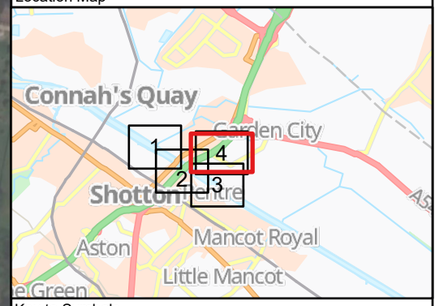
Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:3,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

Survey extent (800m)

UK BoCC status

- Amber BoCC status
- Red BoCC status (Section 41)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

Metres
0 20 40 60 80 100

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

RICHARDS MOOREHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp
NOT FOR CONSTRUCTION

Title
A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - UK BoCC status
Page 4 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

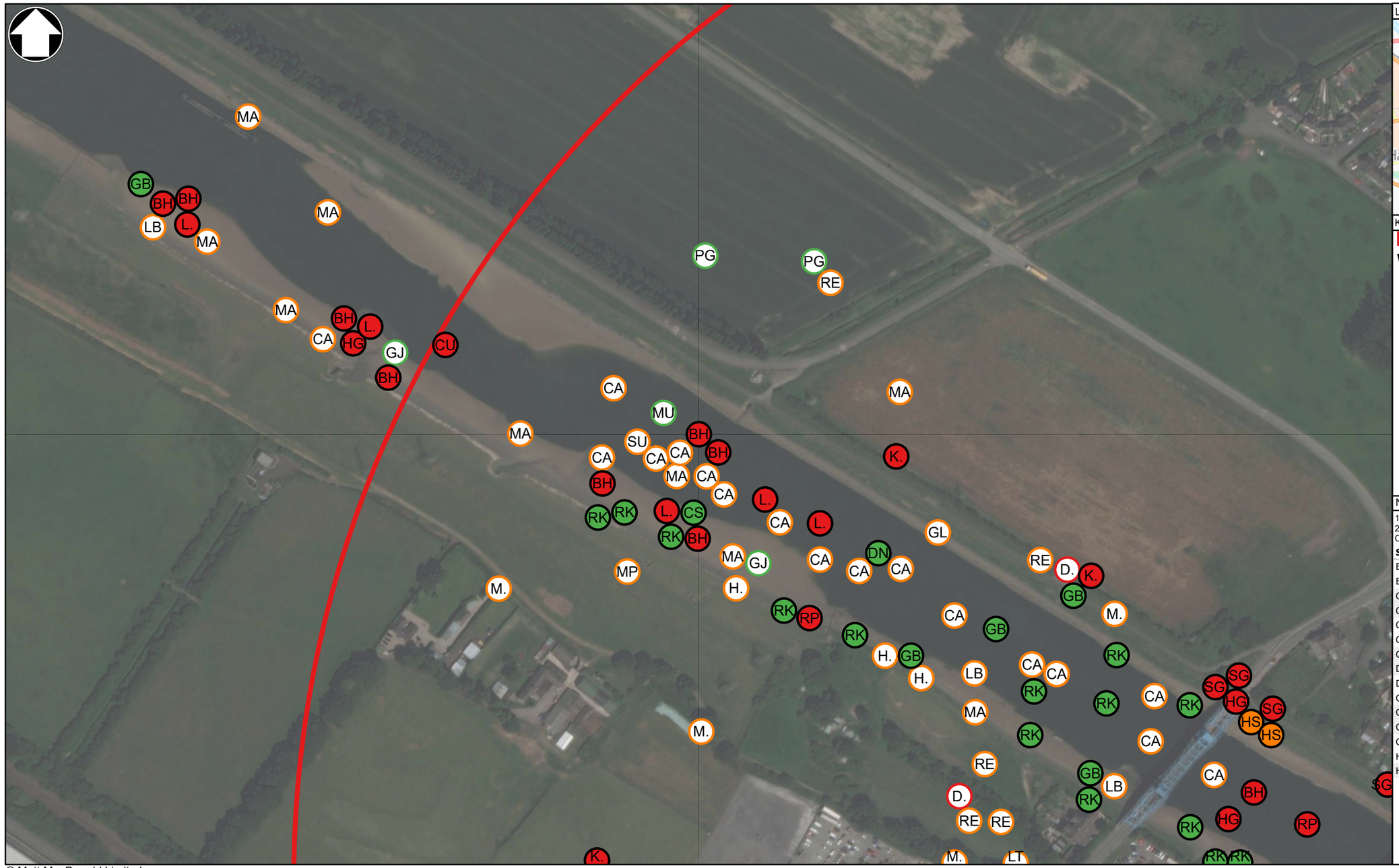
Suitability Description
Suitable for Information

Scale at A3	1:3,000	
MMD Num.	395318	

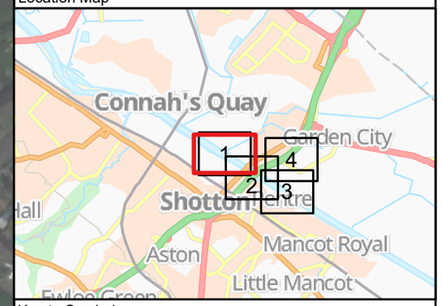
Drawing Number
395318-MMD-ZZ-XX-DR-Y-0007

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

Wales BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOOREHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran
Llywodraeth Cymru
Working on behalf of the
Welsh Government

Status Stamp
NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Title
A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - Wales BoCC status
Page 1 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

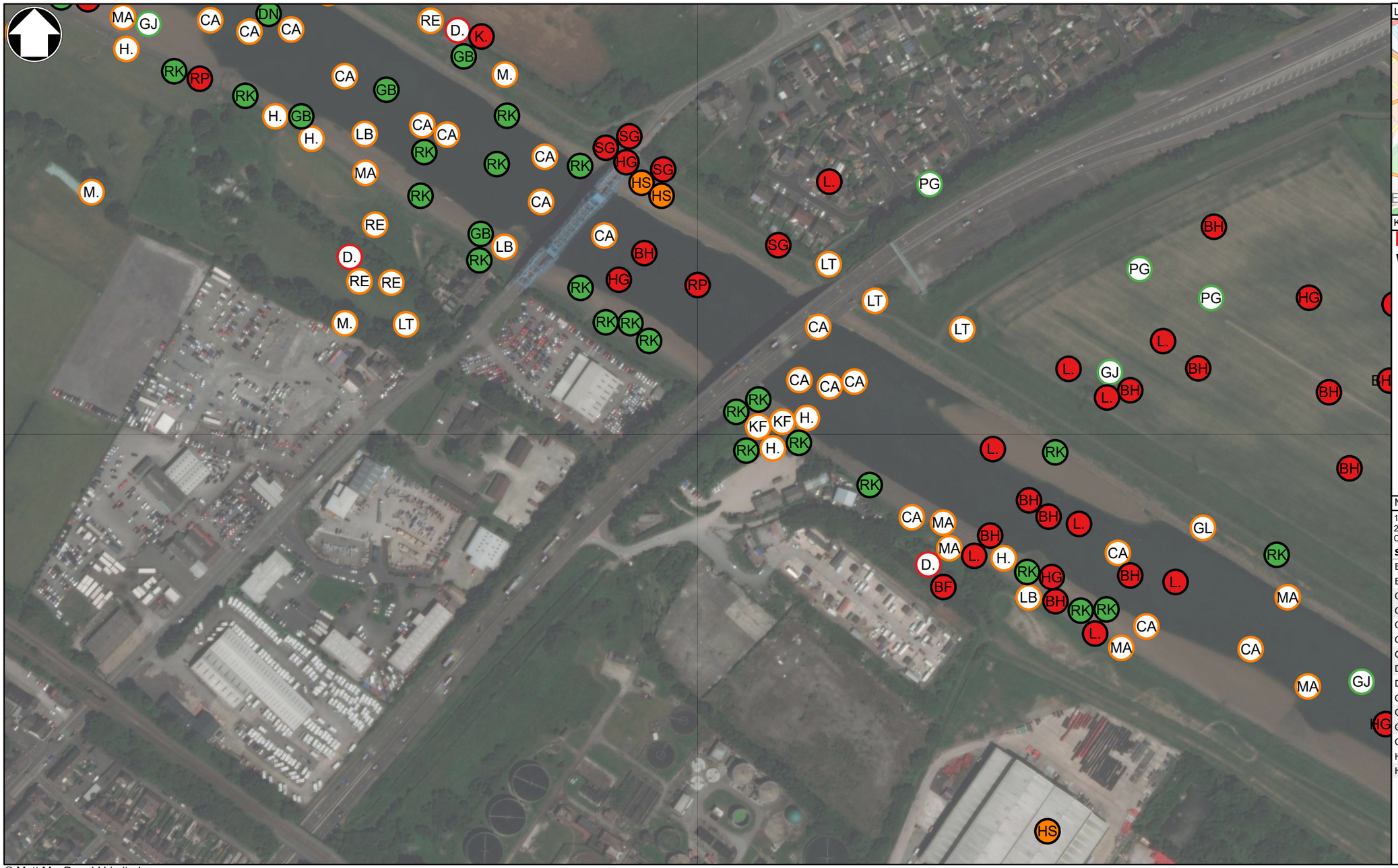
Suitability Description
Suitable for Information

Scale at A3	1:3,000	
MMD Num.	395318	

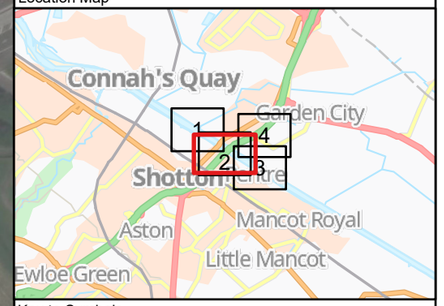
Drawing Number
395318-MMD-ZZ-XX-DR-Y-0008

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

Wales BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOORHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Status Stamp: NOT FOR CONSTRUCTION

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

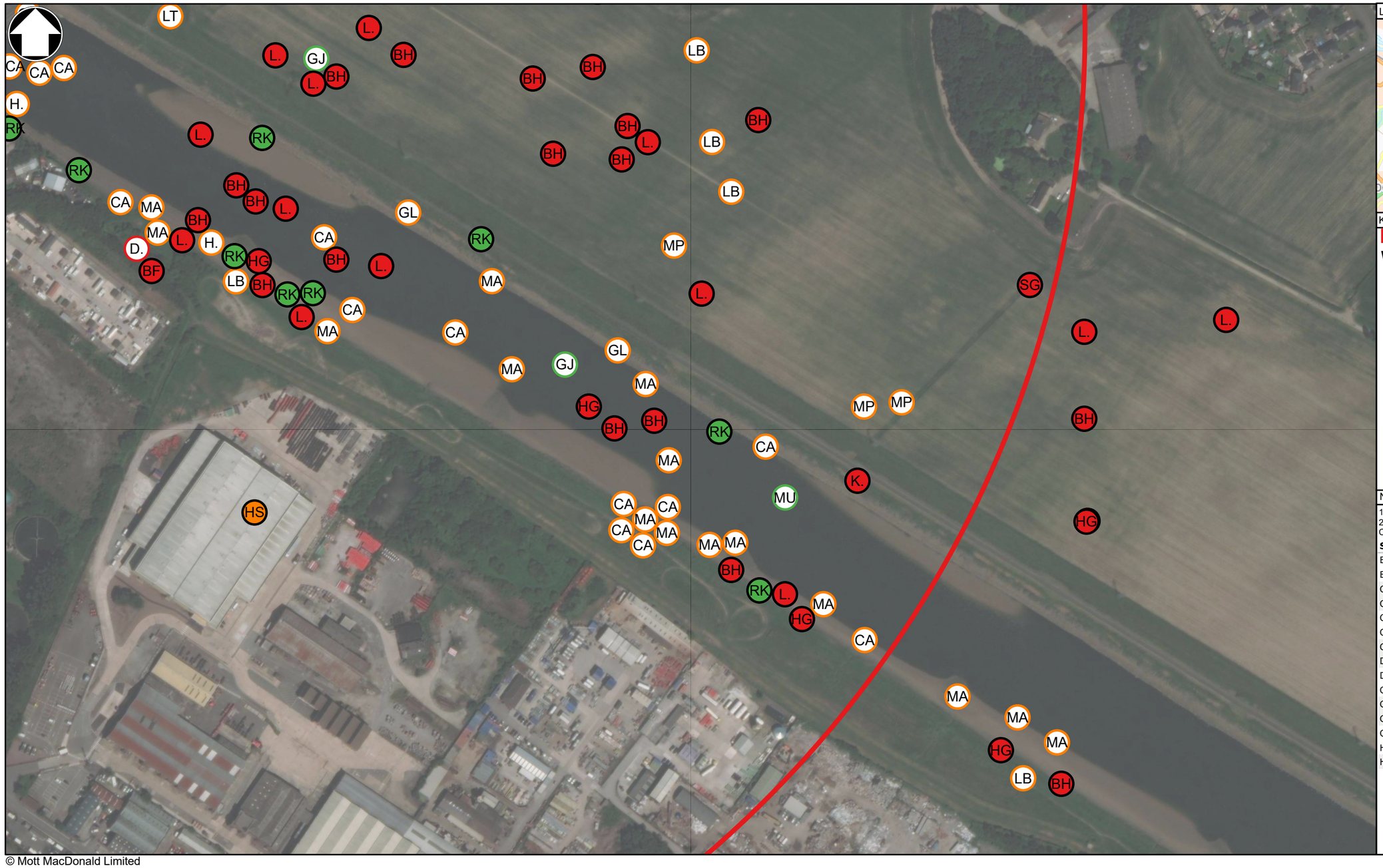
Title: A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - Wales BoCC status
Page 2 of 4

Suitability Description: Suitable for Information

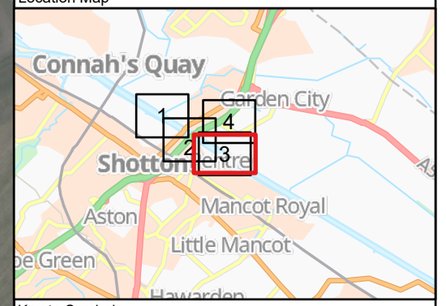
Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0008

Designed	K Doneo		KD
Drawn	S Li		SL
Dwg Check	E Wibberley		EW
Eng Check	K Doneo		KD
Coordination	A L Wilson		ALW
Approved	R Purslow		RP
Scale at A3	1:3,000		
MMD Num.	395318		
Revision	Suit. Code	Security	
P01	INF	STD	

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

Wales BoCC status

- Red BoCC status
- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
RICHARDS MOOREHEAD & LAING LTD PLANNING | LANDSCAPE | ENVIRONMENT
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp: NOT FOR CONSTRUCTION

Title: A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - Wales BoCC status
Page 3 of 4

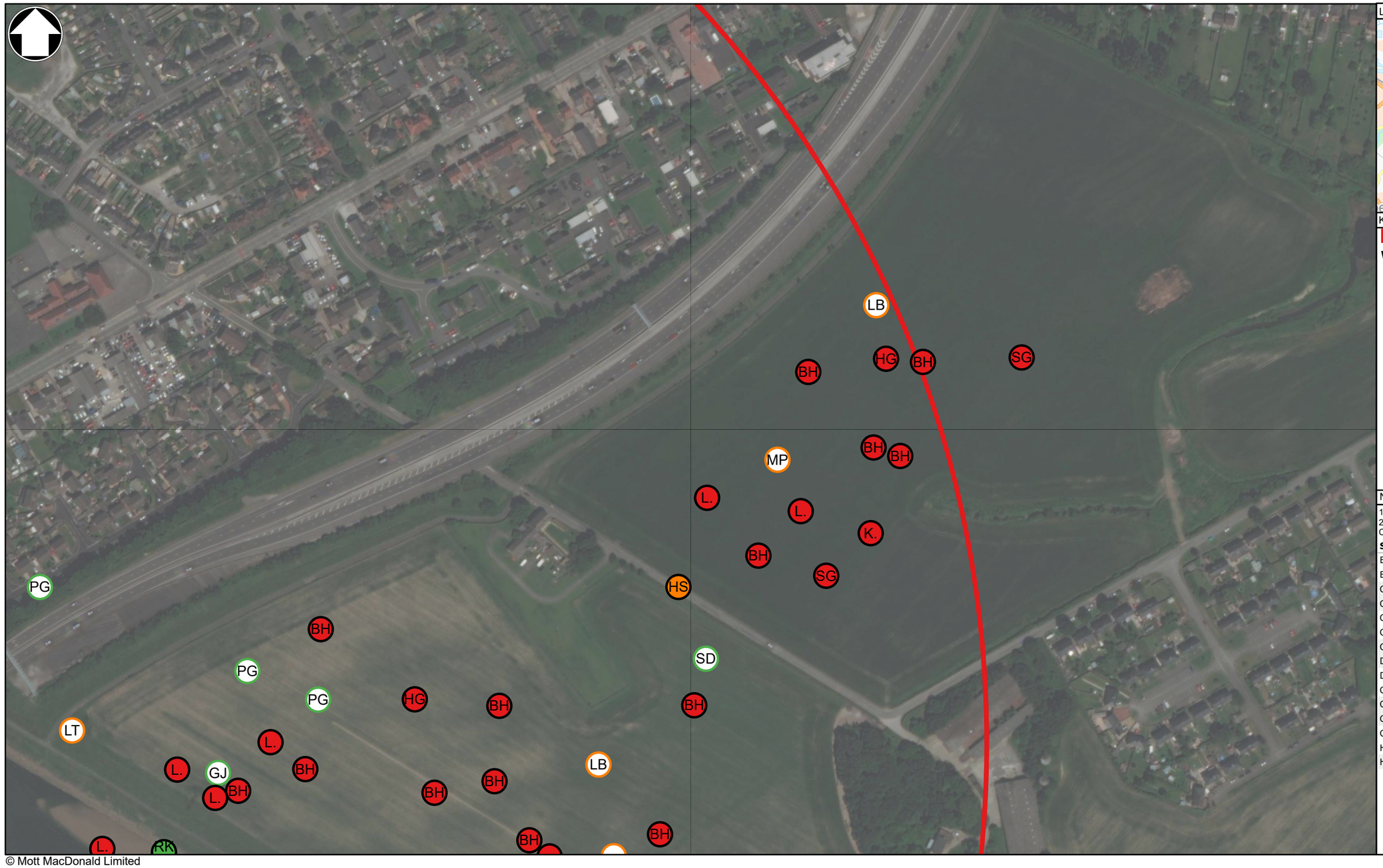
Suitability Description: Suitable for Information

Drawing Number: 395318-MMD-ZZ-XX-DR-Y-0008

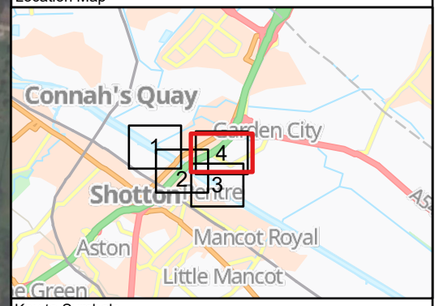
Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP
Scale at A3	1:3,000	
MMD Num.	395318	

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



Location Map



Key to Symbols

- Survey extent (800m)

Wales BoCC status

- Amber BoCC status
- Green BoCC status
- Red BoCC status (Section 7)
- Amber (Section 7)
- Green BoCC status (Section 7)

Notes

1. For information only, not for construction.
2. Contains OS data © Crown Copyright and database right 2020
Contains data from OS Zoomstack, Maxar, Microsoft

Species Name	Code	Species Name	Code
Black-headed Gull	BH	Kestrel	K.
Bullfinch	BF	Kingfisher	KF
Common Redshank	RK	Lapwing	L.
Common Ringed Plover	RP	Lesser Black-backed Gull	LB
Common Sandpiper	CS	Long-tailed Tit	LT
Cormorant	CA	Mallard	MA
Curlew	CU	Meadow Pipit	MP
Dunlin	DN	Mediterranean Gull	MU
Dunnock	D.	Mistle Thrush	M.
Great Black-backed Gull	GB	Pink-footed Goose	PG
Grey Heron	H.	Redwing	RE
Grey Wagtail	GL	Shelduck	SU
Greylag Goose	GJ	Starling	SG
Herring Gull	HG	Stock Dove	SD
House Sparrow	HS		

0 20 40 60 80 100 Metres

© Mott MacDonald Limited
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

MOTT MACDONALD
Mott MacDonald House
5 Woodland Road West
Colwyn Bay, LL29 7DH
United Kingdom
T +44 (0)151 482 9910
F -
W www.mottmac.com

RICHARDS MOOREHEAD & LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran **Llywodraeth Cymru**
Working on behalf of the **Welsh Government**

Rev	Date	Drawn	Description	Ch'k'd	App'd
P01	16/09/21	SL	For information	KD	RP

Status Stamp
NOT FOR CONSTRUCTION

Title
A494 River Dee Bridge Improvement
Wintering Birds Survey
General Distribution - Wales BoCC status
Page 4 of 4

Designed	K Doneo	KD
Drawn	S Li	SL
Dwg Check	E Wibberley	EW
Eng Check	K Doneo	KD
Coordination	A L Wilson	ALW
Approved	R Purslow	RP

Suitability Description
Suitable for Information

Scale at A3	1:3,000	
MMD Num.	395318	

Drawing Number
395318-MMD-ZZ-XX-DR-Y-0008

Revision	Suit. Code	Security
P01	INF	STD

C:\Users\LI95314\Mott MacDonald\NW Ecology - River Dee\GIS\MXD\River Dee - Breeding and Wintering Birds.aprx



mottmac.com

8.4 Non-Breeding Bird Technical Report - September 2023

MOTT MACDONALD

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

Yn gweithio ar ran **Llywodraeth Cymru**
Working on behalf of the **Welsh Government**

A494 River Dee Bridge Improvement Scheme

Non-Breeding Bird Technical Report (2022-2023)

September 2023

This page left intentionally blank for pagination.

Mott MacDonald Limited
First Floor
Bryn Eirias
Abergele Road
Colwyn Bay
LL29 8BY
United Kingdom

T +44 (0)1492 534601
mottmac.com

North & Mid Wales Trunk Road Agent
Uned 5
Llys Britannia
Parc Menai
Bangor
LL57 4BN

A494 River Dee Bridge Improvement Scheme

Non-Breeding Bird Technical Report (2022-2023)

September 2023

Mott MacDonald Limited. Registered in England and Wales no. 1243967.
Registered office: Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	18/09/23	K Doneo	R Forrester	R Purslow	First revision – 2022 – 2023 surveys
		K Doneo	R Forrester	R Purslow	

Document reference: 395318 | 0174 | A |

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary 1

1 Introduction 2
1.1 Project background 2
1.2 Site description 2
1.3 Aims and objectives of the report 3

2 Legislation and policy 4
2.1 Wildlife and Countryside Act 1981 4
2.1.1 Birds of conservation concern Wales (BoCCW4) 4
2.1.2 Local biodiversity action plans 4
2.1.3 IUCN regional red list assessment of extinction risk for Great Britain 5
2.1.4 Environment (Wales) Act 2016 5
2.1.5 Planning Policy Wales 5
2.1.6 Technical Advice Note 5 6
2.1.7 Local planning policy 6
2.1.8 Biodiversity policy 7
2.2 The Conservation of Habitats and Species Regulations 2017, including the Wild Bird Habitat Duty 7

3 Methodology 8
3.1 Survey area and scope 8
3.2 Desk study 8
3.2.1 Existing ornithological data 8
3.3 Field surveys 8
3.3.1 Winter bird surveys 8
3.4 Survey limitations 10

4 Results 11
4.1 Desk study 11
4.1.1 Broad habitats in the study area 11
4.1.2 Historical species records 11
4.1.3 BTO data report 12
4.1.4 Winter bird surveys 13
4.2 Valuable features and habitats for birds in winter 19
4.2.1 Tree lines, hedgerows and scrub 19
4.2.2 Grassland and arable land 19
4.2.3 River Dee corridor 19

4.2.4 Residential and commercial properties 19
4.2.5 Rocky embankments 19

5 Potential impacts on non-breeding birds 20
5.1.1 River and associated banks 20
5.1.2 Farmland and grassland habitat 20
5.1.3 Woodland, treeline, and hedgerow habitat 21
5.2 Opportunities for enhancement 21
5.3 Validity of the survey data and assessment 21

6 Conclusions 22

Appendices 25

A. Species List 26

B. Maps 33

C. BTO report 34

Tables

Table 1.1: River Dee SPA and Ramsar designated species 3
Table 4.1: Historical records of bird species returned within 2.0km of the Scheme footprint, including results from surveys completed during winter 2018/19 and 2020/21. 11

Executive summary

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake wintering bird surveys in support of an on-line improvement of approximately 1.75km of the A494 between the River Dee and the Queensferry Interchange; hereafter referred to as the 'Scheme'.

The purpose of this report is to document the findings of the overwintering bird surveys, to inform the proposed development and any mitigation requirements.

Records of 50 notable species of bird were returned from within 2.0km of the Scheme.

A total of 59 species were recorded during winter bird surveys between November 2022 and February 2023 following methods described by Bibby *et al* (1992; 2000).

Of the 59 species recorded, 30 species were listed under at least one legal or conservation designation. These comprised:

- Two species listed on Schedule 1 of the 1981 Act;
- 12 species listed in Section 7;
- 10 'Red Listed' species of Conservation Concern (BoCC5);
- 17 'Amber Listed' species of Conservation Concern (BoCC5);
- Three UK Rare Breeding Bird Panel species; and
- One European Birds Directive Annexe 1 species

The majority of Scheme survey area was covered during the overwintering period; however some areas were restricted due to health and safety reasons which is discussed further in 3.4.

Important habitat areas identified within the Scheme survey area for overwintering birds include:

- Tree lines, hedgerows and scrub;
- Grassland and arable land;
- River Dee corridor;
- Residential and commercial properties; and
- Rocky embankments

The overall abundance of species documented was relatively low to moderate across the Scheme survey area but were typical of the landscape in relation to the habitats and current influences present (i.e. roads, public paths, residential areas and cycle routes). It is likely that this is predominantly due to higher quality habitat available beyond the Scheme survey area.

The recommendations of this report are based upon the potential enabling works and construction actives and provide general recommendations and mitigation with regard to overwintering birds in order to safeguard the key areas of greatest importance for this group.

Limitations to the overwintering surveys include limited access to some areas and twilight and cryptic natured species potentially under-recorded due to surveys being conducted during daylight hours only.

1 Introduction

1.1 Project background

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake wintering bird surveys in support of an on-line improvement of approximately 1.75km of the A494 between the River Dee and the Queensferry Interchange.

In summary, the proposed scheme consists of two new bridges to carry eastbound and westbound traffic. The eastbound carriageway will make use of the current A494 bridge's supporting river piers combined with a new deck structure and abutments. The westbound carriageway will include a completely new river crossing bridge structure and highway construction constructed immediately to the south of the existing A494 road.

Full details of the proposed scheme are described in the Scheme Assessment Report (ref: 395318-0031). However, the key elements of the proposed Scheme are as follows:

- A 1.5km long offline widening in order to create three lanes and hard shoulder in each direction;
- Three new main structures are required – Westbound River Dee Bridge; Eastbound River Dee Bridge and Westbound Railway Under Bridge; and
- A shared path for pedestrians and cyclists with new connections, including to the Wales Coastal Path, NCN Route 568, Garden City, Chemistry Lane/Factory Road, and Station Road.

1.2 Site description

The site limits are between grid references SJ316679 and SJ327688, along the A494 dual carriageway in Queensferry, Wales. Central to the proposed works and where the overwintering bird surveys were conducted is the River Dee crossing (central OS grid reference SJ 32373 68598).

The River Dee is fringed with intertidal mudflats, small rock revetments and is surrounded by industrial and residential buildings, farmlands and amenity grasslands. The River Dee has a total length of 110.0km and flows through both England and Wales, and forms part of the border between the two countries.

The river rises in Eryri (Snowdonia) in Wales, runs East through Chester (Wales) and England, it then discharges into the Dee Estuary between both Wales and the Wirral Peninsula.

The Dee Estuary is a Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar site and is significantly important, specifically for over-wintering birds. The estuary contains vital intertidal mudflat and saltmarsh habitats that provide optimal feeding and roosting opportunities for large populations of coastal birds. In addition, the site is also particularly important during migration periods for bird species and supports breeding population of two species of terns of European importance: Common tern (*Sterna hirundo*) and little tern (*Sternula albifrons*).

Table 1.1: River Dee SPA and Ramsar designated species

On passage	
Sandwich tern (*Sterna sandvicensis*)	957 individuals- 2.3% of the population in Great Britain
Common redshank (*Tringa totanus*)	8,795 individuals- 5.9% Eastern Atlantic (wintering)
Overwinter	
Bar-tailed godwit (*Limosa lapponica*)	1,150 individuals- 1.2% Western Palearctic
Curlew (*Numenius arquata*)	3,899 individuals- 1.1% Europe (breeding)
Black-tailed godwit (*Limosa limosa islandica*)	1,747 individuals- 2.5% Iceland (breeding)
Dunlin (*Calidris alpina*)	27,769 individuals- 2.0% N Siberia/Europe/ W Africa
Grey plover (*Pluvialis squatarola*)	1,643 individuals- 1.1% Eastern Atlantic
Knot (*Calidris canutus*)	12,394 individuals- 3.5% NE Can/Grl/ Iceland/NW Eur
Oystercatcher (*Haematopus ostralegus*);	22,677 individuals- 2.5% Europe & N/W Africa
Pintail (*Anas acuta*)	5,407 individuals- 9.0% North-western Europe
Common redshank (*Tringa tetanus*)	5,293 individuals- 3.5% Eastern Atlantic
Shelduck (*Tadorna totanus*)	7,725 individuals- 2.6% North-western Europe
Teal (*Anas crecca*)	5,251 individuals- 1.3% North-western Europe
Nationally important populations within the internationally important assemblage of overwintering waterbirds of the Dee Estuary SPA include the following: ● Great crested grebe (*Podiceps cristatus*); ● Cormorant (*Phalacrocorax carbo*); ● Sanderling (*Calidris alba*); and ● Wigeon (*Anas penelope*).	

1.3 Aims and objectives of the report

As part of the enabling works, a study of non-breeding bird species and the habitats which they are associated with was completed to inform the proposed Scheme. This included a desk study of designated sites and bird species. A non-breeding bird survey was then completed between November 2022 to February 2023.

The objectives of this study were:

- To collate information from desk-based sources relating to the presence of designated sites of ornithological importance, or bird species within the study area of the proposed Scheme
- To undertake a field survey to identify any non-breeding bird species within the zones of influence of the proposed Scheme.
- To assign the importance of bird species and their habitats within the zones of influence of the proposed Scheme.
- To provide recommendations for further survey work and/or mitigation requirements.

The surveys provide a robust baseline of overwintering bird data to enable any future impact assessment to be made and mitigation to be designed to lessen the impact on overwintering birds within the Scheme area.

2 Legislation and policy

2.1 Wildlife and Countryside Act 1981

In the UK, all wild birds, their nests, eggs and young are protected by the Wildlife and Countryside Act 1981 (as amended), hereafter referred to as the '1981 Act'. Offences under the 1981 Act include:

- Intentionally killing, injuring or taking any wild bird;
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built;
- Intentionally taking or destroying the egg of any wild bird.

Bird species listed on Schedule 1 of the 1981 Act are afforded additional protection from disturbance when at or near an active nest or when they have dependent young. In the case of breeding Schedule 1 species, it is illegal to intentionally or recklessly disturb them. Offences could result in an unlimited fine and up to six months in prison for each offence if found guilty.

Government standing advice is to avoid potentially harmful activities in the bird breeding season (typically considered as being from March to August inclusive).Furthermore, any disturbance to breeding birds may result in substantial reputational damage and negative publicity for National Highways and its contractors.

Although winter bird reports with respect to development proposals typically focus on the non-breeding period, the 1981 Act emphasises legal protection for all wild birds. Furthermore, certain species (e.g. raven *Corvus corax*, for which there are local biological record centre data in the Scheme footprint) can commence breeding as early as February [Brooks and Perrins (eds), 1994]).

2.1.1 Birds of conservation concern Wales (BoCCW4)

The fifth review of the status of wild birds within Great Britain (BoCC5) was undertaken in 2021. A total of 245 species were assessed and assigned to the Red, Amber or Green lists regarding conservation concerns. Criteria for assessment included the conservation status of these species on global, European and national scales, as well as historical records and population trends. This list is complemented by the Birds of Conservation Concern Wales (BoCCW4) which reviews up to date information on the status of birds in Wales.

Focusing at the Welsh level, the quantitative criteria assessed the historical and more recent trends in the population and range of each species, as well as its current population size, localised distribution and international importance. A total of 220 species were considered, of which 60 were listed as Red, 91 on Amber and 69 listed as Green.

For this assessment, Wales BoCCW4 has been used to assess the status of birds recorded during the survey.

2.1.2 Local biodiversity action plans

The UK Biodiversity Action Plan (UKBAP) (1994) 1994 – 2010 was superseded by the UK Post-2010 Biodiversity Framework and covered the period 2011 – 2020 (Biodiversity 2020). Whilst it has largely been superseded, many of the tools and resources originally developed under the UKBAP still remain of use. Background information on UKBAP priority habitats and species form the basis of county level biodiversity protection initiatives such as Local Biodiversity Action Plans (LBAP).

The Flintshire Local Biodiversity Action Plan (LBAP) has been superseded by a new Nature Recovery Action Plan (NRAP) for east Wales, which is still evolving. Up to now, the recovery plan will focus on three key habitats initially and will expand their data over time to include additional habitats and local important species and species groups. The habitats include woodland, grasslands and waterbodies (running and static).

2.1.3 IUCN regional red list assessment of extinction risk for Great Britain

Stanbury *et al*. (2021) also undertook the second International Union for Conservation of Nature ('IUCN2') 'Regional Red List' assessment of extinction risk for birds in Great Britain. This process is based upon the use of standardised criteria as applied to various plant and animal taxa, both globally and in the UK, with potential for the creation of multi-taxa indicators (e.g. Butchart *et al*., 2005).

Stanbury *et al*. (2021) assessed 243 species against the five IUCN Red List criteria (IUCN, 2022), namely:

- Criterion A: Reduction in the size (either abundance or range) of the population measured over 10 years or three generations, whichever is longer.
- Criterion B: Restricted geographical range in conjunction with fragmentation, continuing decline or extreme population fluctuations.
- Criterion C: Small population size and continuing decline.
- Criterion D: Very small population or very restricted distribution.
- Criterion E: Quantitative analysis of extinction risk.

2.1.4 Environment (Wales) Act 2016

Under the Environment (Wales) Act 2016, Local Authorities and public bodies have a statutory duty 'to seek to maintain and enhance biodiversity in Wales' when carrying out their normal functions. Section 7 of the Act contains a list of species and habitats of 'principal importance to the conservation of biodiversity in Wales' to act as an aid to guide public bodies in implementing their duty. In order to do this, the Local Authority must consider the impact of the proposed works on protected habitats and species. These are known as 'priority species'. There are currently 51 bird species on the priority species list.

For Flintshire the following 6 objectives are highlighted as part of their plan to maintain and enhance biodiversity under the Environment Act:

- Engage and support participation and understanding to embed biodiversity throughout decision making at all levels;
- Safeguard species and habitats of principle importance and improve their management;
- Increase the resilience of our natural environment by restoring degraded habitats and habitat creation;
- Tackle key pressures on species and habitats;
- Improve our evidence, understanding and monitoring; and
- Put in place a framework of governance and support for delivery.

2.1.5 Planning Policy Wales

In terms of planning policy, at national level, under Chapter 6 of Planning Policy Wales (which in part relates to conserving biodiversity and ecological networks) planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. Development plans and proposals must consider the need to:

- Support the conservation of landscape and biodiversity, in particular the conservation of native wildlife and habitats;
- Ensure that action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;
- Ensure that statutorily and non-statutorily designated sites are properly protected and managed;
- Safeguard protected species and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat; and
- Secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.

This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity. In doing so, planning authorities must also take account of and promote the resilience of ecosystems. In fulfilling this duty, planning authorities must have regard to:

- The list of habitats and species of principal importance for Wales, published under Section 7 of the Environment (Wales) Act 2016;
- The State of Natural Resources Report (SoNaRR), published by NRW; and
- Any Area Statement that covers all or part of the area in which the authority exercises its functions.

2.1.6 Technical Advice Note 5

Technical Advice Note (TAN) 5 relates to nature conservation and planning (Welsh Assembly Government, 2009) and provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. The TAN 5 provides advice for local planning authorities on:

- The key principles of positive planning for nature conservation;
- Nature conservation and Local Development Plans;
- Nature conservation in development management procedures;
- Development affecting protected internationally- and nationally- designated sites and habitats; and
- Development affecting protected and priority habitats and species.

2.1.7 Local planning policy

The site lies within the administrative area of Flintshire Council (FC) (2023). Policies considered of ecological relevance and their objectives to this site as part of the FC Local Development Plan (LDP) (2020) 2015-2030 are as follows:

- **STR13 Natural and Built Environment, Green Networks and Infrastructure-** landscapes and coastline will be protected and where feasible enhanced;
  - Conserve, protect and enhance the quality and diversity of Flintshire's natural environment including landscape, biodiversity, the Dee Estuary and the Clwydian Range and Dee Valley AONB;
- **STR14 Climate Change and Environmental Protection** – Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution levels.
  - Encouraging the use and development of appropriate or suitable brownfield land;

- Ensuring that new development has regard to the protection of the environment in terms of air, noise and light pollution, unstable and contaminated land and former landfill sites
- Designing development to be adaptable and resilient to future effects of climate change.

2.1.8 Biodiversity policy

Wales Biodiversity Partnership (WDP) has produced biodiversity checklists for local authority and public authority staff in Wales. The checklists will assist public and local authorities to take account of biodiversity in their operational activities and will help organisations to comply with the requirements of the Environment (Wales) Act (2016) Biodiversity Duty, The Conservation of Habitats and Species Regulations 2017 and other biodiversity related legislation. In addition, the implementation of the checklists and guidance will help build towards the biodiversity outcomes contained in the Environment Strategy for Wales.

2.2 The Conservation of Habitats and Species Regulations 2017, including the Wild Bird Habitat Duty

These regulations comprise elements of domestic law that transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Birds Directive (Directive 2009/147/EC) (known as the Nature Directives) predominantly in England and Wales following the UK's departure from the European Union. Any planning permission granted by a general development order which is:

- likely to result in a significant effect upon a 'European Site' (either alone or in-combination with other plans or projects); and
- is not directly connected with or necessary to the management of the site,

cannot commence without prior approval from the local planning authority.

Under the Wild Bird Habitat Duty, competent authorities must take appropriate steps to help:

- preserve, manage and re-establish habitat that is large and varied enough for wild birds to support and maintain their populations in the long term;
- avoid any pollution or deterioration of wild bird habitat as far as possible.

3 Methodology

3.1 Survey area and scope

Ornithological baseline data regarding wintering birds was gathered by means of a desk study to gather third party data, with field surveys to collect contemporary and site-specific data. The field survey comprised of all suitable habitats within 500m of the Scheme footprint, hereafter referred to as the "survey area" within this report.

3.2 Desk study

3.2.1 Existing ornithological data

A desk study was undertaken and reported within the Preliminary Ecological Appraisal Report (Mott MacDonald, 2020; Mott MacDonald 2021) to collate any overwintering bird data within 2.0km of the Scheme. Only records less than 10 years old were considered valid and relevant due to the potential changes a landscape may experience in a particular length of time.

The following sources were reviewed/consulted:

- Cofnod (https://www.cofnod.org.uk);
- Previous survey data report (Mott MacDonald, 2019);
- eBird (https://ebird.org/); and
- A detailed Data Report commissioned from the British Trust for Ornithology (BTO), with a full methodology provided in Section 4.1.3. This study incorporated data obtained via three large-scale citizen science projects: the 2007–2011 Bird Atlas, the 'BirdTrack' database covering the period 2018–2022 and Breeding Bird Survey data covering 2017–2020. The BTO Data Report includes a full species list together with the legal designations and conservation status associated with each species.

3.3 Field surveys

3.3.1 Winter bird surveys

Winter bird surveys were carried out across four survey visits in November 2022 to February 2023. Premium quality binoculars and spotting scopes were used. In accordance with health and safety policies, ornithologists were accompanied by a junior ecologist plus-one. Surveys were undertaken in accordance with good industry practice as documented in British Standard 42020:2013 (BSI, 2013).

Surveyors followed the 'look- see' method per Bibby *et al*. (2000). The surveys were undertaken by walking a predetermined transect route at a constant pace and surveying a representative sample of the habitats within a 0.5km buffer of Scheme footprint. Habitats included running water, wooded areas and fields. All birds present within a 0.5 km buffer of the Scheme footprint or considered to be using the survey area were recorded. Larger areas and continuous stretches of the River Dee were scanned from accessible vantage points to record any assemblages of species such as waterbirds.

Birds identified by sight or sound were registered electronically using either the 'QField' or ESRI 'Field Maps' application on a Samsung Galaxy Note 2 Tablet. The number of individuals and their activity was noted (e.g. foraging, loafing, flying). Schedule 1 and UK Rare Breeding Bird Panel species were recorded if there was suitable breeding habitat available within the Scheme footprint to inform the breeding bird report (in production at the time of writing).

Each survey was split across two days in order to capture the changes in bird assemblages during high and low tide.

3.3.1.1 High tide

Predetermined transects were completed two hours either side of high tide and the starting point and direction was reversed on alternate visits to avoid potential temporal bias (Marchant, 1983). Surveyors walked at a constant pace and all species of birds observed within and considered to be utilising the study area were recorded. Particular attention was paid to the area ahead of the observer to ensure, where possible, that birds were recorded before they were flushed (e.g. small duck and skulking wader species). Surveyors stopped periodically at certain locations to listen for calls and observe any bird behaviour.

3.3.1.2 Low tide

The continuous stretch of the River Dee was scanned for two hours either side of low tide, from three predetermined, accessible, and elevated points (a form of vantage point) such as the Jubilee Bridge and elevated banks fringing the River Dee. A minimum of 30 minutes were spent at each point and were revisited until the survey had ended.

3.3.1.3 Survey timings

Visit 1 and 2: 21st and 22nd November 2022

Visit 3 and 4: 19th December and 21st December 2022

Visit 5 and 6: 25th and 26th January 2023

Visit 7 and 8: 23rd and 24th February 2023

The surveys were conducted where practicable in optimal or near optimal conditions and avoided periods of heavy rainfall and/or strong winds (above wind Force 4) wherever possible.

3.3.1.4 Defining important ecological features in the survey area

A species is considered to be an important ecological feature, otherwise referred to as notable species in this report if it meets one or more of the following criteria:

a. Species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) with breeding evidence in the study area;
b. Rare Breeding Bird Panel (RBBP) species with breeding evidence in the study area;
c. Species listed on Section 7 of the Environment (Wales) Act 2016;
d. Annex 1 of the EU Birds Directive that are notable in the study area and have more negative/positive population trends in the study area compared to the national, regional, county or local areas; and
e. Red List or Amber List Birds of Conservation Concern that are notable in the study area; and have more negative/positive population trends in the study area compared to the national, regional, county or local areas.

For criterion e, the use of the following symbols is given with the relevant geographic frame of reference (i.e. national [Great Britain and England], region, county, vice-county):

↓ — population of this species is declining more in the study area than the reference area; and

↑ — population of this species is increasing more in the study area than the reference area.

3.3.1.5 Nomenclature

The vernacular and scientific bird names used in this report follows the 10th edition of the British Ornithologists' Union official list of species recorded in Great Britain (McInerny *et al*., 2022). Birds are listed in vernacular name alphabetical order.

3.4 Survey limitations

- The absence of a species is not conclusive proof that a species is not present or that it will not be present in the future. However, the desk data coupled with the field surveys provide a good comprehensive understanding of breeding bird species that exist within the site footprint and surrounding areas which are likely to be impacted by the proposed works;
- The results presented in this report are a snapshot of the current non-breeding community within the survey area during winter 2022 and 2023;
- The majority of surveys were carried out in daylight hours only and therefore species most frequently observed during hours of darkness or twilight may have been under recorded; and
- The survey methodology does not detect all species evenly and it is known that cryptic species such as snipe (*Gallinago gallinago*) and skylark (*Alauda arvensis*) may not be recorded and/or under recorded.
- Access was restricted to the travellers site located at (SJ 32372 68436) Wastewater Treatment Works area (SJ 32228 68232) and immediate habitats surrounding the A494 could not be surveyed due to health and safety reasons; and
- Due to technical issues, weather recordings were lost and could not be presented in the report. However, all surveys were completed in optimal weather conditions.

4 Results

4.1 Desk study

4.1.1 Broad habitats in the study area

Based on the broad habitats in the working width of the proposed Scheme and the habitat associations of the species identified from the BTO data report present in the study area, the study area is considered to comprise the following broad habitats:

- Farmland;
- Grasslands;
- Scrub;
- Rivers and ponds;
- Woodland; and
- Urban and suburban.

The Scheme survey area is also intersected by a network of A and B roads.

4.1.2 Historical species records

Records of 50 notable species of bird were returned from within 2.0km of the Scheme. Notable bird species which could be encountered during the overwintering period are listed in Table 4.1 below.

Table 4.1: Historical records of bird species returned within 2.0km of the Scheme footprint, including results from surveys completed during winter 2018/19 and 2020/21.

Species	Scientific name	Distance (m)
Avocet	*Recurvirostra avosetta*	1236
Barn owl	*Tyto alba*	1754
Barnacle goose	*Branta leucopsis*	0
Bewick's swan	*Cygnus columbianus*	562
Black-headed gull	*Chroicocephalus ridibundus*	165
Black-tailed godwit	*Limosa limosa*	1236
Bullfinch	*Pyrrhula pyrrhula*	1853
Common gull	*Larus canus*	200
Common redshank	*Tringa totanus*	60
Common ringed plover	*Charadrius hiaticula*	60
Cormorant	*Phalacrocorax carbo*	0
Curlew	*Numenius arquata*	1236
Dotterel	*Charadrius morinellus*	1236
Dunnock	*Prunella modularis*	30
Dunlin	*Calidris alpina*	400
Fieldfare	*Turdus pilaris*	320
Firecrest	*Regulus ignicapilla*	1206
Garganey	*Anas querquedula*	1267
Grasshopper warbler	*Locustella naevia*	1233
Greylag goose	*Anser anser*	200

Species	Scientific name	Distance (m)
Great-black backed gull	*Larus marinus*	100
Herring gull	*Larus argentatus*	165
House sparrow	*Passer domesticus*	1590
Kestrel	*Falco tinnunculus*	1360
Kingfisher	*Alcedo atthis*	1519
Lapwing	*Vanellus vanellus*	309
Lesser black-backed gull	*Larus fuscus*	250
Linnet	*Linaria cannabina*	717
Little egret	*Egretta garzetta*	30
Little ringed plover	*Charadrius dubius*	1921
Mallard	*Anas platyrhynchos*	0
Meadow pipit	*Anthus pratensis*	500
Mediterranean gull	*Ichthyaetus melanocephalus*	640
Oystercatcher	*Haematopus ostralegus*	70
Peregrine	*Falco peregrinus*	290
Pink-footed goose	*Anser brachyrhynchus*	0
Redwing	*Turdus iliacus*	320
Shelduck	*Tadorna tadorna*	250
Skylark	*Alauda arvensis*	692
Song thrush	*Turdus philomelos*	1530
Spotted flycatcher	*Muscicapa striata*	492
Starling	*Sturnus vulgaris*	165
Stock dove	*Columba oenas*	540
Shelduck	*Tadorna tadorna*	600
Tree sparrow	*Passer montanus*	1233
Twite	*Linaria flavirostris*	1236
Whooper swan	*Cygnus cygnus*	562
Yellow wagtail	*Motacilla flava*	153
Yellowhammer	*Emberiza citrinella*	654
Yellow-legged gull	*Larus michahellis*	200

Source: Cofnod 2018; Mott MacDonald, 2018/19 and 2020/2021.

4.1.3 BTO data report

Within the one 10 km National Grid square which contains the Scheme footprint, the BTO held winter records for total of 114 species. These were analysed at five spatial scales (i.e. UK, England, region [East Midlands], county [Nottinghamshire] and Watsonian vice-county [Nottinghamshire]). The BTO Data Report pays particular attention to 'notable species.' Notable species are defined as those for which the species' percentage range and/or relative abundance is at least twice the site's percentage size, except at the UK scale, where species are described as notable if the site and vicinity account for ≥2% of the species' range and/or relative abundance.

On a **UK** scale, no records for notable species were found in terms of winter **range** or winter **abundance** for the 10 km square.

At the spatial scale of **Wales**, the 10 km square contained records for 13 notable species in terms of **winter** range (greylag goose, grey partridge (*Perdix perdix*), red-legged partridge (*Alectoris rufa*), great crested grebe, oystercatcher, green sandpiper (*Tringa ochropus*), redshank, little egret, hen harrier (*Circus cyaneus),* little owl (*Athene noctua*), waxwing (*Bombycilla garrulus*), chiffchaff (*Phylloscopus collybita)* and tree sparrow).

In terms of winter **abundance** at the scale of Wales, the 10 km square contained records for 22 notable species (mallard, red-legged partridge, rock dove, stock dove, woodpigeon, collared dove, moorhen (*Gallinula chloropus)*, black-headed gull, lesser black-backed gull, barn owl, kestrel, magpie (*Pica pica)*, rook (*Corvus frugilegus)*, carrion crow (*Corvus corone*), blackcap (*Sylvia atricapilla*), redwing, fieldfare, tree sparrow, pied/white wagtail, bullfinch, goldfinch (*Carduelis carduelis)* and yellowhammer).

At the **regional (East Wales)** scale, the 10 km square contained records of 17 notable species for **winter range** (greylag goose, wigeon, grey partridge, red-legged partridge, great crested grebe, oystercatcher, curlew, green sandpiper, redshank, common gull, great black-backed gull, little egret, hen harrier, little owl, waxwing, chiffchaff, tree sparrow).

In terms of **winter abundance**, there was 22 notable species (greylag goose, mallard, red-legged partridge, rock dove, stock dove, woodpigeon, collared dove, moorhen, black-headed gull, common gull, lesser black-backed gull, barn owl, kestrel, magpie, rook, blackcap, redwing, fieldfare, tree sparrow, pied/white wagtail *(Motacilla alba)*, linnet and goldfinch (*Carduelis carduelis*)).

At the **county (Clwyd)** scale, the one 10km squares contained 8 notable species in terms of **winter range** (grey partridge, red-legged partridge, oystercatcher, green sandpiper, redshank, hen harrier, little owl and chiffchaff).

In respect to **winter abundance** there were 24 notable species (mallard, red-legged partridge, rock dove, stock dove, woodpigeon, collared dove, moorhen, black-headed gull, lesser black-backed gull, barn owl, kestrel, magpie, rook, blackcap, redwing, fieldfare, tree sparrow, house sparrow, pied/white wagtail, chaffinch, bullfinch, linnet, goldfinch and yellowhammer).

At the **vice-county (Flintshire)** scale, the 10 km square contained two notable species with regards to **winter range** (grey partridge and hen harrier). In terms of **winter abundance**, records for 15 notable species were found (red-legged partridge, stock dove, woodpigeon, moorhen, lesser black-backed gull, barn owl, kestrel, rook, blackcap, fieldfare, tree sparrow, , chaffinch, bullfinch, goldfinch and yellowhammer).

4.1.4 Winter bird surveys

A total of 59 species were recorded during winter bird surveys between November and December.

A full list of all species recorded during professional winter bird surveys is included in Appendix A. Maps of bird species distribution, abundance and richness can be found in Appendix B.

Of the 59 species recorded, 30 species were listed under at least one legal or conservation designation. These comprised:

- Two species listed on Schedule 1 of the 1981 Act;

- Nine species listed in Section 7 of the Environment (Wales) Act 2016;
- 10 ‘Red Listed’ species of Conservation Concern Wales (BoCCW);
- 17 ‘Amber Listed’ species of BoCCW;
- Three UK Rare Breeding Bird Panel species, and
- One European Birds Directive Annexe 1 species

These species are listed in Table 4.1

Table 4.1: Notable species, their average count and distribution within the Scheme survey area.

Common Name	Scientific name	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count	Distance from Scheme footprint (m)	Observations
Teal	*Anas crecca*	Amber					0.5	0	On pair of teal were observed foraging along the river during November.
Greylag goose	*Anser anser*	Amber					15.8	0	Greylag geese were commonly observed flying over the Scheme footprint. Moderate sized groups of 30 birds were observed roosting in fields and on the banks outside of the Survey Area.
Grey heron	*Ardea cinerea*	Amber					1.8	0	Grey heron were commonly observed foraging in a small gulley located south of the A494 bridge and along the banks during low tide.
Black-headed gull	*Chroicocephalus ridibundus*	Red			●		106.5	0	Black-headed gull were predominantly observed within the river area, either flying over, or roosting or foraging along the banks. This species was also observed in small numbers utilising the small waterbody located north of Chemistry Lane.
Great black-backed gull	*Larus marinus*	Amber					0.5	0	Small groups of birds were observed foraging in the arable fields east of the A494 bridge.
Greenfinch	*Chloris chloris*	Red					0.5	500	One greenfinch was observed on two separate surveys. Greenfinch were observed commuting along treelines fringing the Scheme boundary.
Little egret	*Egretta garzetta*	Green	●			Regular	1.5	0	Little egret were observed alone or in pairs foraging along the banks during low tide.
Coot	*Fulica atra*	Amber					0.3	270	One coot was observed foraging along the banks during November.
Oystercatcher	*Haematopus ostralegus*	Amber					3.5	120	Oystercatcher were regularly observed roosting and feeding on the banks.

Common Name	Scientific name	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count	Distance from Scheme footprint (m)	Observations
Lapwing	*Vanellus vanellus*	Red			●		60.3	120	In comparison to previous years, lapwing numbers have appeared to decline. Lapwing were mainly observed roosting upon the arable fields located east of the A494 during high tide. During low tide, lapwing were observed loafing upon the small rocky areas fringing the river Dee. Lapwing were identified in the same areas as previous surveys.
Snipe	*Gallinago gallinago*	Amber					0.5	120	Snipe were observed utilising the small waterbody located north of Chemistry Lane.
Common sandpiper	*Actitis hypoleucos*	Amber					0.5	150	It is known that few individuals overwinter in this area. Two common sandpiper were observed foraging along the banks.
Redshank	*Tringa totanus*	Red					5.5	0	Common redshank were commonly observed as individuals and occasionally in pairs foraging along the banks during low tide.
Herring gull	*Larus argentatus*	Red			●		106	0	Herring gull were commonly encountered throughout the survey area and particularly favoured the southern side of the A494 bridge. Arable land located east of the A494 bridge, the banks and commercial buildings located south were areas where they were most concentrated. Numbers reflected previous years surveys.
Lesser black-backed gull	*Larus fuscus*	Red					3.5	35	Lesser-black backed gull were observed in mixed species flocks of gull roosting along the river Dee banks at low tide.
Kestrel	*Falco tinnunculus*	Amber			●		0.5	30	Individual kestrel were observed utilising the grasslands and arable fields for foraging.
Magpie	*Pica pica*	Amber					17	0	Magpie were frequently observed foraging upon grasslands and arable land surrounding the Scheme footprint, usually feeding alongside other corvid species.
Rook	*Corvus frugilegus*	Red					1.5	300	Rook were observed foraging upon the grassland and arable fields within the survey area.

Common Name	Scientific name	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count	Distance from Scheme footprint (m)	Observations
Goldcrest	*Regulus regulus*	Red					0.8	0	Goldcrest were observed foraging and commuting along treelines surrounding the Scheme footprint. Goldcrest is a new species identified within the Scheme Survey area.
Starling	*Sturnus vulgaris*	Red			●		32.8	10	Starling were commonly encountered roosting in moderate sized flocks on pylons and wires which run parallel to the A494 and Jubilee bridges. They were also observed foraging upon the brown and green fields surrounding the Scheme footprint.
Fieldfare	*Turdus pilaris*	Amber		●		Regular	1	600	Fieldfare were observed commuting through the survey area. No moderate or large or large sized flocks were identified.
Redwing	*Turdus iliacus*	Green		●		Regular	30.8	320	Redwing were observed commuting and foraging along treelines throughout the Scheme Survey Area.
Song thrush	*Turdus philomelos*	Green			●		0.5	20	Song thrush were seen and heard foraging within the Survey Area, mainly within treelines.
Mistle thrush	*Turdus viscivorus*	Amber					0.3	480	Single mistle thrush were observed commuting through the Survey Area.
House sparrow	*Passer domesticus*	Amber			●		27	0	House sparrow were commonly observed within and surrounding the residential areas, which is likely due to suitable roosting areas and supplementary feeding identified during winter.
Dunnock	*Prunella modularis*	Amber			●		2	70	Dunnock were observed in hedgerows that surround the Scheme footprint.
Grey wagtail	*Motacilla cinerea*	Amber					0.8	0	Grey wagtail were observed foraging along the banks south of the A494 bridge.
Meadow pipit	*Anthus pratensis*	Red					0.5	10	Two meadow pipit were observed throughout the surveys along the treelines fringing the Scheme boundary.

Common Name	Scientific name	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count	Distance from Scheme footprint (m)	Observations
Chaffinch	*Fringilla coelebs*	Amber					13	120	Chaffinch appeared to favour the northern area of the A494 bridge and were observed commuting and foraging through treelines and hedgerows.
Bullfinch	*Pyrrhula pyrrhula*	Amber			●		0.5	315	Bullfinch were observed twice commuting through hedgerows surrounding the Scheme footprint.

No species were considered Near Threatened, Vulnerable, Endangered, Critically Endangered (IUCN, 2022).

Designated species that were recorded and are supported by the Dee Estuary SPA and Ramsar (common redshank, teal and oystercatcher) within the Survey Area did not reach or exceed significant thresholds of 1% or more.

It is reasonable to assume that given the combination of a comprehensive desk study (including a BTO-commissioned Data Report) and detailed survey data generated via fieldwork undertaken by experienced professional ornithologists, the desk and field data are relatively robust and broadly capture the non-breeding season avifaunal assemblage across the Scheme footprint and/or its two associated 10km National Grid squares.

Of the 12 species which are listed as Section 7, impacts are considered negligible as they are likely to be temporary during the enabling and constructional phase of the proposed works. It is likely that during the operational phase, these species will return and perhaps more if enhancements are included during the construction and operational phase.

The BTO Data Report identified several notable species (‘notable’ is defined in Section 4.1.3), these data were at the comparatively low spatial resolution of the one 10 km squares which encompass the Scheme footprint. The majority of notable species were captured within the Survey Area or were captured during previous years surveys. The 22/23 winter survey captured 17 of 23 notable species at the spatial scale of Wales (Section 4.1.3). Although these species were recorded in low numbers, it is likely that most of these species within the survey area and those which were not captured are likely to be birds which may relate and/or use the River Dee to commute to areas such as the RSPB reserves Burton Mere Wetlands, Parkgate and Point of Ayr. However, further desk work would be required to establish this.

4.2 Valuable features and habitats for birds in winter

4.2.1 Tree lines, hedgerows and scrub

The hedgerows, tree lines and unmanaged gardens within the vicinity of the Scheme provide winter foraging and roosting habitats for passerines such as warblers, thrushes and finches and may facilitate their movement across the landscape.

4.2.2 Grassland and arable land

Particularly during high tide, the grassland and arable land in the vicinity of the Scheme Survey Area provide winter foraging opportunities for birds. Groups of 5-10 lapwings, herring and black-headed gull were observed to the south of the A494 bridge. In addition, redwing, starling, rook, magpie and stonechat were all recorded foraging in grassland and arable habitats.

4.2.3 River Dee corridor

The river Dee which intersects the Scheme survey area and footprint appears to support a moderate number (>21) of species including common sandpiper, cormorant, oystercatcher, common redshank, goosander, lapwing, grey heron, little egret, moorhen, duck, grebe, goose and gull species. The number of birds at which this watercourse supports is considered as moderate.

4.2.4 Residential and commercial properties

The residential properties within the Scheme footprint contain a typical selection of passerines associated with domestic gardens. Such species are likely to benefit from the presence of lawns and shrubs for foraging, roosting and breeding opportunities as well as predictable anthropogenic food subsidies.

4.2.5 Rocky embankments

Small rocky embankments which became exposed during low tide only were considered to be of importance to roosting lapwing (10-25), common redshank (1-2), cormorant (1-2), oystercatcher (1-12), mallard (1-2) and gull species, including herring (1-40), black-headed, lesser (1-25) and greater black-backed gull (1-30).

5 Potential impacts on non-breeding birds

The potential impacts of the Scheme on overwintering birds may include but are not limited to:

- Loss and fragmentation of foraging habitat; and
- Increased levels of disturbance resulting from noise and light.

The resulting effects may include:

- A reduction in species richness and/or abundance;
- Displacement of birds from foraging sites; and
- A reduction in overwinter survival.

5.1.1 River and associated banks

During the construction phase, the proposed activities are anticipated to temporarily create barriers both in terms of sight and sound, which could lead to a form of habitat fragmentation. This could have an impact on species that rely on the River Dee for activities such as feeding, moulting, resting, and commuting. These species encompass, but are not restricted to, lapwings, oystercatchers, common sandpipers, little egrets, grey herons, common redshanks, various gull species, grebes, as well as different duck and goose species.

Most of the aforementioned bird species did not directly utilise the area immediately beneath the A494 bridge for overwintering activities; they appeared to prefer exposed banks situated approximately 200m away, both up and downstream of the bridge, however larger concentrations of bird species could be observed west of the bridge. This behaviour is likely influenced by the existing disturbances in the area. Nonetheless, these bird species did use the space under the bridge for commuting purposes, either by flying over or swimming through.

Throughout the surveys, a significant number of birds were observed at distances exceeding 1.0km from the Scheme's location. Additionally, substantial flocks of geese and gulls were spotted flying across the Scheme footprint. These observations might be attributed to improved habitat quality (such as the Dee Estuary), increased resource availability, and/or reduced levels of disturbance.

To reduce disturbance and displacement during the constructional phase, it is advised that quieter operating plant and machinery are used during works to the bridge area. Where unavoidable, anticipated nosier construction activities should be completed during three hours either side of high tide in order for species to utilise the banks during low tide in order to both commute and/or forage.

In addition, it is also advised that acoustic and visual bunds are placed to alleviate visual and noise disturbance to the foraging and (or) commuting species listed above.

5.1.2 Farmland and grassland habitat

The enabling works and proposed construction work are expected to result in some habitat loss and fragmentation, impacting species like starling, redwing, meadow pipit, stonechat, bullfinch, herring gull, black-headed gull, lapwing, and corvid species. These species were identified in open grassland and farmland habitats during the surveys.

Since there are already comparable habitats existing beyond the Survey Area, it's likely that these species will be temporarily displaced from their current wintering grounds within the Survey Area to other regions featuring habitats of either equal or greater quality.

To mitigate disturbances and the displacement of these overwintering species during the construction phase, it is recommended to implement acoustic and visual barriers. These measures would help minimize both noise and visual disturbances, ensuring a more favourable environment for the mentioned bird species.

To reduce disturbance, displacement, and to reduce road mortality during the operational phase, it is advised that the planting of treelines and (or) hedgerows are done to act as natural visual and sound barriers surrounding the new widening of the A494 road, particularly alongside the westbound carriageway as the current tree and shrub line is likely to be lost. This will also benefit other fauna found within the Survey Area.

In addition to this, the natural barriers will also compensate and/or create new habitats and elevate bird flight paths which will aid the reduction of road mortality.

Native species including hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), Holly (*Ilex aquifolium*): etc. should be encouraged during planting.

Trees and (or) hedgerows are advised to be planted before or during the constructional phase due to the time it can take for them to reach a good height/maturity. These should also be maintained during the operational phase.

5.1.3 Woodland, treeline, and hedgerow habitat

Any vegetation clearance should be carefully considered to try to avoid or minimise the removal and/or the disconnection of hedgerow and treelines, particularly those that fringe the River Dee and the westbound carriageway as these were identified as important commuting and foraging network for kestrel, redwing, meadow pipit, long-tailed tit, mistle thrush, house sparrow, dunnock and bullfinch.

It is advised that all tree and (or) hedgerow losses are compensated, with a minimum of 2:1 for trees and 1.5m for every 1m of hedgerow lost.

5.2 Opportunities for enhancement

There is a duty placed on public authorities under Section 6 of the Environment (Wales) Act 2016 to seek to maintain and enhancement biodiversity and promote the resilience of ecosystems, in so far as it is possible.

The Environment (Wales) Act 2016 ensures that wildlife and habitats are gained and (or) enhanced compared to the pre-development baseline.

This means the local planning authorities will have a duty to ensure that any plans or projects provide biodiversity net gains, as opposed to ‘no net loss’. Although the legislation to support this has yet to be made, it is expected to become a legal requirement imminently and clients are advised to plan accordingly.

In line with this, opportunities for ecological enhancement to benefit overwintering birds under the Scheme have been highlighted below:

- The enhancement of existing suitable habitats to increase species diversity; and
- The creation of new habitats and the connection of suitable habitats with the use of planting, such as native species rich scrub and broadleaved trees.

5.3 Validity of the survey data and assessment

In line with CIEEM guidance (2019) on the lifespan of ecological surveys, the survey results are considered valid for up to 18 months. Following this, the survey data should be reviewed and, if appropriate, updated to ensure any assessment and mitigation approach remains valid.

6 Conclusions

The habitats considered significant to the wintering birds identified to be present within the Survey area encompass hedgerows, riverine zones, open grasslands, and farmland areas.

During the 2022/23 overwintering bird surveys within the Scheme survey area, an inventory of 59 bird species were documented, including 30 notable species. This assemblage holds importance at the county level for conservation.

Section 7 species (like dunnock, black-headed gull, bullfinch, herring gull, house sparrow, song thrush, starling, kestrel, and lapwing), Red List species (such as goldcrest, greenfinch, rook, lesser black-backed gull, meadow pipit, and common redshank), and Amber List species (including grey wagtail, mistle thrush, chaffinch, coot, grey heron, magpie, common sandpiper, great black-backed gull, greylag goose, oystercatcher, snipe, teal, and fieldfare) were noted in low to moderate numbers across the Survey Area and it is considered that more suitable and higher quality habitats are available beyond the extent of the Scheme survey area, as outlined in this report.

Overall, the Scheme is not anticipated to have a substantial impact on wintering birds, given that the proposed habitat loss areas are already exposed to considerable disturbances due to their proximity to existing roads, public spaces, and cycle networks. Additionally, compensatory bird habitats are accessible in close proximity to the designated areas of habitat loss.

During the operational phase, it is anticipated that there will be no impacts to overwintering birds.

This report provides recommendations to avoid detrimental effects on critical habitats and proposes potential mitigation measures to protect the most significant wintering bird habitats within the Scheme survey area.

Recommendations are made within this report for avoidance of impacts to key habitats as well as potential mitigation measures to safeguard the overwintering bird assemblages within the Scheme survey area.

7 References

Bibby, C.J., Burgess, N.D., Hill, D.A., Mustoe, S. and Lambton, S. (1992, 2000) Bird Census Techniques. Academic Press, London, UK.

British Trust for Ornithology, 2023. BTO Data Report: A494: 24 August 2023. British Trust for Ornithology Services Ltd, Thetford.

Brooks, D.J. and Perrins, C.M. (eds), 1994. Handbook of the Birds of Europe, the Middle East and North Africa: The Birds of the Western Palearctic. Vol. VIII: Crows to Finches. Oxford University Press, Oxford.

Broughton, R.K., Shutt, J.D., Lees, A.C., 2020. Rethinking bird feeding: Are we putting extra pressure on some struggling woodland birds? *Brit. Birds* 115, 2–6.

Butchart, S.H.M, Stattersfield, A.J., Baillie, J., Bennun, L.A., Stuart, S.N., Akcakaya, H.R., Hilton-Taylor, C., Mace, G.M., 2005. Using Red List Indices to measure progress toward the 2010 target and beyond. *Philos. Trans. R. Soc. B.* 360, 255–268.

BSI, 2013. British Standard 42020: 2013. Biodiversity – Code of Practice for Planning and Development. British Standards Institution, London.

The Conservation of Habitats and Species Regulations, 2017. Available at: The Conservation of Habitats and Species Regulations 2017 (legislation.gov.uk). Accessed 25.01.2023.

CIEEM (2017), *Guidelines for Preliminary Ecological Appraisal*, 2nd Edition. Winchester: Chartered Institute of Ecology and Environmental Management [online] https://cieem.net/wp-content/uploads/2019/02/Guidelines-for-Preliminary-Ecological-Appraisal-Jan2018-1.pdf, Last accessed 21st January 2023.

CIEEM (2018), *Guidelines for Ecological Impact Assessment in the UK and Ireland*, Winchester: Chartered Institute of Ecology and Environmental Management [online] https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf, Last accessed 21st January 2023.

CIEEM (2019). On the Lifespan of Ecological Reports and Surveys.

Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D. & Gregory, R.D., (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds, 108, 708–746.

Flintshire County Council (2020), *Biodiversity and ecosystem resilience duty delivery plan*. Available at: https://www.flintshire.gov.uk/en/PDFFiles/Countryside--Coast/Biodiversity/Biodiversity-and-Ecosystem-Resilience-Duty-Delivery-Plan.pdf (Accessed: 29 August 2023).

Flintshire County Council (2023) Local Development Plan 2015-2030- Adopted Plan 24th January 2023.

Fuller, R., 1980. A method for assessing the ornithological interest of sites for conservation. Biological Conservation, 17. pp. 229-239.

Gillings, S., Balmer, D. E., Caffrey, B. J. & Swann, B., 2013. Survey methods and data sources. In: Balmer, D. E., Gillings, S., Caffrey, B. J., Swann, R. L., Downie, I. S. & Fuller, R. J. (eds), 2013. Bird Atlas 2007–11: The Breeding and Wintering Birds of Britain and Ireland. BTO Books, Thetford, UK. pp.34–45.

International Union for Conservation of Nature, 2022. Guidelines for using the IUCN Red List categories and Criteria. Version 15.1. Prepared by the Standards and Petitions Committee of the IUCN Species Survival

Commission. Available at: https://www.iucnredlist.org/documents/RedListGuidelines.pdf. Accessed on 13.01.2023.

Marchant, J.H., (1983). Common Birds Census Instructions. Tring: British Trust for Ornithology.

McInerny, C. J., Musgrove, A. J., Stoddart, A., Harrop, A. H.J. and Dudley, S. P. (2018) The British List: a checklist of birds of Britain (9th edition). *Ibis*, 160(1), pp. 190-240

Multi-Agency Geographic Information for the Countryside (MAGIC), 2018. Available at: http://magic.defra.gov.uk/. Accessed on 15.07.2023.

Highways Agency (2001). Design Manual for Roads and Bridges (DMRB) Volume 10 HA 80/99 Nature Conservation Advice in Relation to Bats.

Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. & Taylor, R.C. (2022). Birds of Conservation Concern in Wales 4: the population status of birds in Wales. [online] Available at: MJWOS_202212_BoCCW4.pdf (birdsin.wales). [Accessed: March, 2023]

Kirby, J., Davidson, N., Giles, N., Owen, M. and Spray, C. 2004. Waterbirds & Wetland Recreation Handbook: A review of issues and management practice., Slimbridge, The Wildfowl & Wetlands Trust.

Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble D, Win, I., 2021. The status of our bird populations: The Fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *Brit. Birds* 114, 723–747.

UK Government, 1994. Biodiversity: The UK Action Plan. The Stationery Office, London. Accessed 25.07.2023.

Wildlife and Countryside Act, 1981 (as amended). Available at: Wildlife and Countryside Act 1981 (legislation.gov.uk). Accessed 25.07.2023.

Appendices

A. Species List

A.1: Full species list and average count of birds identified within the Scheme survey area, throughout the survey period.

BTO	Common Name	Scientific name	IUCN status	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count
B.	Blackbird	*Turdus merula*	LC (stable)	Green					32.5
BC	Blackcap	*Sylvia atricapilla*	LC (increasing)	Green					0.3
BF	Bullfinch	Pyrrhula pyrrhula	LC (decreasing)	Amber			●		0.5
BH	Black-headed Gull	Chroicocephalus ridibundus	LC (decreasing)	Red			●		106.5
BT	Blue Tit	*Cyanistes caeruleus*	LC (increasing)	Green					15.5
BZ	Buzzard	*Buteo buteo*	LC (increasing)	Green					0.5
C.	Carrion Crow	*Corvus corone*	LC (increasing)	Green					34.7
CA	Cormorant	*Phalacrocorax carbo*	LC (increasing)	Green					10.5
CC	Chiff chaff	*Phylloscopus collybita*	LC (increasing)	Green					0.3
CD	Collared Dove	*Streptopelia decaocto*	LC (increasing)	Green					1.8

BTO	Common Name	Scientific name	IUCN status	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count
CG	Canada Goose	Branta canadensis	LC (increasing)	n/a					28
CH	Chaffinch	Fringilla coelebs	LC (stable)	Amber					13
CO	Coot	Fulica atra	LC (increasing)	Amber					0.3
CS	Common Sandpiper	Actitis hypoleucos	LC (decreasing)	Amber					0.5
D.	Dunnock	Prunella modularis	LC (decreasing)	Amber			●		2
ET	Little Egret	*Egretta garzetta*	LC (increasing)	Green	●			Regular	1.5
FF	Fieldfare	Turdus pilaris	LC (stable)	Amber		●		Regular	1
FP	Feral Pigeon/Rock dove	Columba livia domestica	LC9 (decreasing)	n/a					1
GB	Great Black-backed Gull	Larus marinus	LC (increasing)	Amber					0.5
GC	Goldcrest	Regulus regulus	LC (decreasing)	Red					0.8
GD	Goosander	*Mergus merganser*	LC (increasing)	Green					1
GJ	Greylag Goose	Anser anser	LC (increasing)	Amber					15.8

BTO	Common Name	Scientific name	IUCN status	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count
GL	Grey Wagtail	Motacilla cinerea	LC (stable)	Amber					0.8
GO	Goldfinch	*Carduelis carduelis*	LC (decreasing)	Green					15
GR	Greenfinch	Chloris chloris	LC (stable)	Red					0.5
GS	Great Spotted Woodpecker	*Dendrocopos major*	LC (increasing)	Green					0.3
GT	Great Tit	*Parus major*	LC (increasing)	Green					8
H.	Grey Heron	Ardea cinerea	LC (unknown)	Amber					1.8
HG	Herring Gull	Larus argentatus	LC (decreasing)	Red			●		106
HS	House Sparrow	Passer domesticus	LC (decreasing)	Amber			●		27
J.	Jay	*Garrulus glandarius*	LC (stable)	Green					0.5
JD	Jackdaw	*Coloeus monedula*	LC (stable)	Green					51.8
K.	Kestrel	Falco tinnunculus	LC (decreasing)	Amber			●		0.5
L.	Lapwing	Vanellus vanellus	NT (decreasing)	Red			●		60.3

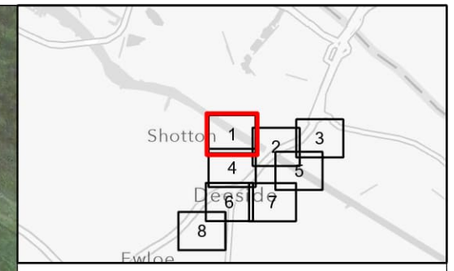
BTO	Common Name	Scientific name	IUCN status	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count
LB	Lesser Black-backed Gull	Larus fuscus	LC (increasing)	Red					3.5
LG	Little Grebe	*Tachybaptus ruficollis*	LC (decreasing)	Green					0.3
LT	Long-tailed Tit	*Aegithalos caudatus*	LC (stable)	Green					14.8
M.	Mistle Thrush	Turdus viscivorus	LC (increasing)	Amber					0.3
MA	Mallard	*Anas platyrhynchos*	LC (decreasing)	Green					15.5
MG	Magpie	Pica pica	LC (increasing)	Amber					17
MH	Moorhen	*Gallinula chloropus*	LC (stable)	Green					0.5
MP	Meadow Pipit	Anthus pratensis	NT (decreasing)	Red					0.5
OC	Oystercatcher	Haematopus ostralegus	NT (decreasing)	Amber					3.5
PG	Pink-footed Goose	*Anser brachyrhynchus*	LC (increasing)	Green				Occasional	89.5
PH	Pheasant	Phasianus colchicus	LC (decreasing)	n/a					0.3

BTO	Common Name	Scientific name	IUCN status	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count
PW	Pied Wagtail	*Motacilla alba*	LC (stable)	Green					1.5
R.	Robin	*Erithacus rubecula*	LC (increasing)	Green					11.5
RE	Redwing	*Turdus iliacus*	LC (decreasing)	Green		●		Regular	30.8
RK	Redshank	Tringa totanus	LC (unknown)	Red		0			5.5
RO	Rook	Corvus frugilegus	LC (decreasing)	Red		0			1.5
SC	Stonechat	*Saxicola rubicola*	LC (stable)	Green					1
SD	Stock Dove	*Columba oenas*	LC (increasing)	Green					0.3
SG	Starling	Sturnus vulgaris	LC (decreasing)	Red		0	●		32.8
SH	Sparrowhawk	*Accipiter nisus*	LC (stable)	Green					0.5
SN	Snipe	Gallinago gallinago	LC (decreasing)	Amber		0			0.5
ST	Song Thrush	*Turdus philomelos*	LC (increasing)	Green			●		0.5
T.	Teal	Anas crecca	LC (unknown)	Amber		0			0.5
WP	Woodpigeon	*Columba palumbus*	LC (increasing)	Green					33.3

BTO	Common Name	Scientific name	IUCN status	BOCCW	Annex 1	Schedule 1	Section 7	RBBP Br. Status	Average count
WR	Wren	*Troglodytes troglodytes*	LC (increasing)	Green					2.5

B. Maps





Behaviour
- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species
- Black headed gull
- Buzzard
- Canada goose
- Common coot
- Common sandpiper
- Little egret
- Goldfinch
- Greenfinch
- Greater spotted woodpecker
- Great tit
- Herring gull
- Magpie
- Oyster catcher
- Redshank
- Stock dove
- Song thrush
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

RICHARDS MOORLAND LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 1 of 8

Suitability Description
Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	**F Lumb**	**K Doneo**	**J Roberts**
Scale at A3	Suit. Code	Revision	Security
1:3,000	**S2**	**02**	**STD**

395318-MMD-ZZ-XX-DR-Y-0200

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m



Behaviour

- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species

- Blackbird
- Black headed gull
- Blue tit
- Buzzard
- Carrion crow
- Cormorant
- Collared dove
- Common coot
- Little egret
- Ferral pigeon
- Greater blacked backed gull
- Goosander
- Greywagtail
- Goldfinch
- Greater spotted woodpecker
- Great tit
- Grey heron
- Herring gull
- Jackdaw
- Kestrel
- Lapwing
- Lesser black backed gull
- Little grebe
- Long tailed tit
- Mallard
- Magpie
- Meadow pipit
- Oyster catcher
- Pink footed goose
- Robin
- Redshank
- Stonechat
- Starling
- Sparrow hawk
- Teal
- Wood pigeon
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS MOORLAND LIVING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 2 of 8

Suitability Description

Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	**F Lumb**	**K Doneo**	**J Roberts**
Scale at A3	Suit. Code	Revision	Security
1:3,000	**S2**	**02**	**STD**

395318-MMD-ZZ-XX-DR-Y-0201

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m



Behaviour
- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species
- Carrion crow
- Collared dove
- Fieldfare
- Greater blacked backed gull
- Herring gull
- Jackdaw
- Lapwing
- Long tailed tit
- Mistle Thrush
- Pink footed goose
- Robin
- Redwing
- Rook
- Sparrow hawk
- Wood pigeon

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

RICHARDS MOORHEAD LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 3 of 8

Suitability Description

Suitable for Information

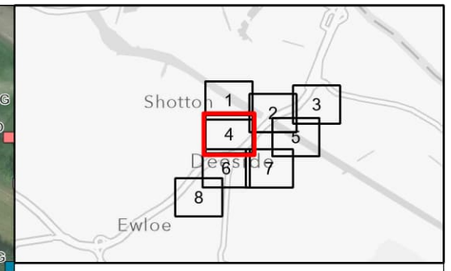
Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:3,000	S2	02	STD

395318-MMD-ZZ-XX-DR-Y-0202

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





Behaviour
- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species
- Blackcap
- Buzzard
- Common sandpiper
- Little egret
- Goldfinch
- Greater spotted woodpecker
- Herring gull
- Kestrel
- Magpie
- Redwing
- Stock dove
- Starling
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 4 of 8

Suitability Description

Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:3,000	S2	02	STD

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m

395318-MMD-ZZ-XX-DR-Y-0203



Behaviour

- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species

- Blackbird
- Black headed gull
- Blue tit
- Buzzard
- Carrion crow
- Chaffinch
- Greater blacked backed gull
- Goosander
- Greywagtail
- Goldfinch
- Great tit
- Grey heron
- Herring gull
- Kestrel
- Lapwing
- Lesser black backed gull
- Little grebe
- Mallard
- Meadow pipit
- Pink footed goose
- Robin
- Redshank
- Stonechat
- Starling
- Sparrow hawk
- Teal
- Wood pigeon

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS MOORHEAD LAING LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 5 of 8

Suitability Description

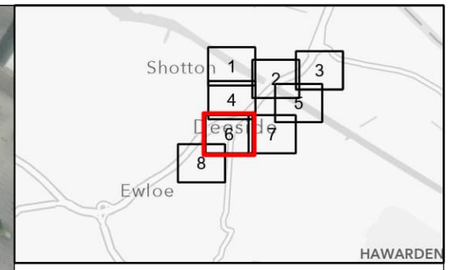
Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	**F Lumb**	**K Doneo**	**J Roberts**
Scale at A3	Suit. Code	Revision	Security
1:3,000	**S2**	**02**	**STD**

395318-MMD-ZZ-XX-DR-Y-0204

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m



Behaviour
- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species
- Bullfinch
- Dunnock
- Goldcrest
- Great tit
- Herring gull
- Jay
- Long tailed tit
- Rook
- Starling
- Wood pigeon

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 6 of 8

Suitability Description

Suitable for Information

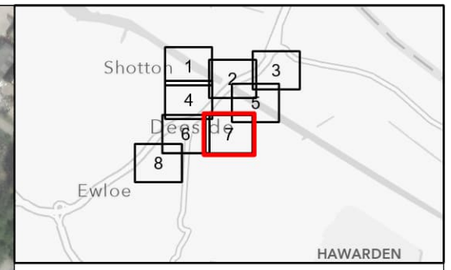
Drawn	GIS Checked	Checked	Approved
M Hargest	**F Lumb**	**K Doneo**	**J Roberts**
Scale at A3	Suit. Code	Revision	Security
1:3,000	**S2**	**02**	**STD**

395318-MMD-ZZ-XX-DR-Y-0205

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





Behaviour

- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species

- Black headed gull
- Goldcrest
- Herring gull
- House sparrow
- Moorhen
- Pied wagtail
- Starling
- Snipe

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD

Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

RICHARDS MACKINNON LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 7 of 8

Suitability Description

Suitable for Information

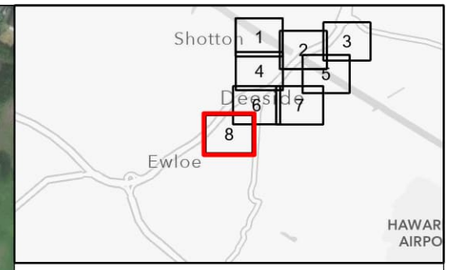
Drawn	GIS Checked	Checked	Approved
M Hargest	**F Lumb**	**K Doneo**	**J Roberts**
Scale at A3	Suit. Code	Revision	Security
1:3,000	**S2**	**02**	**STD**

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m

395318-MMD-ZZ-XX-DR-Y-0206





Behaviour
- Calling
- Commuting
- Flying
- Perched
- Singing
- Loafing
- Foraging
- Roosting

Species
- Canada goose
- Greylag goose

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Distribution
Sheet 8 of 8

Suitability Description

Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	**F Lumb**	**K Doneo**	**J Roberts**
Scale at A3	Suit. Code	Revision	Security
1:3,000	**S2**	**02**	**STD**

395318-MMD-ZZ-XX-DR-Y-0207

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m



Number of species within a hexagon

- 1 - 20
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100
- 101 - 120
- 121 - 140
- 141 - 160
- > 160

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, FAO, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Abundance

Suitability Description

Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:10,000	S2	02	STD

395318-MMD-ZZ-XX-DR-Y-0208

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 800 m





Number of unique species within a hexagon

- 1 - 2
- 3 - 4
- 5 - 6
- 7 - 8
- > 10

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Esri UK, Esri, HERE, Garmin, Foursquare, FAO, METI/NASA, USGS

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Yn gweithio ar ran Llywodraeth Cymru
Working on behalf of the Welsh Government

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Overwintering Bird Survey
Bird Species Richness

Suitability Description

Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:10,000	S2	02	STD

395318-MMD-ZZ-XX-DR-Y-0209

© Mott MacDonald 2023
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 200 400 600 800 m

C. BTO report

BTO DATA REPORT

A494

Compiled on 04 August 2023



SUMMARY

Background The BTO Data Report collates and analyses comprehensive (2007–2011) and contemporary (2019-2023) bird data relating to the grid squares spanned by the site: eight 1-km squares, four tetrads and one 10-km square. For contextual analyses, data from these relevant squares are related to equivalent data from one vice-county, one county, one region, one country and the UK to assess species' importance in the vicinity of the site to help inform delivery of habitat mitigation, enhancement and biodiversity net gain.

Data used Coverage of relevant squares spanned by the site from 2007–2011 is complete at the 10-km resolution and there is good coverage of the site by timed visits and very good coverage from casual recording in the breeding season (good and very good respectively in winter). Contemporary information for the period 2019-2023 is available from BirdTrack for 75% of tetrads (100% of 10-km squares) in the breeding season and from one BBS square.

Results During 2007–2011, 79 species with breeding evidence and 89 species in winter were recorded in the vicinity of the site at various spatial scales. Breeding season figures include four Schedule 1 species, one Annex 1 species and 17 BoCC Red list species.

During the breeding seasons of 2019-2023, 121 species were recorded in the vicinity of the site at various spatial scales. These included 15 Schedule 1 species, 11 Annex 1 species and 24 BoCC Red list species.

In a regional context, the site's 10-km squares accounted for up to 20% of regional population size. Fifty-two species were notable in at least one region or season. In a county context, the site's 10-km squares accounted for up to 27% of county population size. Forty-seven species were notable in at least one county or season. In a vice-county context, the site's 10-km squares accounted for up to 100% of vice-county population size. Thirty-three species were notable in at least one vice-county or season. Full details of notable species and those showing more positive population trends in the vicinity of the site compared to the wider context are given in the Report.

1. INTRODUCTION

The purpose of the BTO Data Report is to provide information on bird species associated with potential development sites at a range of spatial scales to inform desk studies for ecological impact assessments. The Report uses BTO's long-term ornithological datasets, providing high quality comprehensive and contemporary information. BTO is grateful to the volunteers who collected all the data, and to the funders and scheme partners, who are listed in Section 3 under the relevant data sources.

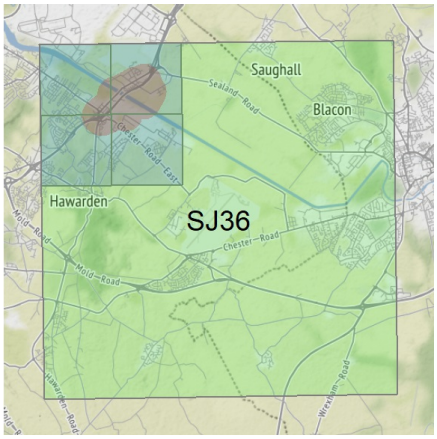
The species list in this report can guide the need for detailed field surveys in conjunction with Bird Survey Guidelines advice. This Report highlights the legal and conservation status assigned to each species in the relevant country. Beyond simple species lists, BTO data are uniquely able to provide context to help quantify the importance of a site and its surroundings in conservation terms. This includes assessments of the percentage of county, regional and national geographic range and population size associated with the site, plus recent population changes, offering the potential to highlight priorities for delivering habitat mitigation, enhancement and biodiversity net gain.

All maps reproduced in this report use map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under ODbL.

2. SITE, SQUARES, REGIONS AND FEATURES

2.1 Relevant grid squares

Systematic bird recording in Britain and Ireland typically involves the collection of records for 1-km, 2-km ('tetrad') or 10-km squares, or using the boundaries of user-defined sites, nature reserves and other 'popular places'. Rarely can records be definitively attributed within the boundary of proposed development sites, especially small ones.



Unless otherwise stated, all species detailed in the BTO Data Report concern species present in grid squares *intersected* by the site boundary, rather than species that are definitively *within* the site boundary. Grid squares with at least 1ha overlapping the site are referred to as 'relevant' squares.

For example 'relevant tetrads' are all 2-km squares with at least 1ha overlapping the site. Data are summarised at the finest spatial scale possible, subject to the size of the site and the availability and spatial precision of BTO datasets in the vicinity of the site.

The number of relevant 1-km squares, tetrads and 10-km squares for the site are listed below. The map above shows the site in relation to relevant tetrads and relevant 10-km squares (for an equivalent map for 1-km squares, and for full lists of relevant 1-km squares, tetrads and 10-km squares, see Appendix 1).

- eight relevant 1-km squares
- four relevant tetrads
- one relevant 10-km squares

For reasons of confidentiality the precise locations of certain rare breeding and wintering birds (typically those reported on by the Rare Breeding Birds Panel) cannot be revealed precisely in BTO Data Reports. For these species we follow the treatment introduced by *Bird Atlas 2007–11* where records were summarised for 20-km and 50-km squares. If any such rare breeding species have been recorded in the same 20-km or 50-km squares as the site, lists and maps of relevant 20-km and/or 50-km squares are included in Appendix 1.

All results in the BTO Data Report, especially those for larger grid resolutions, should be interpreted with respect to the habitats present on the site as some species listed may not occur within the site boundary.

2.2 Relevant county, regional and national contexts

The BTO Data Report contains contextual 'site importance' analyses that aim to highlight species for which the site and its relevant grid squares are important in local, regional, national and UK contexts. For example, does the site and its surroundings support a regionally significant population of a protected species?

National context concerns the site relative to the country it falls within. In addition to the UK (here combined with the Isle of Man and Channel Islands), the site also falls within one country: *Wales*.

Regional context concerns the site relative to the regions it falls within. For sites in Wales, regions are based on NUTS (Nomenclature of territorial units for statistics) level 2 regions. The following regions are relevant for this site: *East Wales*.

County context concerns the site relative to counties. The following counties are relevant for this site: *Clwyd*.

Vice-county context concerns the site relative to vice-counties. For sites in Great Britain, the Report uses Watsonian Vice-counties. The following vice-counties are relevant for this site: *Flintshire*.

Maps of all these areas can be found in Appendix 1. The grid squares associated with each of these area are used to determine overall range size and abundance at county, regional and national scales with which range size and abundance for the site's relevant grid squares can be calculated. Note that some individual grid squares may be associated with more than one geographical area. For more information see Section 5.

2.3 Relevant features

The BTO Data Report summarises species occurrence and abundance for species of conservation and statutory importance. In addition to the lists of species important across the UK, certain lists are of relevance in the UK's devolved administrations. The table below lists all species lists relevant for UK, Isle of Man and Channel Islands and Wales. Section 4 summarises the number of species recorded at or around the site for each of these feature lists.

Feature	Description
Schedule 1 UK	Species listed on Schedule 1 of the Wildlife and Countryside Act 1981
BoCC Red	Species on the Red list according to Birds of Conservation Concern 5 (Stanbury et al. 2021)
BoCC Amber	Species on the Amber list, according to Birds of Conservation Concern 5 (Stanbury et al. 2021)
Annex 1	Species on Annex 1 of the EU Birds Directive
IUCN2 Critically Endangered	Species listed as Critically endangered in Great Britain (Stanbury et al. 2021)
IUCN2 Endangered	Species listed as Endangered in Great Britain (Stanbury et al. 2021)
IUCN2 Near Threatened	Species listed as Near Threatened in Great Britain (Stanbury et al. 2021)
IUCN2 Vulnerable	Species listed as Vulnerable in Great Britain (Stanbury et al. 2021)
RBBP	Rare and scarce species considered by the Rare Breeding Birds Panel
Schedule ZA1 England & Wales	Species listed on Schedule ZA1 of the Wildlife and Countryside Act (England & Wales only)
Section 7 Wales	Species listed on Section 7 of the Environment (Wales) Act

3. DATA SOURCES AND COVERAGE

The BTO Data Report uses comprehensive atlas distribution data from 2007–11 to give a baseline of high-quality

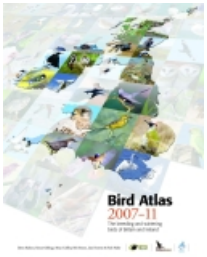
information about species status at and around the site and in the wider context. This is supplemented by the latest records from current schemes, including BirdTrack and BBS. The report considers **269 species** that regularly occur in Britain and Ireland. These include **221 breeding species** and **226 wintering species**. The report includes BOU Category C established non-native species but excludes exotic non-native species (i.e. those without self-sustaining populations). Breeding species are defined as those that were recorded with confirmed breeding evidence in at least one 10-km square in Britain or Ireland in *Bird Atlas 2007–11*. Wintering species are defined as those recorded in at least fifty 10-km squares in *Bird Atlas 2007–11*, plus six rare residents that the 50-square rule excluded (e.g. Cirl Bunting). Species on statutory and conservation status lists, such as Schedule 1, Birds of Conservation Concern 5, or Section 7 (Wales) are highlighted. Some lists consider subspecies or populations (e.g. Greenland White-fronted Goose, Hebridean Song Thrush) for which BTO data are not ideally suited. We therefore include the parent species in these analyses to ensure appropriate warnings are raised and dedicated surveys may be required.

Systematic bird recording often involves the assignment of 'breeding evidence' to records. Breeding evidence is hierarchical, having three levels: possible breeding, probable breeding and confirmed breeding. These are directly inferred from field observations and indicate the certainty that can be ascribed to the record that breeding is taking place at a location. For example, a bird singing in suitable territory is assigned possible breeding evidence, a bird carrying nesting material is assigned probable breeding evidence, whereas recently fledged young amounts to confirmed breeding evidence. Lack of breeding evidence (i.e. simple presence) can reflect either that the observer did not witness appropriate behaviours indicative of breeding, or that submission of breeding evidence was not mandatory for that particular data source.

Lack of breeding evidence in the data should not be assumed to indicate lack of breeding.

See below for details about each dataset and an assessment of the quantity of data relating to the site and its relevant grid squares.

3.1 Comprehensive species assessment 2007–2011

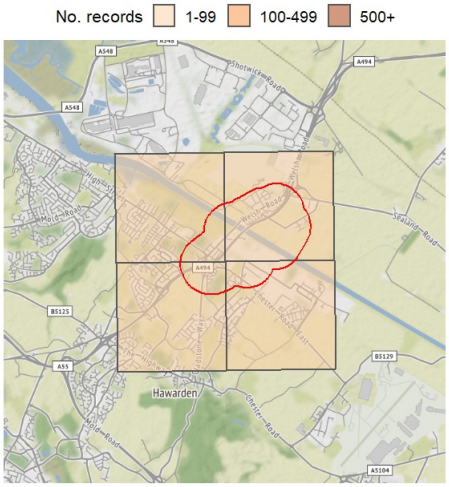


Bird Atlas 2007–11 (BTO, BirdWatch Ireland and the Scottish Ornithologists' Club) provides data at two resolutions: complete 10-km distribution datasets and sample 2-km distribution and relative abundance datasets. Although the Bird Atlas data are now 12 years old, they still provide the most recent and comprehensive assessment of bird distributions available. **All one relevant 10-km square** that the site spans will have been surveyed in winter and the breeding season to provide 10-km resolution distribution information. Unstructured data (i.e. casual records) at tetrad resolution were provided for **four relevant tetrads** in the breeding season and for **four relevant tetrads** in winter. The total numbers of records submitted across this set of tetrads in the breeding season and winter were **91 records** and **122 records** respectively.

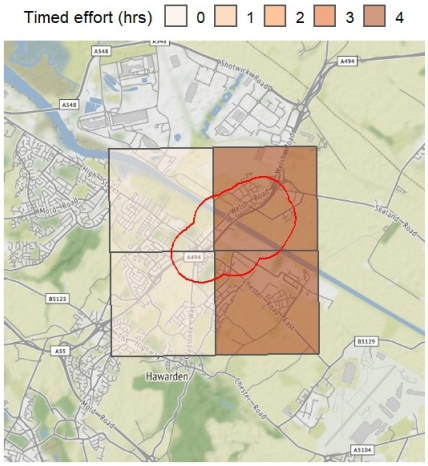
Additionally, at least 32% of tetrads in each 10-km square received timed visits, amounting to structured data for 50089 tetrads across Britain and Ireland. Of the four relevant tetrads that the site spans, **two** (50%) received Timed Tetrad Visits in the breeding season (8 hours of recording effort). Similarly, **two tetrads** (50%) were visited in winter (6 hours).

Data quality control: All records have been manually verified prior to use.

Distribution of casual records (breeding)



Distribution of timed effort (breeding)



3.2 Contemporary species assessment 2019-2023

The current species assessment is based on the following data sources.

3.2.1 Breeding Bird Survey

The UK *Breeding Bird Survey* (BBS hereafter; BTO, JNCC, RSPB) is an annual survey of over 4000 randomly selected 1-km squares across the UK. Each square is surveyed twice per breeding season, providing up to date records of bird occurrence in this c.3% sample of the UK. The BBS does not require observers to provide breeding evidence information. Consequently, all records relate to presence information; *it should not be assumed that lack of breeding evidence means species were not breeding at or near the site*. This Report queries data from the 4900 1-km squares surveyed for the BBS during 2017–2020. Only **one** of the relevant 1-km squares was also a BBS square (SJ3368). That square was surveyed for three years, most recently in **2019**.

Data quality control: All records have been manually verified prior to use.

3.2.2 BirdTrack

BirdTrack (BTO, RSPB, BirdWatch Ireland, Scottish Ornithologists' Club and Welsh Ornithological Society) provides information on recent sightings of birds throughout Britain and Ireland. Unlike *Bird Atlas*, which has a structured component ensuring complete coverage of 10-km squares, *BirdTrack* is unstructured and coverage is strongly associated with the distribution and birdwatching preferences of observers. The consequent variation in recording effort means that for some areas there be less information to generate a report. A further difference from *Bird Atlas* is that observers are not required to provide breeding evidence information. Consequently, some searches may yield only presence information; it should not be assumed that lack of breeding evidence means species were not breeding at or near the site. Observers are free to birdwatch where they choose, and can provide records with varying levels of spatial precision, from pin-pointed records, to large polygons that may span multiple grid squares. The assessment includes data for the breeding season (March–July inclusive) and non-breeding season (August–February inclusive) for the last five years and is summarised with respect to the relevant grid squares, summarising records to the finest spatial precision that the records permit.

BirdTrack data were available for **75%** of the site's relevant tetrads in the breeding season (100% of 10-km squares), including data from **2023**. Data were available for **100%** of the site's relevant tetrads in winter (100% of 10-km squares), including data from **2023**.

Data quality control: Observers are warned of 'threshold breaking' records at the point of data entry (unusual place or date for a species; unusually high count) and given the opportunity to correct mistakes. Further manual verification occurs but as BirdTrack data are 'live', the verification status of individual records varies. Rejected records and any in an active state of query are excluded from the Report.

4. SPECIES LISTS

4.1 Species assessment 2007–2011

This section summarises comprehensive *Bird Atlas 2007–11* distribution data for the four relevant tetrads and one relevant 10-km square the site spans. It also considers data from the one relevant 20-km square and one relevant 50-km square for any confidential RBBP species records.

4.1.1 Breeding season

Bird Atlas 2007–11 indicate **79 species** with breeding evidence in the vicinity of the site at a range of spatial resolutions (Table 1). At the highest level of spatial resolution achievable with Bird Atlas data, 56 species were recorded with breeding evidence in the site's relevant tetrads. No confidential species were recorded with breeding evidence in any of the site's relevant 20-km or 50-km squares. See Appendix 3 for the full list of species with breeding evidence recorded in the vicinity of the site.

Table 1. Numbers of species in the breeding season recorded during 2007–11 at different spatial resolutions relative to the site. Rows give figures for all species, and according to various lists of important features. Columns indicate status in relevant grid squares of different sizes.

Species category	2-km	10-km	20-km	50-km
All species	56	23	0	0
Annex 1	0	1	0	0
BoCC Amber	17	7	0	0
BoCC Red	14	3	0	0
IUCN2 Critically Endangered	0	0	0	0
IUCN2 Endangered	5	2	0	0
IUCN2 Near Threatened	6	5	0	0
IUCN2 Vulnerable	9	3	0	0
RBBP	0	4	0	0
Schedule 1 UK	0	4	0	0
Schedule ZA1 England & Wales	0	0	0	0
Section 7 Wales	14	4	0	0

4.1.2 Winter

Bird Atlas 2007–11 indicates **89 species** were recorded in the vicinity of the site in winter at a range of spatial resolutions (Table 2). At the highest level of spatial resolution achievable with Bird Atlas data, 66 species were recorded in winter in the site's relevant tetrads. No confidential species were recorded in winter in any of the site's relevant 20-km or 50-km squares. See Appendix 3 for the full list of species recorded in the vicinity of the site.

Table 2. Numbers of species in winter during 2007–11 at different spatial resolutions relative to the site. Rows give figures for all species, and according to various lists of important features. Columns indicate status in relevant grid squares of different sizes.

Species category	2-km	10-km	20-km	50-km
All species	66	23	0	0
Annex 1	3	2	0	0
BoCC Amber	22	5	0	0
BoCC Red	13	5	0	0
IUCN2 Critically Endangered	2	1	0	0
IUCN2 Endangered	6	1	0	0
IUCN2 Near Threatened	6	2	0	0
IUCN2 Vulnerable	13	5	0	0
RBBP	6	4	0	0
Schedule 1 UK	5	4	0	0
Schedule ZA1 England & Wales	0	0	0	0
Section 7 Wales	15	4	0	0

4.2 Species assessment 2019-2023

4.2.1 Breeding season

The assessment of current species associated with the site in the breeding season is based on BBS and BirdTrack. This information summarises species with and without breeding evidence as (unlike Bird Atlas data) these data sources do not require evidence to be submitted. These sources indicate **121 species** recorded in the vicinity of the site in the breeding season at a range of spatial resolutions (Table 3). At the highest level of spatial resolution achievable with these data, 40 species were recorded in the same 1-km square(s) as the site. Some BirdTrack sites spanned 10-km square boundaries; any species associated with these BirdTrack sites and not present at a finer resolution are summarised in the '>10-km' column. Particular care should be taken with such records as the species could have been recorded some distance from the site. See Appendix 4 for the full list of species recorded in the vicinity of the site during 2019-2023.

Table 3. Numbers of species in the breeding season during 2019-2023 at different spatial resolutions relative to the site. Rows give figures for all species, and according to various lists of important features. Columns indicate status in relevant grid squares of different sizes.

Species category	1-km	2-km	10-km	>10-km
All species	40	29	28	24
Annex 1	0	2	3	6
BoCC Amber	10	14	11	9
BoCC Red	8	4	5	7
IUCN2 Critically Endangered	0	0	3	0
IUCN2 Endangered	3	2	4	2
IUCN2 Near Threatened	3	6	2	5
IUCN2 Vulnerable	5	6	5	5
RBBP	0	3	7	6
Schedule 1 UK	0	2	7	6
Schedule ZA1 England & Wales	0	0	0	0
Section 7 Wales	9	4	4	7

4.2.2 Non-breeding season

The assessment of current species associated with the site is based on BirdTrack and indicate **114 species** recorded in the vicinity of the site in the non-breeding season at a range of spatial resolutions (Table 4). Some BirdTrack sites spanned 10-km square boundaries; any species associated with these BirdTrack sites and not present at a finer resolution are summarised in the '>10-km' column. Particular care should be taken with such records as the species could have been recorded some distance from the site. See Appendix 4 for the full list of species recorded in the vicinity of the site during 2019-2023.

Table 4. Numbers of species in the non-breeding season during 2019-2023 at different spatial resolutions relative to the site. Rows give figures for all species, and according to various lists of important features. Columns indicate status in relevant grid squares of different sizes.

Species category	1-km	2-km	10-km	>10-km
All species	0	76	17	21
Annex 1	0	5	2	5
BoCC Amber	0	32	4	6
BoCC Red	0	12	4	5
IUCN2 Critically Endangered	0	5	0	1
IUCN2 Endangered	0	6	2	2
IUCN2 Near Threatened	0	6	2	1
IUCN2 Vulnerable	0	15	3	4
RBBP	0	12	2	9
Schedule 1 UK	0	7	2	9
Schedule ZA1 England & Wales	0	0	0	0
Section 7 Wales	0	11	5	4

5. SITE IMPORTANCE

A site may be important if it supports a high proportion of a species' local, regional or national population, or if its population trends are more positive at the site compared to elsewhere. Whilst data are not available at sufficiently fine scales to assess the site itself (see Section 2), here we used *Bird Atlas 2007–11* distribution and relative abundance data for relevant 10-km squares to assess the area in which the site falls.

For each species we express its range and population size in the vicinity of the site relative to the total range size and population size in different geographic contexts, ranging from vice-counties and counties, through regions, to countries. This requires determining how many of the relevant 10-km squares spanned by the site are occupied (e.g. one) and how many 10-km squares in the larger region are occupied (e.g. 20); in this case the site and its vicinity account for 5% (= 1/20) of the species' range in the region. As large sites will tend to account for a higher percentage of range than small sites, such figures need to be bench-marked to allow comparability across sites. This requires knowing how many of the site's relevant 10-km squares fall in the region (e.g. one) and the total number of 10-km squares in the region (e.g. 100); in this case the site's 'percentage size' is 1% (= 1/100). We define **Notable species** as those for which the percentage range is at least twice the site's percentage size. In the above examples the percentage range (5%) is more than double the site's percentage size (1%) so the species would be highlighted as Notable. The exception to this rule is at the scale of United Kingdom where we mark species as **Notable** if the site and vicinity account for 2% or more of the species' UK range.

Distribution data are available for all species for the above analysis. However, distribution data ignore the fact that some species vary widely in abundance within their range. Therefore, to supplement the results above, we undertake a similar exercise using relative abundance data which can help to highlight species for which the site and its vicinity is a particular hot-spot of locally, regionally or nationally high density. *Bird Atlas 2007–11* data give a relative density measure for each terrestrial species in each 10-km square (**colonial seabirds are excluded**). These can be summarised in the same way as distribution data to estimate the percentage of the region's population size found at the site and its vicinity. Calculations of percentages and derivation of Notable species are as above.

Lastly, breeding season relative abundance data are available for two periods, 1988–91 and 2008–11, allowing for an assessment of relative abundance change for terrestrial bird species over this interval for the site and its vicinity (**colonial seabirds are excluded**). By comparing such values with corresponding change measures for the wider region we can identify species for which the site and its vicinity has had more positive population trends (i.e. increasing more than elsewhere, or declining less). This may indicate that the 10-km squares in which the site falls are an important refuge for these species in a local, regional or national context. When interpreted alongside the species lists in Section 4 and the result of any commissioned field surveys, these results can help to identify species for which the site may be particularly important. For very small sites spanning only a single 10-km square these results should be interpreted with caution.

It is important to remember that all these calculations use 10-km resolution data so relate to the site and its vicinity, not strictly to the site alone.

5.1 Country: UK, Isle of Man and Channel Islands

Overall, one of the 10-km squares that include the site fall in UK, Isle of Man and Channel Islands, accounting for 0.033% of 10-km squares in UK, Isle of Man and Channel Islands. According to *Bird Atlas* data, these squares support between 0% and 0.2% of the geographic range in UK, Isle of Man and Channel Islands of all the species considered (breeding and winter combined). In terms of abundance, these squares represent between 0% and 0.3% of the total population size in UK, Isle of Man and Channel Islands. In the context of the United Kingdom, **notable species** are defined as those for which the site's relevant 10-km squares account for at least 2% of geographic range in the UK. If any species qualify they are listed below, with those on the BoCC Red List and BoCC Amber List highlighted in corresponding colour:

- Breeding range, zero species:
- Winter range, zero species:
- Breeding abundance, zero species:
- Winter abundance, zero species:

Between 1988–91 and 2008–11, there were 39 species for which relative abundance increased more (or decreased less) at/near the site compared to the relative abundance changes apparent across the rest of UK, Isle of Man and Channel Islands. The ten species with the most positive difference in trend between site and region are listed below and all species can be seen in Figure 5.1 in Appendix 5.

- Stock Dove, Coot, Oystercatcher, Lapwing, Buzzard, Long-tailed Tit, Sedge Warbler, Song Thrush, House Sparrow, Goldfinch

There were 35 species for which the opposite was the case, i.e. that they were declining more (or increasing less) at/near the site compared to the rest of UK, Isle of Man and Channel Islands. The ten species with the most negative difference in trend between site and region were:

- Swift, Cuckoo, Moorhen, Grey Heron, Green Woodpecker, Skylark, Sand Martin, House Martin, Willow Warbler, Starling

5.2 Country: Wales

Overall, one of the 10-km squares that include the site fall in Wales, accounting for 0.36% of 10-km squares in Wales. According to *Bird Atlas* data, these squares support between 0.4% and 3.2% of the geographic range in Wales of all the species considered (breeding and winter combined). In terms of abundance, these squares represent between 0% and 18% of the total population size in Wales. **Notable species** for Wales are listed below, with those on the BoCC Red List and BoCC Amber List highlighted in corresponding colour:

- Breeding range, 15 species: Greylag Goose, Mandarin Duck, Teal, Tufted Duck, Grey Partridge, Quail, Red-legged Partridge, Oystercatcher, Common Sandpiper, Little Owl, Lesser Spotted Woodpecker, Hobby, Reed Warbler, Tree Sparrow, Yellow Wagtail
- Winter range, 13 species: Greylag Goose, Grey Partridge, Red-legged Partridge, Great Crested Grebe, Oystercatcher, Green Sandpiper, Redshank, Little Egret, Hen Harrier, Little Owl, Waxwing, Chiffchaff, Tree Sparrow
- Breeding abundance, 26 species: Greylag Goose, Mallard, Teal, Tufted Duck, Grey Partridge, Swift, Rock Dove, Stock Dove, Woodpigeon, Collared Dove, Moorhen, Coot, Lapwing, Little Owl, Kestrel, Hobby, Magpie, Rook, House Martin, Long-tailed Tit, Reed Warbler, Lesser Whitethroat, Starling, Tree Sparrow, Yellow Wagtail, Goldfinch
- Winter abundance, 22 species: Mallard, Red-legged Partridge, Rock Dove, Stock Dove, Woodpigeon, Collared Dove, Moorhen, Black-headed Gull, Lesser Black-backed Gull, Barn Owl, Kestrel, Magpie, Rook, Carrion Crow, Blackcap, Redwing, Fieldfare, Tree Sparrow, Pied/White Wagtail, Bullfinch, Goldfinch, Yellowhammer

Between 1988–91 and 2008–11, there were 43 species for which relative abundance increased more (or decreased less) at/near the site compared to the relative abundance changes apparent across the rest of Wales. The ten species with the most positive difference in trend between site and region are listed below and all species can be seen in Figure 5.2 in Appendix 5.

- Stock Dove, Coot, Oystercatcher, Lapwing, Buzzard, Long-tailed Tit, Blackcap, Song Thrush, House Sparrow, Goldfinch

There were 31 species for which the opposite was the case, i.e. that they were declining more (or increasing less) at/near the site compared to the rest of Wales. The ten species with the most negative difference in trend between site and region were:

- Shelduck, Moorhen, Grey Heron, Raven, Skylark, Sand Martin, House Martin, Willow Warbler, Mistle Thrush, Dunnock

5.3 Region: East Wales

Overall, one of the 10-km squares that include the site fall in East Wales, accounting for 0.79% of 10-km squares in East Wales. According to *Bird Atlas* data, these squares support between 0.8% and 4.2% of the geographic range in East Wales of all the species considered (breeding and winter combined). In terms of abundance, these squares represent between 0% and 20.3% of the total population size in East Wales. **Notable species** for East Wales are listed below, with those on the BoCC Red List and BoCC Amber List highlighted in corresponding colour:

- Breeding range, 13 species: Greylag Goose, Mandarin Duck, Teal, Grey Partridge, Quail, Red-legged Partridge, Oystercatcher, Common Sandpiper, Little Owl, Lesser Spotted Woodpecker, Reed Warbler, Tree Sparrow, Yellow Wagtail
- Winter range, 17 species: Greylag Goose, Wigeon, Grey Partridge, Red-legged Partridge, Great Crested Grebe, Oystercatcher, Curlew, Green Sandpiper, Redshank, Common Gull, Great Black-backed Gull, Little Egret, Hen Harrier, Little Owl, Waxwing, Chiffchaff, Tree Sparrow
- Breeding abundance, 28 species: Greylag Goose, Mallard, Teal, Tufted Duck, Grey Partridge, Swift, Rock Dove, Stock Dove, Woodpigeon, Collared Dove, Moorhen, Coot, Oystercatcher, Lapwing, Little Owl, Kestrel, Hobby, Magpie, Rook, Swallow, House Martin, Long-tailed Tit, Sedge Warbler, Reed Warbler, Lesser Whitethroat, Tree Sparrow, Yellow Wagtail, Goldfinch
- Winter abundance, 22 species: Greylag Goose, Mallard, Red-legged Partridge, Rock Dove, Stock Dove, Woodpigeon, Collared Dove, Moorhen, Black-headed Gull, Common Gull, Lesser Black-backed Gull, Barn Owl, Kestrel, Magpie, Rook, Blackcap, Redwing, Fieldfare, Tree Sparrow, Pied/White Wagtail, Linnet, Goldfinch

Between 1988–91 and 2008–11, there were 45 species for which relative abundance increased more (or decreased less) at/near the site compared to the relative abundance changes apparent across the rest of East Wales. The ten species with the most positive difference in trend between site and region are listed below and all species can be seen in Figure 5.3 in Appendix 5.

- Stock Dove, Coot, Oystercatcher, Lapwing, Buzzard, Long-tailed Tit, Blackcap, Song Thrush, House Sparrow, Goldfinch

There were 29 species for which the opposite was the case, i.e. that they were declining more (or increasing less) at/near the site compared to the rest of East Wales. The ten species with the most negative difference in trend between site and region were:

- Shelduck, Pheasant, Swift, Moorhen, Grey Heron, Raven, Skylark, House Martin, Willow Warbler, Dunnock

5.4 County: Clwyd

Overall, one of the 10-km squares that include the site fall in Clwyd, accounting for 2.1% of 10-km squares in Clwyd. According to *Bird Atlas* data, these squares support between 2.1% and 14.3% of the geographic range in Clwyd of all the species considered (breeding and winter combined). In terms of abundance, these squares represent between 0.1% and 27.1% of the total population size in Clwyd. **Notable species** for Clwyd are listed below, with those on the BoCC Red List and BoCC Amber List highlighted in corresponding colour:

- Breeding range, eight species: Mandarin Duck, Teal, Grey Partridge, Quail, Lesser Spotted Woodpecker, Hobby, Reed Warbler, Yellow Wagtail
- Winter range, eight species: Grey Partridge, Red-legged Partridge, Oystercatcher, Green Sandpiper, Redshank, Hen Harrier, Little Owl, Chiffchaff
- Breeding abundance, 22 species: Greylag Goose, Mallard, Teal, Tufted Duck, Grey Partridge, Swift, Stock Dove, Woodpigeon, Coot, Lapwing, Little Owl, Hobby, Magpie, Rook, House Martin, Long-tailed Tit, Sedge Warbler, Reed Warbler, Lesser Whitethroat, Tree Sparrow, Yellow Wagtail, Goldfinch
- Winter abundance, 24 species: Mallard, Red-legged Partridge, Rock Dove, Stock Dove, Woodpigeon, Collared Dove, Moorhen, Black-headed Gull, Lesser Black-backed Gull, Barn Owl, Kestrel, Magpie, Rook, Blackcap,

Redwing, Fieldfare, Tree Sparrow, House Sparrow, Pied/White Wagtail, Chaffinch, Bullfinch, Linnet, Goldfinch, Yellowhammer

Between 1988–91 and 2008–11, there were 43 species for which relative abundance increased more (or decreased less) at/near the site compared to the relative abundance changes apparent across the rest of Clwyd. The ten species with the most positive difference in trend between site and region are listed below and all species can be seen in Figure 5.4 in Appendix 5.

- Stock Dove, Coot, Oystercatcher, Buzzard, Long-tailed Tit, Blackcap, Goldcrest, Song Thrush, House Sparrow, Goldfinch

There were 31 species for which the opposite was the case, i.e. that they were declining more (or increasing less) at/near the site compared to the rest of Clwyd. The ten species with the most negative difference in trend between site and region were:

- Shelduck, Swift, Cuckoo, Moorhen, Grey Heron, Skylark, Sand Martin, House Martin, Willow Warbler, Dunnock

5.5 Vice-county: Flintshire

Overall, one of the 10-km squares that include the site fall in Flintshire, accounting for 6.7% of 10-km squares in Flintshire. According to *Bird Atlas* data, these squares support between 6.7% and 50% of the geographic range in Flintshire of all the species considered (breeding and winter combined). In terms of abundance, these squares represent between 0.1% and 100% of the total population size in Flintshire. **Notable species** for Flintshire are listed below, with those on the BoCC Red List and BoCC Amber List highlighted in corresponding colour:

- Breeding range, seven species: Mandarin Duck, Teal, Quail, Common Sandpiper, Lesser Spotted Woodpecker, Hobby, Yellow Wagtail
- Winter range, two species: Grey Partridge, Hen Harrier
- Breeding abundance, 17 species: Greylag Goose, Teal, Tufted Duck, Grey Partridge, Swift, Stock Dove, Woodpigeon, Lapwing, Little Owl, Hobby, Rook, House Martin, Long-tailed Tit, Reed Warbler, Lesser Whitethroat, Tree Sparrow, Yellow Wagtail
- Winter abundance, 15 species: Red-legged Partridge, Stock Dove, Woodpigeon, Moorhen, Lesser Black-backed Gull, Barn Owl, Kestrel, Rook, Blackcap, Fieldfare, Tree Sparrow, Chaffinch, Bullfinch, Goldfinch, Yellowhammer

Between 1988–91 and 2008–11, there were 51 species for which relative abundance increased more (or decreased less) at/near the site compared to the relative abundance changes apparent across the rest of Flintshire. The ten species with the most positive difference in trend between site and region are listed below and all species can be seen in Figure 5.5 in Appendix 5.

- Stock Dove, Coot, Buzzard, Long-tailed Tit, Sedge Warbler, Blackcap, Song Thrush, Meadow Pipit, Linnet, Goldfinch

There were 23 species for which the opposite was the case, i.e. that they were declining more (or increasing less) at/near the site compared to the rest of Flintshire. The ten species with the most negative difference in trend between site and region were:

- Pheasant, Cuckoo, Grey Heron, Green Woodpecker, Magpie, Raven, Sand Martin, House Martin, Willow Warbler, Starling

APPENDICES

Appendix 1. Contextual maps

Maps of the site with reference to geographical context areas at different scales, and for different sized grids used for data extraction. Note that for some of the larger context areas the site may be too small to see on the map.

Country

Country = UK, Isle of Man and Channel Islands, Wales



Region

Region = East Wales



County

County = Clwyd



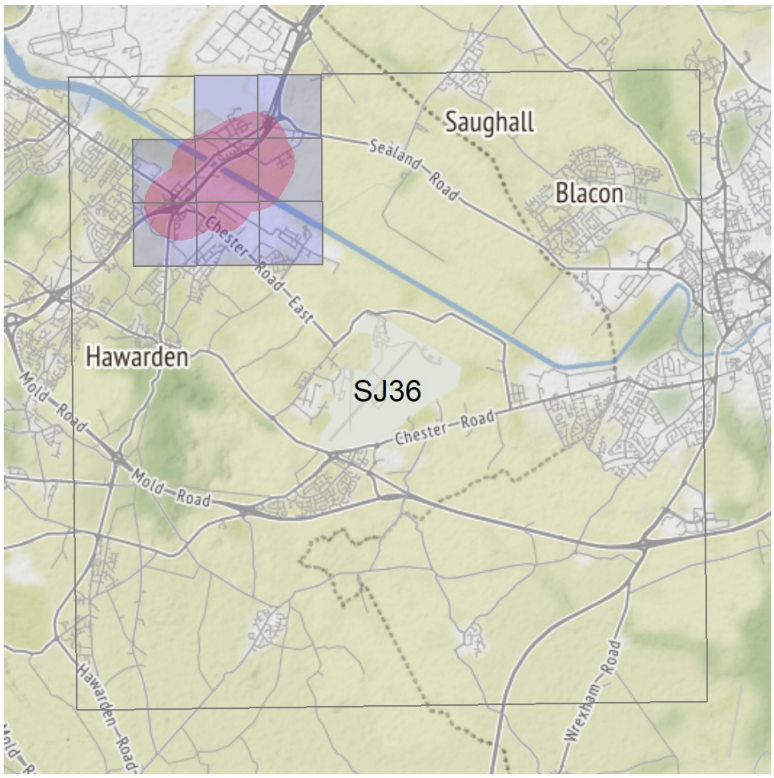
Vice-county

Vice-county = Flintshire



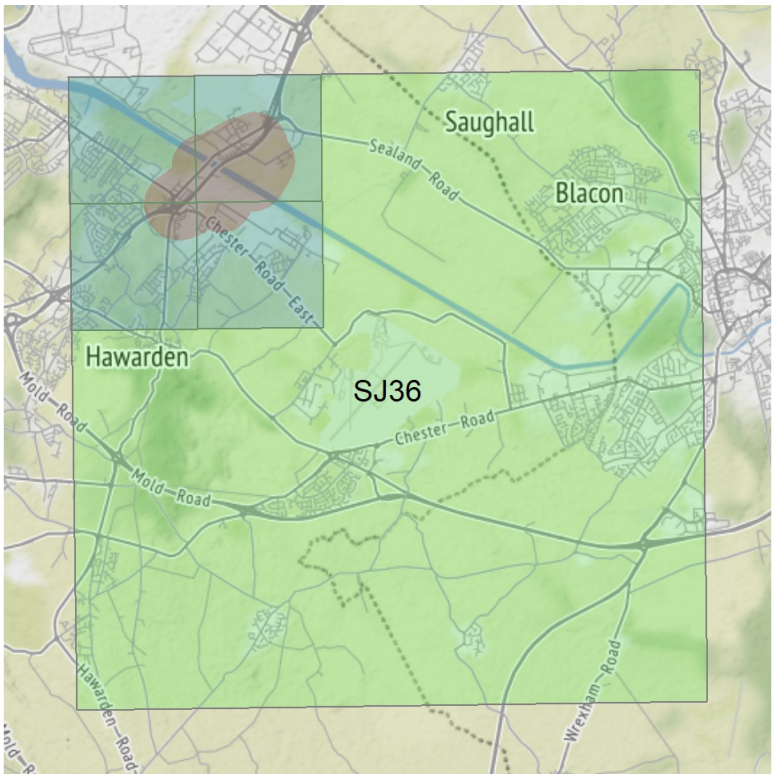
Site with 1-km squares

Eight relevant 1-km squares : SJ3167, SJ3168, SJ3267, SJ3268, SJ3269, SJ3367, SJ3368, SJ3369



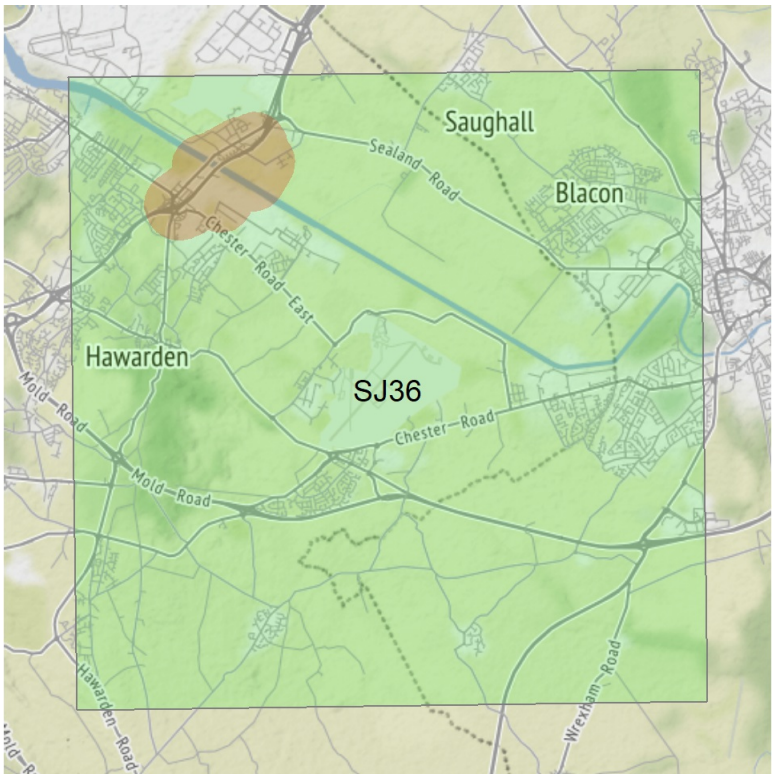
Site with tetrads

Four relevant tetrads : SJ36D, SJ36E, SJ36I, SJ36J



Site with 10-km squares

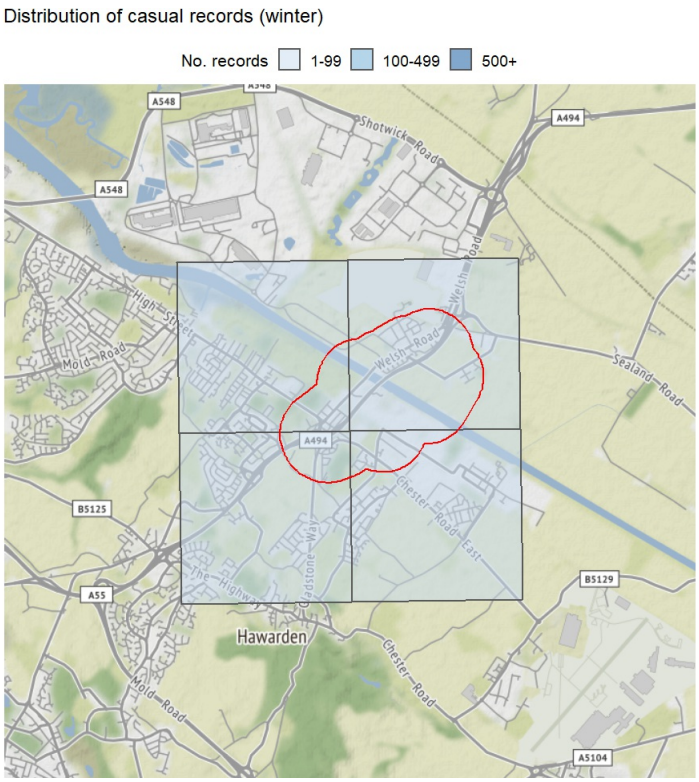
One relevant 10-km square : SJ36



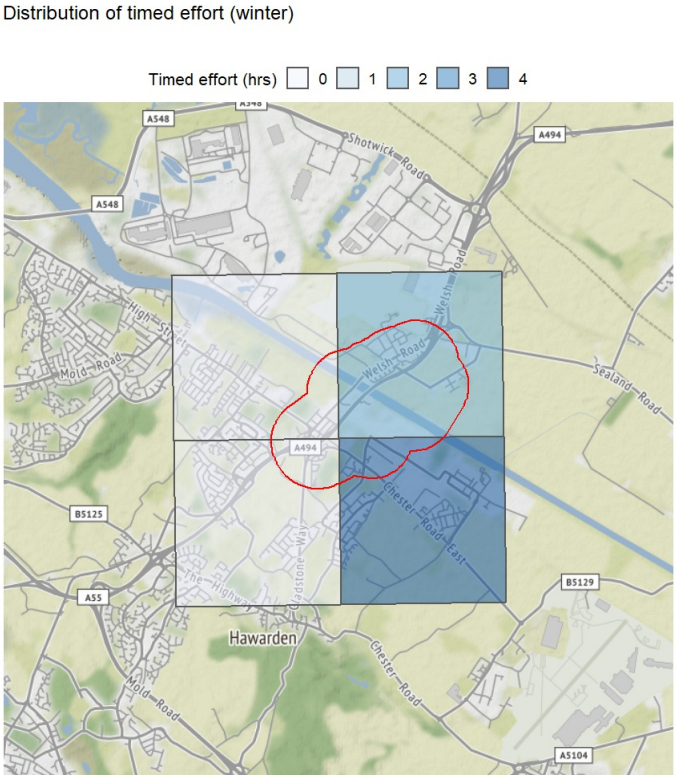
Appendix 2. Additional coverage maps

Atlas winter coverage

Map of unstructured Bird Atlas coverage in winter



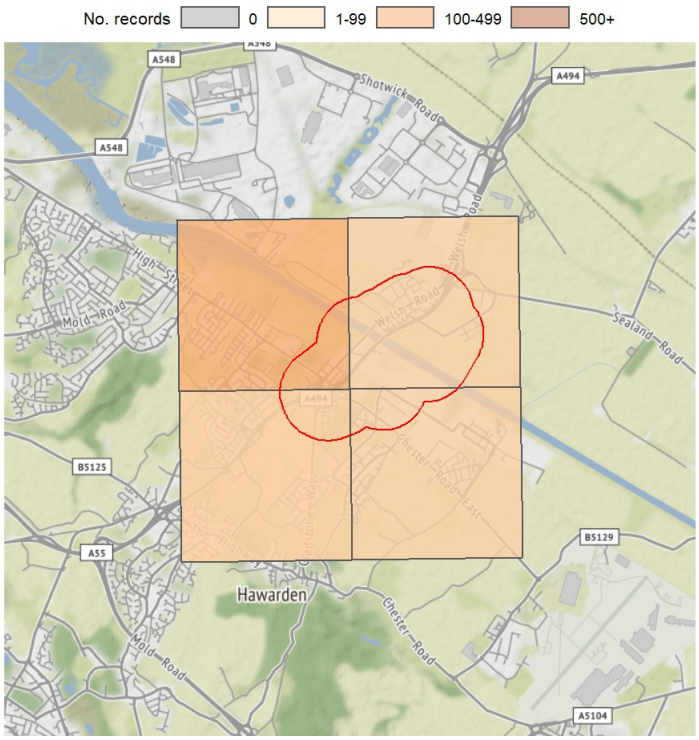
Map of structured Bird Atlas coverage in winter



BirdTrack coverage

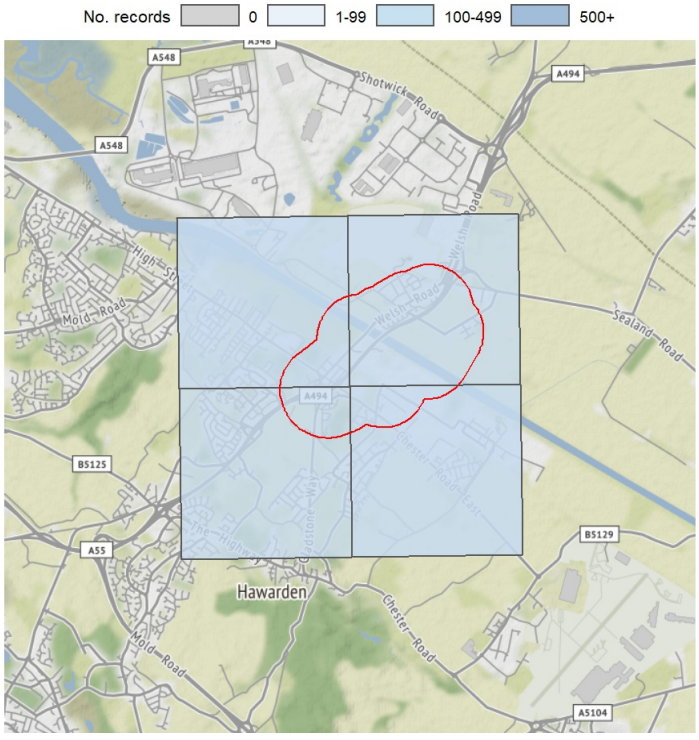
Map of BirdTrack recording effort in the breeding season. Grey shading indicates no sites centred in the tetrad, although sites from bordering tetrads may have extended into the tetrad.

Distribution of BirdTrack records (breeding)



Map of BirdTrack recording effort in the non-breeding season. Grey shading indicates no sites centred in the tetrad, although sites from bordering tetrads may have extended into the tetrad.

Distribution of BirdTrack records (non-breeding)



Appendix 3. Species list 2007–11

Feature column heading abbreviations: S1 = Schedule 1 UK; A1 = Annex 1; Amber, Red = BoCC5 Amber and Red list; CR, EN, NT, VU = GB IUCN2 Critically Endangered, Endangered, Near Threatened and Vulnerable; S41E = Section 41 England; SZA1EW = Schedule ZA1 England & Wales; S1AS = Schedule 1A Scotland; SA1S = Schedule A1 Scotland; SBL = Scottish Biodiversity List; S7W = Section 7 Wales.

Breeding season

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	Tetrad	10-km/20-km/50-km
CG	Canada Goose													Confirmed
GJ	Greylag Goose			Y										Confirmed
MS	Mute Swan													Confirmed
MN	Mandarin Duck													Probable
MA	Mallard			Y				Y					Confirmed	Confirmed
T.	Teal			Y										Probable
TU	Tufted Duck							Y						Probable
P.	Grey Partridge		Y					Y				Y	Probable	Probable
PH	Pheasant												Confirmed	Confirmed
Q.	Quail	Y		Y		Y				Y				Probable
RL	Red-legged Partridge													Possible
SI	Swift		Y			Y							Probable	Confirmed
DV	Rock Dove												Probable	Probable
SD	Stock Dove			Y									Probable	Confirmed
WP	Woodpigeon			Y									Confirmed	Confirmed
CD	Collared Dove						Y						Confirmed	Confirmed
MH	Moorhen			Y				Y						Confirmed
CO	Coot							Y						Confirmed
OC	Oystercatcher			Y				Y					Confirmed	Confirmed
L.	Lapwing		Y					Y				Y	Confirmed	Confirmed
CU	Curlew		Y			Y						Y	Probable	Probable
CS	Common Sandpiper			Y			Y							Possible
SH	Sparrowhawk			Y				Y					Probable	Confirmed
BZ	Buzzard												Probable	Confirmed
BO	Barn Owl	Y												Confirmed
LO	Little Owl													Probable
TO	Tawny Owl			Y			Y						Confirmed	Confirmed
LS	Lesser Spotted Woodpecker		Y			Y				Y		Y		Probable
GS	Great Spotted Woodpecker												Confirmed	Confirmed
K.	Kestrel			Y				Y				Y	Confirmed	Confirmed
HY	Hobby	Y					Y			Y				Possible
PE	Peregrine	Y							Y	Y				Confirmed
J.	Jay												Confirmed	Confirmed
MG	Magpie												Confirmed	Confirmed
JD	Jackdaw												Confirmed	Confirmed
RO	Rook			Y			Y						Confirmed	Confirmed
C.	Carrion Crow												Confirmed	Confirmed
RN	Raven													Confirmed
CT	Coal Tit												Confirmed	Confirmed
BT	Blue Tit												Confirmed	Confirmed

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	Tetrad	10-km/20-km/50-km
GT	Great Tit												Confirmed	Confirmed
S.	Skylark		Y									Y	Confirmed	Confirmed
SL	Swallow							Y					Confirmed	Confirmed
HM	House Martin		Y				Y						Confirmed	Confirmed
LT	Long-tailed Tit												Confirmed	Confirmed
WW	Willow Warbler			Y									Possible	Confirmed
CC	Chiffchaff												Confirmed	Confirmed
SW	Sedge Warbler			Y			Y						Confirmed	Confirmed
RW	Reed Warbler												Confirmed	Confirmed
GH	Grasshopper Warbler		Y									Y	Possible	Possible
BC	Blackcap												Probable	Confirmed
GW	Garden Warbler													Possible
LW	Lesser Whitethroat													Confirmed
WH	Whitethroat			Y									Probable	Confirmed
GC	Goldcrest												Confirmed	Confirmed
WR	Wren			Y									Confirmed	Confirmed
NH	Nuthatch												Confirmed	Confirmed
TC	Treecreeper												Probable	Probable
SG	Starling		Y					Y				Y	Confirmed	Confirmed
ST	Song Thrush			Y								Y	Probable	Confirmed
M.	Mistle Thrush		Y				Y						Confirmed	Confirmed
B.	Blackbird												Confirmed	Confirmed
SF	Spotted Flycatcher		Y				Y					Y		Confirmed
R.	Robin												Confirmed	Confirmed
W.	Wheatear			Y		Y							Possible	Possible
TS	Tree Sparrow		Y					Y				Y	Probable	Confirmed
HS	House Sparrow		Y									Y	Confirmed	Confirmed
D.	Dunnock			Y								Y	Confirmed	Confirmed
YW	Yellow Wagtail		Y				Y					Y		Confirmed
GL	Grey Wagtail			Y			Y							Confirmed
PW	Pied Wagtail												Confirmed	Confirmed
MP	Meadow Pipit			Y									Probable	Probable
CH	Chaffinch					Y							Confirmed	Confirmed
BF	Bullfinch			Y								Y	Confirmed	Confirmed
GR	Greenfinch		Y			Y							Confirmed	Confirmed
LI	Linnet		Y									Y	Probable	Confirmed
GO	Goldfinch												Confirmed	Confirmed
Y.	Yellowhammer		Y									Y	Probable	Confirmed
RB	Reed Bunting			Y								Y		Confirmed

Winter

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	Tetrad	10-km/20-km/50-km
CG	Canada Goose													Present
GJ	Greylag Goose			Y										Present
MS	Mute Swan													Present
WN	Wigeon			Y				Y		Y			Present	Present
MA	Mallard			Y				Y					Present	Present
T.	Teal			Y										Present
TU	Tufted Duck							Y						Present
GD	Goosander												Present	Present
P.	Grey Partridge		Y					Y				Y		Present
PH	Pheasant												Present	Present
RL	Red-legged Partridge													Present
DV	Rock Dove												Present	Present
SD	Stock Dove			Y									Present	Present
WP	Woodpigeon			Y									Present	Present
CD	Collared Dove						Y						Present	Present
MH	Moorhen			Y				Y					Present	Present
CO	Coot							Y						Present
LG	Little Grebe													Present
GG	Great Crested Grebe												Present	Present
OC	Oystercatcher			Y				Y					Present	Present
L.	Lapwing		Y					Y				Y	Present	Present
CU	Curlew		Y			Y						Y	Present	Present
WK	Woodcock		Y					Y						Present
SN	Snipe			Y				Y						Present
GE	Green Sandpiper	Y		Y	Y					Y				Present
RK	Redshank			Y				Y					Present	Present
BH	Black-headed Gull			Y				Y				Y	Present	Present
CM	Common Gull			Y									Present	Present
GB	Great Black-backed Gull			Y		Y							Present	Present
HG	Herring Gull		Y			Y						Y	Present	Present
LB	Lesser Black-backed Gull			Y									Present	Present
CA	Cormorant						Y						Present	Present
H.	Grey Heron							Y					Present	Present
ET	Little Egret								Y	Y			Present	Present
SH	Sparrowhawk			Y				Y					Present	Present
HH	Hen Harrier	Y	Y			Y			Y	Y		Y	Present	Present
BZ	Buzzard												Present	Present
BO	Barn Owl	Y												Present
LO	Little Owl													Present
TO	Tawny Owl			Y			Y						Present	Present
KF	Kingfisher	Y						Y	Y				Present	Present
GS	Great Spotted Woodpecker												Present	Present
G.	Green Woodpecker						Y							Present
K.	Kestrel			Y				Y				Y	Present	Present
ML	Merlin	Y	Y			Y			Y	Y				Present
PE	Peregrine	Y							Y	Y				Present
J.	Jay												Present	Present

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	Tetrad	10-km/20-km/50-km
MG	Magpie												Present	Present
JD	Jackdaw												Present	Present
RO	Rook			Y			Y						Present	Present
C.	Carrion Crow												Present	Present
RN	Raven												Present	Present
WX	Waxwing									Y				Present
CT	Coal Tit												Present	Present
MT	Marsh Tit		Y				Y					Y		Present
BT	Blue Tit												Present	Present
GT	Great Tit												Present	Present
S.	Skylark		Y									Y	Present	Present
LT	Long-tailed Tit												Present	Present
CC	Chiffchaff													Present
BC	Blackcap												Present	Present
GC	Goldcrest												Present	Present
WR	Wren			Y									Present	Present
NH	Nuthatch												Present	Present
TC	Treecreeper													Present
SG	Starling		Y					Y				Y	Present	Present
ST	Song Thrush			Y								Y	Present	Present
M.	Mistle Thrush		Y				Y						Present	Present
RE	Redwing	Y		Y	Y					Y			Present	Present
B.	Blackbird												Present	Present
FF	Fieldfare	Y	Y		Y					Y			Present	Present
R.	Robin												Present	Present
SC	Stonechat												Present	Present
TS	Tree Sparrow		Y					Y				Y	Present	Present
HS	House Sparrow		Y									Y	Present	Present
D.	Dunnock			Y								Y	Present	Present
GL	Grey Wagtail			Y			Y						Present	Present
PW	Pied Wagtail												Present	Present
MP	Meadow Pipit			Y									Present	Present
CH	Chaffinch					Y							Present	Present
BL	Brambling	Y								Y			Present	Present
BF	Bullfinch			Y								Y	Present	Present
GR	Greenfinch		Y			Y							Present	Present
LI	Linnet		Y									Y	Present	Present
LR	Lesser Redpoll		Y									Y		Present
GO	Goldfinch												Present	Present
SK	Siskin												Present	Present
Y.	Yellowhammer		Y									Y	Present	Present
RB	Reed Bunting			Y								Y		Present

Appendix 4. Species list 2019-2023

Feature column heading abbreviations: S1 = Schedule 1 UK; A1 = Annex 1; Amber, Red = BoCC5 Amber and Red list; CR, EN, NT, VU = GB IUCN2 Critically Endangered, Endangered, Near Threatened and Vulnerable; S41E = Section 41 England; SZA1EW = Schedule ZA1 England & Wales; S1AS = Schedule 1A Scotland; SA1S = Schedule A1 Scotland; SBL = Scottish Biodiversity List; S7W = Section 7 Wales.

Breeding season

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	1-km	2-km	10-km	>10-km
CG	Canada Goose												Present	Present	Present	Probable
GJ	Greylag Goose			Y										Present	Present	
PG	Pink-footed Goose			Y						Y					Present	
MS	Mute Swan													Present	Present	
SU	Shelduck			Y		Y									Present	Present
MN	Mandarin Duck														Probable	Present
SV	Shoveler			Y						Y					Present	
GA	Gadwall			Y											Present	Present
WN	Wigeon			Y				Y		Y						Present
MA	Mallard			Y				Y					Present	Present	Confirmed	Probable
T.	Teal			Y										Present	Present	
TU	Tufted Duck							Y							Probable	
CX	Common Scoter	Y	Y		Y					Y		Y			Present	Present
GD	Goosander													Present	Present	
RM	Red-breasted Merganser			Y				Y		Y				Present	Present	
PH	Pheasant												Present		Present	Probable
Q.	Quail	Y		Y		Y				Y						Present
RL	Red-legged Partridge															Present
NJ	Nightjar			Y					Y			Y				Present
SI	Swift		Y			Y								Present	Probable	
CK	Cuckoo		Y									Y		Present	Present	
DV	Rock Dove													Present	Present	
SD	Stock Dove			Y										Present	Present	Probable
WP	Woodpigeon			Y									Present	Present	Probable	Present
CD	Collared Dove						Y						Present		Probable	Confirmed
MH	Moorhen			Y				Y							Confirmed	Present
CO	Coot							Y							Confirmed	
LG	Little Grebe														Possible	
OC	Oystercatcher			Y				Y						Present	Confirmed	
AV	Avocet	Y		Y					Y	Y						Present
L.	Lapwing		Y					Y				Y	Present	Present	Confirmed	Present
GP	Golden Plover								Y			Y				Present
RP	Ringed Plover		Y					Y				Y				Present
LP	Little Ringed Plover	Y								Y						Present
WM	Whimbrel	Y	Y			Y				Y					Present	
CU	Curlew		Y			Y						Y			Present	Present
DN	Dunlin		Y					Y	Y							Present
WK	Woodcock		Y					Y								Present
SN	Snipe			Y				Y							Present	
CS	Common Sandpiper			Y			Y							Present	Present	

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	1-km	2-km	10-km	>10-km
RK	Redshank			Y				Y						Present	Present	
BH	Black-headed Gull			Y				Y				Y	Present	Present	Present	
MU	Mediterranean Gull	Y		Y					Y	Y					Present	Present
CM	Common Gull			Y										Present	Present	Present
GB	Great Black-backed Gull			Y		Y								Present	Present	
HG	Herring Gull		Y			Y						Y	Present	Present	Present	
LB	Lesser Black-backed Gull			Y									Present	Present	Present	
CN	Common Tern			Y			Y		Y						Present	Present
CA	Cormorant						Y							Present	Present	
H.	Grey Heron							Y						Present	Present	Present
ET	Little Egret								Y	Y				Present	Present	
SH	Sparrowhawk			Y				Y						Present	Present	Present
KT	Red Kite	Y							Y					Present	Present	Present
BZ	Buzzard												Present	Probable	Probable	Present
BO	Barn Owl	Y														Present
LO	Little Owl														Possible	
SE	Short-eared Owl			Y		Y			Y	Y						Present
TO	Tawny Owl			Y			Y									Present
KF	Kingfisher	Y						Y	Y						Present	
GS	Great Spotted Woodpecker												Present	Present	Present	Probable
G.	Green Woodpecker						Y								Present	
K.	Kestrel			Y				Y				Y		Present	Present	Probable
HY	Hobby	Y					Y			Y				Present	Present	Probable
PE	Peregrine	Y							Y	Y						Present
J.	Jay													Present	Present	Confirmed
MG	Magpie												Present	Present	Present	
JD	Jackdaw												Present	Present	Present	Probable
RO	Rook			Y			Y							Present	Probable	Present
C.	Carrion Crow												Present	Present	Confirmed	Probable
RN	Raven														Present	Present
CT	Coal Tit												Present	Present	Probable	Confirmed
BT	Blue Tit												Present	Present	Present	Confirmed
GT	Great Tit												Present	Present	Confirmed	Probable
S.	Skylark		Y									Y	Present	Present	Possible	Probable
SM	Sand Martin													Present	Present	
SL	Swallow							Y					Present	Present	Confirmed	Probable
HM	House Martin		Y				Y							Present	Probable	Confirmed
CW	Cetti's Warbler	Y													Present	
LT	Long-tailed Tit												Present	Present	Confirmed	Present
WO	Wood Warbler		Y					Y				Y				Present
WW	Willow Warbler			Y									Present	Present	Possible	
CC	Chiffchaff												Present	Present	Confirmed	Present
SW	Sedge Warbler			Y			Y						Present	Present	Possible	Probable
RW	Reed Warbler														Possible	Present
GH	Grasshopper Warbler		Y									Y			Possible	Present
BC	Blackcap												Present	Present	Probable	Confirmed
GW	Garden Warbler												Present			Present
LW	Lesser Whitethroat														Possible	Confirmed
WH	Whitethroat			Y									Present	Present	Possible	Confirmed
GC	Goldcrest												Present	Present	Probable	Present

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	1-km	2-km	10-km	>10-km
WR	Wren			Y									Present	Present	Probable	Confirmed
NH	Nuthatch													Present	Present	Present
TC	Treecreeper															Present
SG	Starling		Y					Y				Y	Present	Present	Confirmed	
ST	Song Thrush			Y								Y	Present	Present	Confirmed	
M.	Mistle Thrush		Y				Y						Present	Present	Confirmed	Probable
RE	Redwing	Y		Y	Y					Y					Present	Present
B.	Blackbird												Present	Present	Confirmed	
FF	Fieldfare	Y	Y		Y					Y					Present	Present
RZ	Ring Ouzel		Y				Y					Y				Present
R.	Robin												Present	Present	Confirmed	
PF	Pied Flycatcher			Y			Y					Y				Present
RT	Redstart			Y												Present
WC	Whinchat		Y				Y									Present
SC	Stonechat														Confirmed	
W.	Wheatear			Y		Y									Present	
HS	House Sparrow		Y									Y	Present	Present	Confirmed	Probable
D.	Dunnock			Y								Y	Present	Present	Possible	Confirmed
YW	Yellow Wagtail		Y				Y					Y		Present	Confirmed	
GL	Grey Wagtail			Y			Y									Present
PW	Pied Wagtail												Present	Present	Confirmed	
MP	Meadow Pipit			Y										Present	Present	
CH	Chaffinch					Y							Present	Present	Possible	Confirmed
BF	Bullfinch			Y								Y		Present	Present	
GR	Greenfinch		Y			Y							Present	Present	Probable	Probable
LI	Linnet		Y									Y	Present	Present	Present	Probable
LR	Lesser Redpoll		Y									Y				Present
CR	Common Crossbill	Y														Present
GO	Goldfinch												Present	Present	Possible	Confirmed
SK	Siskin															Present
RB	Reed Bunting			Y								Y			Possible	Present

Non-breeding season

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	1-km	2-km	10-km	>10-km
CG	Canada Goose													Present	Present	
GJ	Greylag Goose			Y										Present	Present	
PG	Pink-footed Goose			Y						Y				Present	Present	
MS	Mute Swan													Present	Present	
WS	Whooper Swan	Y		Y		Y			Y	Y						Present
SU	Shelduck			Y		Y								Present	Present	
MN	Mandarin Duck															Present
SV	Shoveler			Y						Y				Present	Present	
GA	Gadwall			Y										Present	Present	
WN	Wigeon			Y				Y		Y				Present	Present	
MA	Mallard			Y				Y						Present	Present	
PT	Pintail			Y	Y					Y				Present	Present	
T.	Teal			Y										Present	Present	
TU	Tufted Duck							Y							Present	
CX	Common Scoter	Y	Y			Y				Y		Y				Present

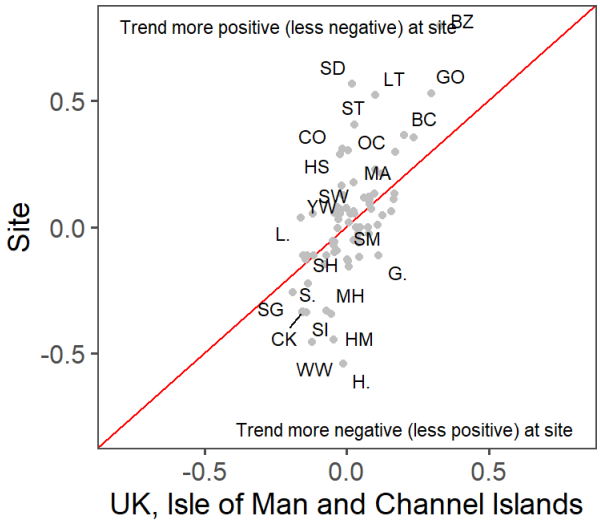
Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	1-km	2-km	10-km	>10-km
GD	Goosander													Present	Present	
PH	Pheasant													Present	Present	
RL	Red-legged Partridge															Present
DV	Rock Dove													Present	Present	
SD	Stock Dove			Y										Present	Present	
WP	Woodpigeon			Y										Present	Present	Present
CD	Collared Dove						Y							Present	Present	Present
MH	Moorhen			Y				Y							Present	
CO	Coot							Y						Present	Present	
LG	Little Grebe													Present	Present	
GG	Great Crested Grebe														Present	
OC	Oystercatcher			Y				Y						Present	Present	
L.	Lapwing		Y					Y				Y		Present	Present	
GP	Golden Plover								Y			Y			Present	
RP	Ringed Plover		Y					Y				Y				Present
CU	Curlew		Y			Y						Y			Present	
BA	Bar-tailed Godwit			Y				Y	Y	Y		Y				Present
BW	Black-tailed Godwit	Y	Y			Y				Y				Present	Present	
RU	Ruff	Y	Y		Y				Y	Y				Present	Present	
DN	Dunlin		Y					Y	Y							Present
WK	Woodcock		Y					Y						Present	Present	
JS	Jack Snipe									Y						Present
SN	Snipe			Y				Y						Present	Present	
CS	Common Sandpiper			Y			Y							Present	Present	
GE	Green Sandpiper	Y		Y	Y					Y				Present	Present	
RK	Redshank			Y				Y						Present	Present	
GK	Greenshank	Y		Y						Y						Present
BH	Black-headed Gull			Y				Y				Y		Present	Present	Present
MU	Mediterranean Gull	Y		Y					Y	Y						Present
CM	Common Gull			Y										Present	Present	
GB	Great Black-backed Gull			Y		Y									Present	Present
HG	Herring Gull		Y			Y						Y		Present	Present	
LB	Lesser Black-backed Gull			Y										Present	Present	Present
GU	Guillemot			Y										Present	Present	
GX	Gannet			Y												Present
CA	Cormorant						Y							Present	Present	
H.	Grey Heron							Y						Present	Present	Present
HW	Great White Egret			Y		Y			Y	Y				Present	Present	
ET	Little Egret								Y	Y				Present	Present	
SH	Sparrowhawk			Y				Y						Present	Present	Present
MR	Marsh Harrier	Y		Y					Y	Y				Present	Present	
BZ	Buzzard													Present	Present	
BO	Barn Owl	Y													Present	Present
LO	Little Owl															Present
TO	Tawny Owl			Y			Y								Present	Present
KF	Kingfisher	Y						Y	Y					Present	Present	
GS	Great Spotted Woodpecker													Present	Present	
G.	Green Woodpecker						Y									Present
K.	Kestrel			Y				Y				Y		Present	Present	
ML	Merlin	Y	Y			Y			Y	Y						Present

Code	Species	S1	Red	Amber	CR	EN	NT	VU	A1	RBBP	SZA1EW	S7W	1-km	2-km	10-km	>10-km
PE	Peregrine	Y							Y	Y					Present	
J.	Jay													Present	Present	
MG	Magpie													Present	Present	
JD	Jackdaw													Present	Present	Present
RO	Rook			Y			Y							Present	Present	
C.	Carrion Crow													Present	Present	
RN	Raven													Present	Present	Present
WX	Waxwing									Y					Present	
CT	Coal Tit													Present	Present	Present
BT	Blue Tit													Present	Present	
GT	Great Tit													Present	Present	
S.	Skylark		Y									Y			Present	Present
SL	Swallow							Y						Present	Present	Present
HM	House Martin		Y				Y								Present	Present
LT	Long-tailed Tit													Present	Present	
CC	Chiffchaff														Present	Present
BC	Blackcap													Present	Present	Present
LW	Lesser Whitethroat														Present	
FC	Firecrest	Y														Present
GC	Goldcrest													Present	Present	Present
WR	Wren			Y										Present	Present	
NH	Nuthatch													Present	Present	
TC	Treecreeper															Present
SG	Starling		Y					Y				Y		Present	Present	
ST	Song Thrush			Y								Y		Present	Present	Present
M.	Mistle Thrush		Y				Y							Present	Present	
RE	Redwing	Y		Y	Y					Y				Present	Present	
B.	Blackbird													Present	Present	
FF	Fieldfare	Y	Y		Y					Y				Present	Present	
R.	Robin													Present	Present	Present
BX	Black Redstart	Y		Y				Y		Y						Present
SC	Stonechat														Present	Present
TS	Tree Sparrow		Y					Y				Y			Present	
HS	House Sparrow		Y									Y		Present	Present	
D.	Dunnock			Y								Y		Present	Present	Present
GL	Grey Wagtail			Y			Y							Present	Present	
PW	Pied Wagtail													Present	Present	
MP	Meadow Pipit			Y										Present	Present	
CH	Chaffinch					Y								Present	Present	Present
BL	Brambling	Y								Y						Present
BF	Bullfinch			Y								Y		Present	Present	Present
GR	Greenfinch		Y			Y								Present	Present	Present
LI	Linnet		Y									Y		Present	Present	
LR	Lesser Redpoll		Y									Y		Present	Present	
CR	Common Crossbill	Y														Present
GO	Goldfinch													Present	Present	
SK	Siskin															Present
Y.	Yellowhammer		Y									Y				Present
RB	Reed Bunting			Y								Y			Present	

Appendix 5. Abundance change figures

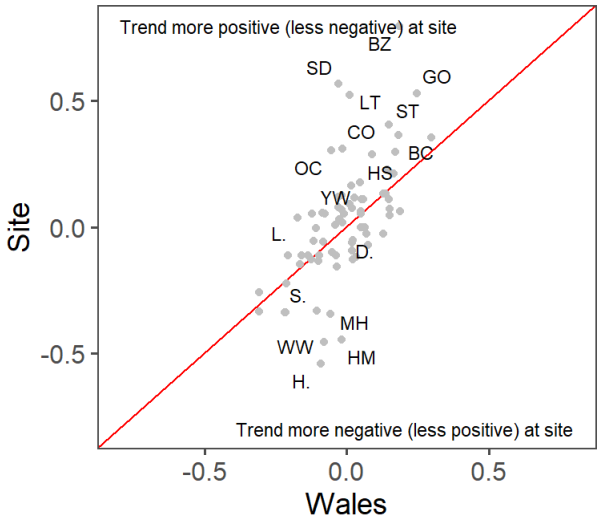
5.1 Country: UK, Isle of Man and Channel Islands

Relative abundance changes for the site and its vicinity compared to the rest of UK, Isle of Man and Channel Islands. Species above the line of equality have more positive/less negative trends at/near the site compared to the country (see Appendix 4 for species codes).



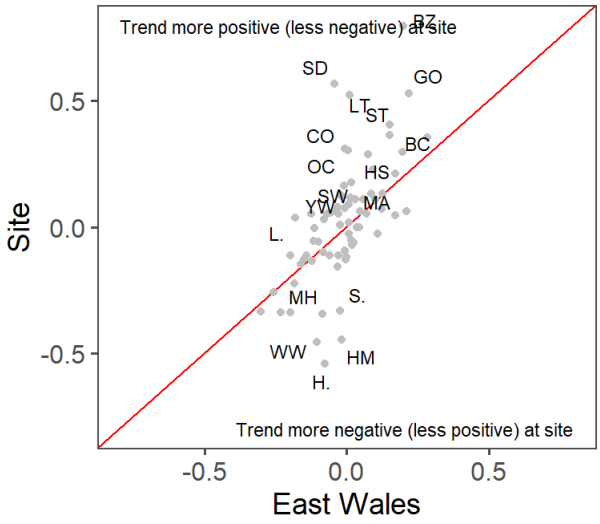
5.2 Country: Wales

Relative abundance changes for the site and its vicinity compared to the rest of Wales. Species above the line of equality have more positive/less negative trends at/near the site compared to the country (see Appendix 4 for species codes).



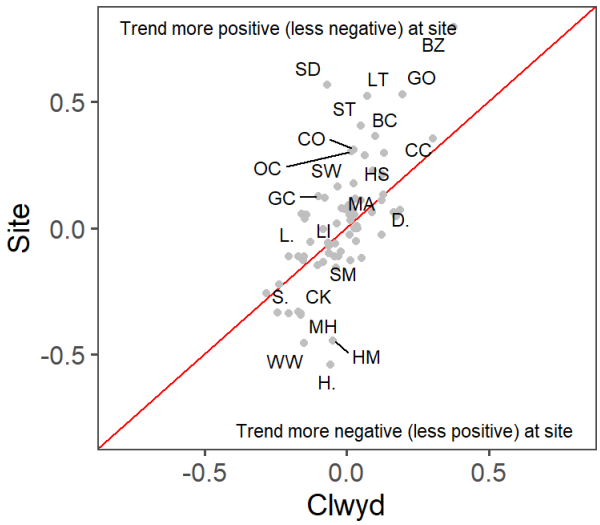
5.3 Region: East Wales

Relative abundance changes for the site and its vicinity compared to the rest of East Wales. Species above the line of equality have more positive/less negative trends at/near the site compared to the country (see Appendix 4 for species codes).



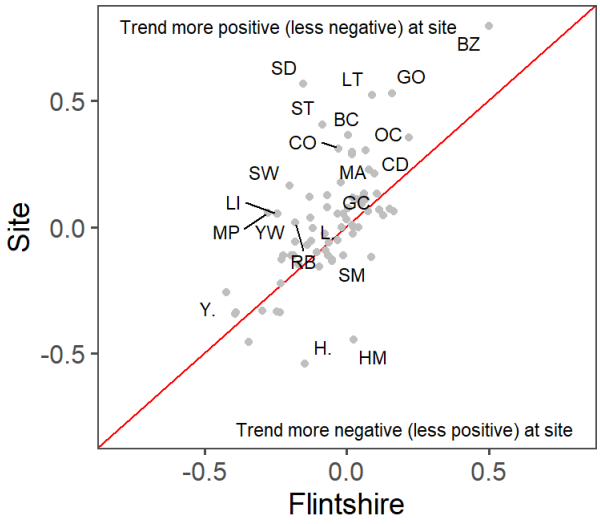
5.4 County: Clwyd

Relative abundance changes for the site and its vicinity compared to the rest of Clwyd. Species above the line of equality have more positive/less negative trends at/near the site compared to the country (see Appendix 4 for species codes).



5.5 Vice-county: Flintshire

Relative abundance changes for the site and its vicinity compared to the rest of Flintshire. Species above the line of equality have more positive/less negative trends at/near the site compared to the country (see Appendix 4 for species codes).





Images: Landscape, Simon Gillings; Barn Owl, Liz Cutting

BTO Data Report

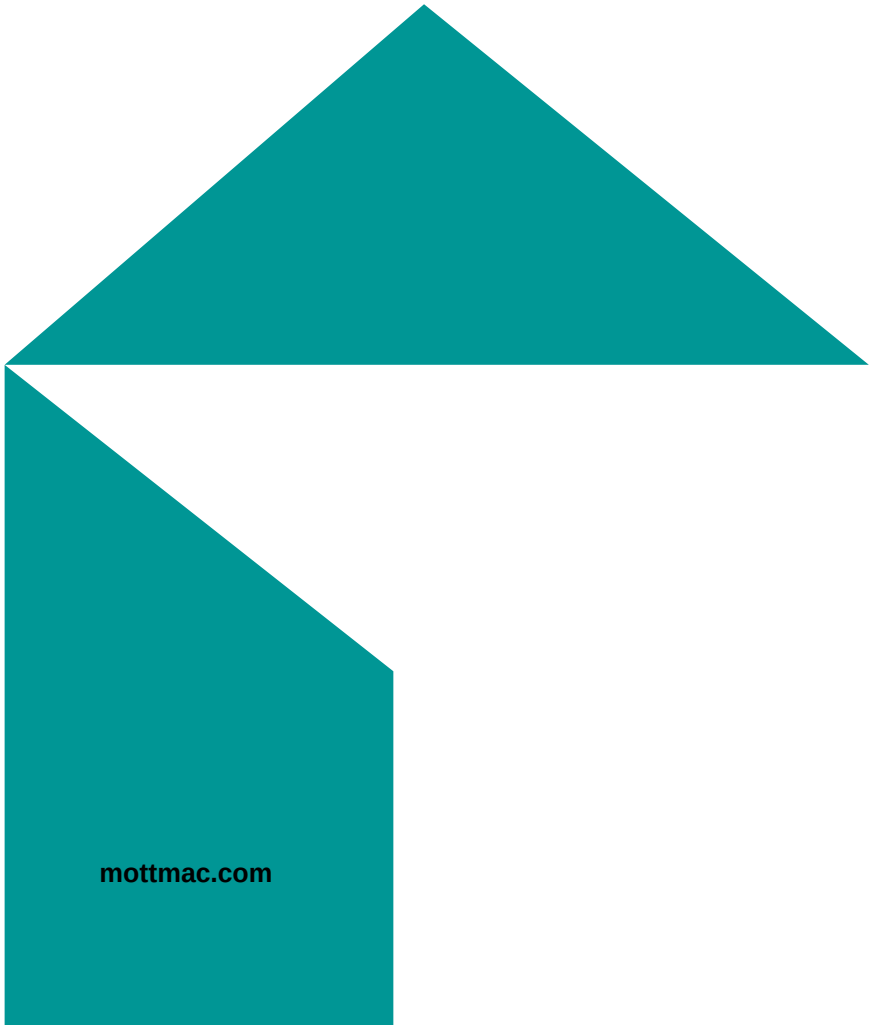
BTO Data Reports provide rigorous scientific information to inform desk studies for ecological impact assessment of proposed development sites. Reports collate comprehensive and contemporary bird distribution and abundance data from the BTO's ornithological datasets. As most biological data are collected in grid squares, spatial analyses identify which grid squares can be associated with the site and its vicinity at different spatial scales. Reports lists all species present at or near the site in the breeding season and in winter, highlighting those of statutory or conservation importance (e.g. Schedule 1, Red List). They also assess the potential importance of the site across a local, regional and national context, listing species for which the site and vicinity account for a high proportion of local, regional or national geographical range and population size.

BTO Data Reports provide unique insights into the bird community present in the vicinity of potential development sites, helping to guide the need for detailed field surveys and highlighting potential priorities for delivering habitat mitigation, enhancement and biodiversity net gain.

BTO Services Ltd
The Nunnery
Thetford
Norfolk
United Kingdom
IP24 2PU

BTO Services Ltd

Registered in England and Wales: 2907282



8.5 Breeding Bird Technical Report - January 2024

MOTT MACDONALD

A494 River Dee Bridge Improvement Scheme

Breeding Bird Technical Report

January 2024

This page left intentionally blank for pagination.

Mott MacDonald
Ground floor
Royal Liver Building
Pier Head
Liverpool L3 1JH
United Kingdom

T +44 (0)151 482 9910
mottmac.com

A494 River Dee Bridge Improvement Scheme

Breeding Bird Technical Report

January 2024

Mott MacDonald Limited. Registered in England and Wales no. 1243967.
Registered office: Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
1.0	January 2024	K. Doneo	A. Tongue	L. Henderson	

Document reference: 395318-0175

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary 1

1 Introduction 2
1.1 Project background 2
1.2 The Scheme 2
1.2.1 Site location 2
1.3 Aims and objectives of this report 3
1.4 Survey area 3
1.5 Nomenclature 3

2 Legislation, Policy and Guidance 5
2.1 Wildlife and Countryside Act 1981 5
2.2 Birds of Conservation Concern 5 and the IUCN regional Red List 5
2.3 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 5
2.4 The Conservation of Habitats and Species Regulations 2017, including the Wild Bird Habitat Duty 5
2.5 Planning Policy Wales 6
2.6 Technical Advice Note 5 6
2.7 Local planning policy 7

3 Methodology 8
3.1 Desktop study 8
3.2 Field survey 8
3.3 Visit timings 9
3.3.1 Data collection 9
3.4 Limitations 10

4 Results 11
4.1 Desk study 11
4.1.1 Wild bird habitats 11
4.1.2 Cofnod dataset 12
4.1.3 BTO Data Report 12
4.2 Breeding bird survey data 13
4.2.1 A summary of bird breeding bird distribution and habitat use 16

5 Recommendations and mitigation 18
5.1 Increased levels of disturbance via construction activity, artificial light, the activity of plant and site personnel 18

5.3 Pollution resulting from xenobiotic substances entering the watercourse 19

6 Recommendations, Mitigation and Habitat Enhancement 20

6.1 Timing of work 20
6.2 Habitat manipulation and enhancement 20
6.3 Noise 20
6.4 Pollution 21
6.5 Lighting 21
6.6 Further surveys 21
6.7 Validity of the survey data and assessment 22

7 Appendices 23

A. Cofnod data 24

B. Breeding bird survey data for 2023 26

C. Maps 29

Tables

Table 1: Breeding bird survey conditions. Metadata are taken as an average across two days surveyed per visit 9
Table 2: River Dee SPA and River Dee Ramsar Site designated species 11
Table 5: Existing Cofnod data for bird species within 2km of the proposed Scheme between 2008 and 2018 24
Table 6: Breeding bird survey data obtained in 2023 by Mott MacDonald 26

Click or tap here to enter text.

Executive summary

Mott MacDonald Limited has been appointed by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake a desk study and breeding bird surveys in relation to a proposed on-line improvement of approximately 1.75km of the A494 road between the River Dee and the Queensferry Interchange, Flintshire, hereafter referred to as the 'Scheme'.

A review of designated sites and existing species records within 2km of the Scheme footprint was undertaken using data from the North Wales Environmental Information Service (Cofnod), a detailed Data Report commissioned from the British Trust for Ornithology (BTO) and data provided by the Multi Agency Geographical Information for the Countryside (MAGIC) website.

The desk study identified that the Scheme footprint is located in an impact risk zone associated with the Dee Estuary and River Dee, which are two Sites of Special Scientific Interest (SSSI), comprising sites within the national site network, namely the Dee Estuary Special Protection Area (SPA), the Dee Estuary Special Area of Conservation (SAC) and the Dee Estuary Ramsar Site. Biological records within 2km (Cofnod) and 10km (BTO Data Report) identified 41 'priority' species (i.e. important in terms of their legal, conservation of research designations) and 34 'notable' species (i.e. those deemed notable at various spatial scales by the BTO Data Report), respectively, all of which could be potentially impacted by the Scheme given their breeding ranges.

Breeding bird surveys were undertaken during April, May, June and July 2023 to elucidate the site's breeding bird assemblage, with a total of 64 species recorded. The purpose of this report is to document the findings of the desk study and the survey work.

The BTO Data Report for the relevant 10km grid squares found 18 species to be 'notable' in terms of range and/or abundance at various spatial scales. Breeding bird surveys in 2023 recorded a total of 40 'priority' species, comprising:

- Two species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- 14 Priority Species listed under Section 7 of the Environment (Wales) Act 2016;
- One Rare Breeding Bird Panel species;
- 14 Red-listed species per Birds of Conservation Concern 5;
- 20 Amber-listed species per Birds of Conservation Concern 5;
- Six species listed as 'Endangered' per the second IUCN Red List assessment of extinction risk for Great Britain;
- 12 species listed as 'Vulnerable' per the second IUCN Red List assessment of extinction risk for Great Britain, and,
- Two EU Birds Directive Annex I species.

The survey area is considered to support a good number of 'notable' and 'priority' species. However, most species were recorded in relatively low or moderate numbers which may be attributable to ongoing anthropogenic disturbance in the vicinity.

Nevertheless, the desk and field data together highlight the importance of various habitats for birds in the survey area. Such habitats and their associated species could potentially be negatively impacted by the Scheme, particularly through habitat loss and disturbance. These habitats should be protected by appropriate mitigation and habitat enhancement measures, as outlined in this report.

1 Introduction

1.1 Project background

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake a desk study and a suite of breeding bird surveys in support of an on-line improvement of approximately 1.75km of the A494 between the River Dee and the Queensferry Interchange in collaboration with Richards Moorehead & Laing Ltd (RML), hereafter referred to as the 'Scheme'.

As part of the scheme, RML were assigned to carry out ecological surveys for the A494 River Dee Bridge Improvements Scheme (Key Stage 3-4). In 2018, a preliminary ecological survey was undertaken which highlighted the requirement for breeding bird surveys. The results of these surveys formed the basis for the assessment presented in Chapter 08 – Nature Conservation of the Environmental Statement (ES) and Statement to Inform an Appropriate Assessment (SIAA)[1].

1.2 The Scheme

The Scheme consists of two new bridges to carry eastbound and westbound traffic. The eastbound carriageway will make use of the current A494 bridge's supporting river piers combined with a new deck structure and abutments. The westbound carriageway will include a completely new river crossing bridge structure and highway constructed immediately to the south of the existing A494 road.

Full details of the Scheme are described in the Scheme Assessment Report (ref: 395318-0031). However, the key elements of the Scheme are as follows:

- A 1.5km long offline widening in order to create three lanes and hard shoulder in each direction;
- Three new main structures are required – Westbound River Dee Bridge; Eastbound River Dee Bridge and Westbound Railway Under Bridge; and
- A shared path for pedestrians and cyclists with new connections, including to the Wales Coastal Path, NCN Route 568, Garden City, Chemistry Lane/Factory Road, and Station Road.

1.2.1 Site location

The site limits are between grid references SJ316679 and SJ327688, along the A494 dual carriageway in Queensferry, Flintshire (Wales). Central to the proposed works and where the breeding bird surveys were conducted is the River Dee crossing (central Ordnance Survey Grid Reference SJ 32373 68598).

The Scheme footprint is located in an impact risk zone[2] associated with the Dee Estuary and River Dee, which are both Sites of Special Scientific Interest (SSSIs), included within sites

[1] June 2022 (Issued for review prior to publication): A494 River Dee Bridge Improvements Scheme Key Stage 3-4. Environmental Statement: Volume 1 Chapter 2: The Project Document Reference 395318-0039-CH02-F. Welsh Government

[2] Natural England, 2023. SSSI Impact Risk Zones (England). Available at: https://www.data.gov.uk/dataset/5ae2af0c-1363-4d40-9d1a-e5a1381449f8/sssi-impact-risk-zones-england (Accessed November 2023).

which are part of the national site network, namely, the Dee Estuary Special Protection Area (SPA), the Dee Estuary Special Area of Conservation (SAC) and the Dee Estuary Ramsar Site.

1.3 Aims and objectives of this report

The aim of this report is to present the baseline conditions within and surrounding the Scheme footprint with respect to potential impacts on breeding birds. This report includes the results of a desk study together with the results of an on-site breeding bird survey undertaken in 2023.

1.4 Survey area

The survey area comprised the intertidal areas of the River Dee, farmland, woodland, grassland, urban green space, industrial and some residential areas within the Scheme footprint and a suitable zone of influence (see below) most likely to be used by wild birds. These habitats are considered to be important[3] in the context of the rural and built-up environment within which the Scheme is located, and most likely to support important ecological features, i.e. those species that are considered to be important and may potentially be impacted by the proposed Scheme.[4]

Given that the development is likely to alter the existing landscape, including farmland, woodland, grassland and built environments, there is a likelihood of potential impacts on birds, via reduced habitat connectivity and increased anthropogenic disturbance. A broader zone of influence was defined by experienced ornithologists. This zone of influence comprises:

- Areas directly within the land take for the proposed Scheme and access (i.e. the Scheme footprint); and
- Areas which will be temporarily and permanently affected during construction. This includes a 500m zone around the Scheme footprint.

1.5 Nomenclature

Vernacular and scientific bird names follow those of the 10th Edition of the British Ornithologists' Union (BOU) official list of species recorded in Great Britain.[5]

[3] Duty to Provide and Protect Habitat for Wild Birds (no date) Available at: https://www.gov.uk/guidance/providing-and-protecting-habitat-for-wild-birds#identify-areas-with-wild-bird-habitat (Accessed November 2023).

[4] Chartered Institute of Ecology and Environmental Management, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

[5] British Ornithologists' Union, 2022. The British List: A Checklist of Birds of Britain (10th edition). Ibis 164: 860–910.

Figure 1.1: The proposed Scheme and 500m site buffer



2 Legislation, Policy and Guidance

2.1 Wildlife and Countryside Act 1981

In the UK, all wild birds, their nests, eggs and young are protected by the Wildlife and Countryside Act 1981 (as amended), hereafter referred to as the '1981 Act'. Offences under the 1981 Act include:

- Intentionally killing, injuring or taking any wild bird;
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built;
- Intentionally taking or destroying the egg of any wild bird.

Bird species listed on Schedule 1 of the 1981 Act are afforded additional protection from disturbance when at or near an active nest or when they have dependent young. In the case of breeding Schedule 1 species, it is illegal to disturb them, either intentionally or recklessly. Offences could result in an unlimited fine and up to six months in prison for each offence if found guilty.

In addition, government standing advice is to avoid potentially harmful activities in the bird breeding season (in this context, typically considered as March to August inclusive).

2.2 Birds of Conservation Concern 5 and the IUCN regional Red List

Birds of Conservation Concern 5 (BoCC5) is the fifth review of the status of bird species in the United Kingdom, Channel Islands, and Isle of Man. The authors use a 'Red', 'Amber' and 'Green' system to classify the conservation status of the most regularly occurring 245 species in the UK. Published in December 2021, it updates the last assessment undertaken in 2015. [6]

BoCC5 also incorporated the second IUCN Red List assessment of extinction risk for birds in Great Britain. Each species was assessed against various thresholds, which if met or exceeded, qualified it for one of the standard IUCN Red List threat categories, i.e. Extinct, Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened and Least Concern.

2.3 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 ('the EIA regulations') require an Environmental Impact Assessment to be undertaken in order to identify, describe and assess potentially significant effects with particular attention to, amongst other features, species listed on Annex I of the EU Birds Directive (Directive 2009/147/EC).[7]

2.4 The Conservation of Habitats and Species Regulations 2017, including the Wild Bird Habitat Duty

These regulations comprise elements of domestic law that transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the

[6] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win, I., 2021. Available at: The status of our bird populations: The fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723–747.

[7] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Codified version). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147 (Accessed November 2023).

Birds Directive predominantly in England and Wales following the UK's departure from the European Union. Any planning permission granted by a general development order which is:

- likely to result in a significant effect upon a 'European Site' (either alone or in-combination with other plans or projects); and
- is not directly connected with or necessary to the management of the site,

cannot commence without prior approval from the local planning authority.

Under the Wild Bird Habitat Duty, competent authorities must take appropriate steps to help:

- preserve, manage and re-establish habitat that is large and varied enough for wild birds to support and maintain their populations in the long term;
- avoid any pollution or deterioration of wild bird habitat as far as possible.

2.5 Planning Policy Wales

In terms of planning policy at the national level, under Chapter 6 of Planning Policy Wales, planning authorities must maintain and enhance biodiversity in the exercise of their functions. Development plans and proposals must consider the need to support the conservation of landscape and biodiversity, ensure that action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats, protect and manage statutory and non-statutory designated sites, safeguard protected species and priority species and existing biodiversity assets and secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent, and connectivity of ecological networks.[8] This means the development should not cause any significant loss of habitats or populations of species, locally or nationally, and must provide a net benefit for biodiversity. In fulfilling this duty, planning authorities must also take account of and promote the resilience of ecosystems. Planning authorities must have regard to the list of habitats and species of principal importance for Wales, published under Section 7 of the Environment (Wales) Act 2016, the State of Natural Resources Report (SoNaRR), published by Natural Resources Wales (NRW), and any Area Statement that covers all or part of the area in which the authority exercises its functions.

2.6 Technical Advice Note 5

Technical Advice Note (TAN) 5 relates to nature conservation and planning (Welsh Assembly Government, 2009) and provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. The TAN 5 provides advice for local planning authorities on:

- The key principles of positive planning for nature conservation;
- Nature conservation and Local Development Plans;
- Nature conservation in development management procedures;
- Development affecting protected internationally and nationally designated sites and habitats; and
- Development affecting protected and priority habitats and species.

[8] Welsh Government (2016) Environment (Wales) Act 2016. Available at: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted (Accessed December 2023).

2.7 Local planning policy

The site lies within the administrative area of Flintshire Council (FC). Policies considered to be of ecological relevance and their objectives for this site as part of the FC Local Development Plan (LDP) (2020) 2015–2030 are as follows:

- **STR13 Natural and Built Environment, Green Networks and Infrastructure**
  - landscapes and coastline will be protected and where feasible, enhanced;
  - Conserve, protect and enhance the quality and diversity of Flintshire's natural environment including landscape, biodiversity, the Dee Estuary and the Clwydian Range and Dee Valley Area of Outstanding Natural Beauty (AONB).
- **STR14 Climate Change and Environmental Protection**
  - Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution levels.
  - Encouraging the use and development of appropriate or suitable brownfield land;
  - Ensuring that new development has regard to the protection of the environment in terms of air, noise and light pollution, unstable and contaminated land and former landfill sites, and,
  - Designing development to be adaptable and resilient to future effects of climate change.

3 Methodology

Baseline breeding bird data were obtained via both a desk study and on-site surveys undertaken in 2023.

3.1 Desktop study

A desk study was undertaken in May 2023 to collate existing breeding bird data in the vicinity of the Scheme.

The following sources were reviewed/ consulted:

- Cofnod (https://www.cofnod.org.uk);
- Previous wintering bird survey data report (Mott MacDonald, 2019[9] and 2021[10]);
- eBird (https://ebird.org/); and
- a Data Report commissioned from the British Trust for Ornithology (BTO) (described below).

The BTO Data Report covered the 10km Ordnance Survey grid square in which the site is located (TL34). The BTO Data Report collated and analysed comprehensive (2007–2011) and contemporary (2019–2023) bird data relating to this grid square. For contextual analyses, data from relevant squares are related to equivalent data from one vice-county, one county, one region, one country and the UK to assess species' importance in the vicinity of the site. BTO Data Reports pay particular attention to 'notable species'. Notable species are defined as those for which the species' percentage range and / or relative abundance is at least twice the site's percentage size, except at the UK scale, where species are described as notable if the site and vicinity account for ≥2% of the species' range and / or relative abundance. The BTO Data Report, summarised in Section 4, includes a comprehensive species list and is reproduced in full in Appendix E.

In addition, the desk study considered all statutory internationally designated sites (i.e. Ramsar Sites, Special Protection Areas [SPAs]) and Special Areas of Conservation [SACs]) relevant to birds within 10km. Nationally designated Sites of Special Scientific Interest (SSSIs) within 2km of the Scheme were also considered.

3.2 Field survey

A total of six breeding bird surveys were carried out bi-monthly between April 2023 and July 2023, by two experienced ornithologists. Each visit was carried out over the course of two days (one visit equates to two days), with five morning surveys and one crepuscular / nocturnal survey following standard industry guidance.[11] Each visit was undertaken on two days as close together as possible, taking weather conditions and other external factors into consideration.

Survey transect routes were devised to enable the surveyors to access a representative sample of habitats and included all farmland, grassland, dense scrub, wooded and some residential and industrial areas within the zone of influence.

[9] Mott MacDonald (2019) River Dee Wintering bird survey data report. Reference: 395318-0070

[10] Mott MacDonald (2021) River Dee Wintering bird survey data report. Reference: 395318-0132-01

[11] UK Bird Survey & Assessment Steering Group, 2023. Birds survey guidelines for assessing ecological impacts, v.1.1.0. Available at: https://birdsurveyguidelines.org (Accessed October 2023).

Transect routes were reversed on alternate visits to avoid potential temporal bias.[12] Surveyors walked at a slow, ambling pace, stopping to scan and listen at priority habitats and features, where appropriate.

3.3 Visit timings

In order to ensure maximum detection of breeding bird activity, surveys were conducted where practicable in optimal or near optimal weather conditions and avoided periods of heavy rainfall and / or strong winds (i.e. above Beaufort Scale Force 4) wherever possible. Table 2.1 below, details weather conditions on the survey visits completed over each week.

Table 1: Breeding bird survey conditions. Metadata are taken as an average across two days surveyed per visit

Visit number/Dates of Survey	Visit time	Temperature (°C)	Wind speed (Beaufort scale) and direction	Cloud cover (oktas)
Visit 1 26/04/23 and 27/04/23	05.05–09.46hrs and 05.02–10.01hrs respectively	8–12	1 SW	1/8
Visit 2 15/05/23 and 18/05/23	04.40–09.38hrs and 04.36–09.15hrs	12–14	2 NW	3/8
Visit 3 30/05/23 and 31/05/23	04.19–09.05hrs and 04:15–09.11hrs	16–18	2 N	1/8
Visit 4 12/06/23 and 13/06/23	04.33–09.24hrs and 04.28–09.06hrs	20–23	1 S	0
Visit 5 27/06/23 and 28/06/23	19.45–23.02hrs and 19.50–23.11hrs	17–19	0	0
Visit 6 10/07/23 and 11/07/23	04.22–09.16hrs and 04.31–09.22hrs	16–17	0	1/8

3.3.1 Data collection

All of the following priority species, either seen or heard, were recorded using ESRI's FieldMaps for ArcGIS on Android mobile or tablet devices and mapped across the survey area:

- Birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- Species listed under Section 7 under the Environment (Wales) Act Section 7;
- Red and Amber listed bird species in Birds of Conservation Concern (BoCC) 5 (2021)[13] and BoCCW[14];
- Localised or highly specialised species regardless of inclusion above;
- Nationally- or locally- declining species regardless of inclusion above;
- Rare Breeding Bird Panel Species;[15]
- Colonial nests or roost sites containing more than one individual or any species;
- Exceptional counts or aggregations of any species (in the context of habitats on site);
- Flintshire Biodiversity Action Plan (BAP) Priority Species;

[12] Marchant, J.H., 1983. Common Birds Census Instructions. British Trust for Ornithology, Thetford.

[13] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble D, Win, I., 2021. The status of our bird populations: The Fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *Brit. Birds* 114, 723–747.

[14] British Trust for Ornithology. (2022). Birds of Conservation Concern Wales. [online] Available at: birds_of_conservation_concern_wales_4_2022.pdf (bto.org) [Accessed 8 Jan. 2024].

[15] Rare Breeding Bird Panel website: Species – overview – UK Rare Breeding Birds Panel. Available at: https://www.rbbp.org.uk. (Accessed November 2023).

- Species evaluated as Critically Endangered, Endangered or Vulnerable on the International Union for Conservation of Nature (IUCN) Regional Red List assessment of extinction risk for Great Britain (IUCN2),[16] or,
- Species listed under Annex I of the European Birds Directive.

3.3.1.1 Notable species

For the purposes of this report, species which are listed by the BTO Data Report as 'notable' are categorised at each of the following spatial scales:

- Vice-county (Flintshire);
- County (Clwyd);
- Region (East Wales);
- Country (Wales);
- United Kingdom

Whilst the primary aim of the data collection is to support the planning process, the British Standards Institution's Biodiversity Code of Conduct for Planning and Development (BS 42020:201310)[17] recommends data are collected in a way that facilitates the process of making the data available to local, county and / or national recording schemes, when this has the agreement with the project proponent.

3.4 Limitations

- Biological records obtained from third parties and presented in the desk study do not represent a full and complete species list for the area. They are given voluntarily by individuals on an ad-hoc basis, often meaning there may potentially be areas of deficiency in the data;
- The absence of a species is not conclusive proof that a species is not present or that it will not be present in the future. However, the desk data coupled with the field surveys provide a good comprehensive understanding of breeding bird species that exist within the Scheme footprint and surrounding areas which are potentially likely to be impacted by the Scheme;
- The field surveys are a snapshot of the current breeding bird assemblage within the survey area during the 2023 breeding season;
- Access was limited due to health and safety concerns. In particular, access was not possible along the immediate areas surrounding the A494 road, Wastewater Treatment Works (WwTW) and traveller site; and
- One survey completed across the two days were not always completed across consecutive days due to suboptimal survey weather conditions.

[16] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble D, Win, I., 2021. The status of our bird populations: The Fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. *Brit. Birds* 114, 723–747.

[17] British Standards Institution, 2013. British Standard 42020:2013. Biodiversity – Code of practice for planning and development. BSI, London.

4 Results

4.1 Desk study

4.1.1 Wild bird habitats

The Scheme is located in an area either side of the River Dee. The Scheme footprint and zone of influence includes intertidal mudflats, saltmarsh (priority habitat under Section 7 of the Environment (Wales),[18] and small rock revetments. The wider area also includes coastal floodplain (Section 7 priority habitat), deciduous and coniferous woodland, industrial and residential buildings, neutral, and amenity grasslands.

The Dee Estuary is a Special Protection Area (SPA), a Special Area of Conservation (SAC) and a Ramsar Site (Table 2). The estuary contains vital intertidal mudflat and saltmarsh habitats that provide optimal feeding and roosting opportunities for large populations of coastal birds. In addition, the site is also particularly important during migration periods for birds and in the breeding season supports populations of two Annex I species: common tern *Sterna hirundo* and little tern *Sternula albifrons*.

Table 2: River Dee SPA and River Dee Ramsar Site designated species

On passage	
Redshank *Tringa totanus*	8,795 individuals - 5.9% Eastern Atlantic (wintering)
Sandwich tern *Thalasseus sandvicensis*	957 individuals - 2.3% of Great Britain population
Overwintering	
Shelduck *Tadorna tadorna*	7,725 individuals - 2.6% N.W. Europe
Pintail *Anas acuta*	5,407 individuals - 9.0% N.W. Europe
Teal *Anas crecca*	5,251 individuals - 1.3% N.W. Europe
Oystercatcher *Haematopus ostralegus*	22,677 individuals - 2.5% Europe & N.W. Africa
Grey plover *Pluvialis squatarola*	1,643 individuals - 1.1% Eastern Atlantic
Curlew *Numenius arquata*	3,899 individuals - 1.1% Europe (breeding)
Bar-tailed godwit	1,150 individuals- 2.2% of Great Britain population
Black-tailed godwit *Limosa limosa islandica*	1,747 individuals - 2.5% Iceland (breeding)
Knot *Calidris canutus*	12,394 individuals - 3.5% N.E. Can/Grl/Iceland/N.W. Eur
Dunlin *Calidris alpina*	27,769 individuals - 2.0% N. Siberia/Europe/ W Africa
Redshank *Tringa totanus*	5,293 individuals - 3.5% Eastern Atlantic
Breeding	
Little Tern *Sternula albifrons*	69 pairs - 2.9% of Great Britain population
Common tern *Sterna hirundo*	392 pairs - 3.2% of Great Britain population
In addition, nationally important populations within the internationally important assemblage of overwintering waterbirds of the Dee Estuary SPA include the following: Great crested grebe *Podiceps cristatus*; Cormorant *Phalacrocorax carbo*; Sanderling *Calidris alba*; and Wigeon *Mareca penelope*.	

[18] Welsh Government (2016) Environment (Wales) Act 2016. Available at: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted (Accessed December 2023).

4.1.2 Cofnod dataset

- Cofnod returned records for a total of 41 priority species within 2km of the Scheme between 2008 and 2018. These are listed in Appendix A and comprised:
- 18 species listed under the Environment (Wales) Act Section 7;
- Seven Annex I species;
- Eight Rare Breeding Birds Panel species;
- 15 species Red Listed by BoCC5;
- 19 species Red Listed by BoCCW;
- 20 species Amber Listed by BoCC5; and
- 11 species Amber Listed by BoCCW.

4.1.3 BTO Data Report

The BTO Data Report considered a total of 269 species that regularly occur in Britain and Ireland within the 10km Ordnance Survey grid square (i.e. SJ36) in which the site is located. These included 221 breeding species and 226 wintering species. Breeding species are defined as those that were recorded with confirmed breeding evidence in at least one 10-km square in Britain or Ireland in the 2007–11 Bird Atlas. Wintering species are defined as those recorded in at least fifty 10-km squares in the 2007–11 Bird Atlas in the non-breeding season, plus six rare residents that the 50-square rule excluded. It should be noted that an absence of breeding evidence in the data should not be assumed to indicate absence of breeding.

The BTO Data report identified a total of 34 notable species at various spatial scales, as discussed below. Notable species listed on the BoCC5 Red and Amber Lists are highlighted in the corresponding colour.

At the UK scale, no records for notable species were found for breeding or winter range and abundance for the site's 10km Ordnance Survey grid square.

At the spatial scale of country (Wales), notable species are listed below:

Breeding range, 15 species: greylag goose *Anser anser*, mandarin duck *Aix galericulata*, teal *Anas crecca,* tufted duck *Aythya fuligula*, grey partridge *Perdix perdix*, quail *Coturnix coturnix*, red-legged partridge *Alectoris rufa*, oystercatcher *Haematopus ostralegus*, common sandpiper *Actitis hypoleucos*, little owl *Athene noctua*, lesser spotted woodpecker *Dryobates minor*, hobby *Falco subbuteo*, reed warbler *Acrocephalus scirpaceus*, tree sparrow *Passer montanus*, yellow wagtail *Motacilla flava.*

Breeding abundance, 26 species: greylag goose, mallard *Anas platyrhynchos*, teal, tufted duck, grey partridge, swift *Apus apus*, rock dove *Columba livia*, stock dove *Columba oenas*, woodpigeon *Columba palumbus*, collared dove *Streptopelia decaocto*, moorhen *Gallinula chloropus*, coot *Fulica atra*, lapwing *Vanellus vanellus*, little owl, kestrel *Falco tinnunculus*, hobby, magpie *Pica pica*, rook *Corvus frugilegus*, house martin *Delichon urbicum*, long-tailed tit *Aegithalos caudatus,* reed warbler, lesser whitethroat *Curruca curruca*, starling *Sturnus vulgaris*, tree sparrow, yellow wagtail, goldfinch *Carduelis carduelis*.

At the regional (East Wales) scale, notable species are listed below:

Breeding range, 13 species: greylag goose, mandarin duck, teal, grey partridge, quail, red-legged partridge, oystercatcher, common sandpiper, little owl, lesser spotted woodpecker, reed warbler, tree sparrow, yellow wagtail.

Breeding abundance, 28 species: greylag goose, mallard, teal, tufted duck, grey partridge, swift, rock dove, stock dove, woodpigeon, collared dove, moorhen, coot, oystercatcher, lapwing, little owl, kestrel, hobby, magpie, rook, swallow *Hirundo rustica*, house martin, long-tailed tit,

sedge warbler *Acrocephalus schoenobaenus*, reed warbler, lesser whitethroat, tree sparrow, yellow wagtail, goldfinch.

At the county (Clwyd) scale, notable species are listed below:

Breeding range, eight species: mandarin duck, teal, grey partridge, quail, lesser spotted woodpecker, hobby, reed warbler, yellow wagtail.

Breeding abundance, 22 species: greylag goose, mallard, teal, tufted duck, grey partridge, swift, stock dove, woodpigeon, coot, lapwing, little owl, hobby, magpie, rook, house martin, long-tailed tit, sedge warbler, reed warbler, lesser whitethroat, tree sparrow, yellow wagtail, goldfinch.

At the vice- county (Flintshire) scale, notable species are listed below:

Breeding range, seven species: mandarin duck, teal, quail, common sandpiper, lesser spotted woodpecker, hobby, yellow wagtail.

Breeding abundance, 17 species: greylag goose, teal, tufted duck, grey partridge, swift, stock dove, woodpigeon, lapwing, little owl, hobby, rook, house martin, long-tailed tit, reed warbler, lesser whitethroat, tree sparrow, yellow wagtail.

4.2 Breeding bird survey data

A total of 64 species were recorded during breeding bird surveys.

A total of 42 priority species were recorded during breeding bird surveys (Table 3), comprising:

- Two species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- 14 species listed under the Environment (Wales) Act Section 7;
- One Rare Breeding Bird Panel species;
- 14 species Red-listed by BoCC5;
- 17 species Red-listed by BoCCW;
- 20 species Amber-listed by BoCC5;
- 14 species Amber-listed BoCCW;
- One Rare Breeding Bird Panel species;
- Six species listed by IUCN2 as Endangered;
- 12 species listed by IUCN2 as Vulnerable; and
- Two Annex I species.

A total of 18 notable bird species (as defined by the BTO Data Report) were recorded during the surveys.

Table 3: Priority species recorded during 2023 breeding bird surveys

Species are listed in vernacular name alphabetical order.

Vernacular Name	Scientific Name	BoCC 5 (UK)	BoCC Wales	IUCN Regional Red List (GB)	Rare Breeding Birds Panel	Wildlife and Countryside Act Schedule 1	Environment (Wales) Act Section 7	EU Birds Directive Annex I	Peak count
Black-headed gull	*Chroicocephalus ridibundus*	Amber	Red	VU			x		64
Bullfinch	*Pyrrhula pyrrhula*	Amber	Amber	LC			x		2
Chaffinch	*Fringilla coelebs*	Green	Amber	EN					8
Common sandpiper	*Actitis hypoleucos*	Amber	Amber	NT					4
Coot	*Fulica atra*	Green	Amber	VU					3
Coal tit	*Periparus ater*	Green	Amber	LC					2
Curlew	*Numenius arquata*	Red		EN			x		1
Dunlin	*Calidris alpina*	Red	Red	VU					1
Dunnock	*Prunella modularis*	Amber	Amber	LC			x		12
Grasshopper warbler	*Locustella naevia*	Red	Red	LC			x		5
Great black-backed gull	*Larus marinus*	Amber	Amber	EN					35
Greenfinch	*Chloris chloris*	Red	Red	EN					5
Greylag goose	*Anser anser*	Amber		LC					1
Grey wagtail	*Motacilla cinerea*	Amber	Amber	NT					1
Herring gull	*Larus argentatus*	Red	Red	EN			x		24
Hobby	*Falco subbuteo*	Green		NT	Regular (Less scarce)	x			1
House martin	*Delichon urbicum*	Red	Amber	NT					70
House sparrow	*Passer domesticus*	Red	Amber	LC			x		42
Kingfisher	*Alcedo atthis*	Green		VU		x		x	1

Lapwing	*Vanellus vanellus*	Red	Red	VU			x		28
Lesser black-backed gull	*Larus fuscus*	Amber	Red	DD					56
Linnet	*Linaria cannabina*	Red	Red	LC			x		10
Little egret	*Egretta garzetta*	Green		LC	Regular (Less scarce)			x	6
Magpie	*Pica pica*	Green	Amber	LC					10
Mallard	*Anas platyrhynchos*	Amber		VU					27
Meadow pipit	*Anthus pratensis*	Amber	Red	LC					2
Mistle thrush	*Turdus viscivorus*	Red	Amber	NT					3
Oystercatcher	*Haematopus ostralegus*	Amber	Amber	VU					26
Redshank	*Tringa totanus*	Amber	Red	VU					4
Reed bunting	*Emberiza schoeniclus*	Amber		LC			x		6
Ringed plover	*Charadrius hiaticula*	Red	Red	VU			x		4
Rook	*Corvus frugilegus*	Amber	Red	NT					4
Skylark	*Alauda arvensis*	Red	Amber	LC			x		5
Song thrush	*Turdus philomelos*	Amber		LC			x		4
Sparrowhawk	*Accipiter nisus*	Amber		VU					3
Starling	*Sturnus vulgaris*	Red	Red	VU			x		92
Stock dove	*Columba oenas*	Amber		LC					1
Swallow	*Hirundo rustica*	Green		VU					39
Swift	*Apus apus*	Red	Red	EN					16
Whitethroat	*Curruca communis*	Amber	Red	LC					3
Woodpigeon	*Columba palumbus*	Amber		LC					32
Wren	*Troglodytes troglodytes*	Amber		LC					17

4.2.1 A summary of bird breeding bird distribution and habitat use

The survey area supports several bird species of conservation concern. However, many species appeared to be in relatively lower numbers within the Scheme footprint compared to the surrounding areas and beyond the zone of influence extents. This is likely attributable to current levels of anthropogenic disturbance from roads, footpaths, cycle paths, a shooting range and industrial activity within the Scheme footprint. The relative abundance of most species appeared to be stable or increasing, except for some, such as woodpigeon, magpie, house martin and swift, for which the BTO Data Report showed declining trends in the vicinity compared to their overall populations in Wales.

The desk and field data also indicated the significance of the habitats within the zone of influence, which could be important for the populations of several species. These habitats should be protected by appropriate mitigation and enhancement measures.

The following habitats and features within the zone of influence have been identified as valuable to breeding birds:

- The **river and riverbank** habitat, particularly during low tide provide an important commuting, foraging and roosting area for various waterbirds, such as lapwing, common sandpiper, redshank, kingfisher, cormorant, mallard, oystercatcher, Canada goose, coot, grey wagtail, and gull species. The majority of these species were recorded in relatively low numbers, but a greater number of birds, particularly goose, duck and smaller waders, could be observed at a distance outside of the survey area towards the western extent (i.e. towards the coastline). This area had more suitable breeding habitat, such as the Dee Estuary and Tata Steelworks, which are known to support breeding colonies of common terns and black-headed gulls. No common terns were observed or recorded within the survey area, although up to 60 black-headed gulls were recorded roosting and foraging on the banks throughout the surveys. In 2023, there was an avian flu outbreak at Tata Steelworks and black-headed gull reproductive output was reported to be extremely low[19].
- The **industrial and commercial properties** along the river offer suitable nesting habitat for herring gulls and lesser black-backed gulls. Several pairs were observed building nests and attending to young throughout the surveys. The actual number of nest sites may potentially be higher due to surveyors' visual obstruction. The birds appeared to favour the Scottish Power building located on Factory Road.
- The **scrub and neutral grasslands (scattered trees)** along the A494 and proposed access roads support nesting bird species such as woodpigeon, collared dove, chiffchaff, blackcap, whitethroat, grasshopper warbler, finch species and other typically widespread passerines such as common tit and thrush species. Several goldfinch, common whitethroat and thrush species nests were identified in these habitats.
- The **residential properties** surrounding the River Dee attract moderate numbers of house sparrow, starling, tit, pigeon, dove, thrush, finch and corvid species due to supplementary feeding and suitable nesting features within buildings and garden boundaries. House sparrow, starling and tit species were commonly observed entering small spaces and gaps within buildings.
- The **farmland** surrounding the Scheme footprint, particularly within the south-east area, appears to support foraging corvid, pigeon, dove and gull species. Skylark and lapwing were observed and heard during April but were not recorded thereafter. This is likely due to the rapid growth of the crop (oilseed rape). Breeding skylarks were noted to the northwest,

[19] Forgrave, A. (2023) 'Hundreds of birds die beside North Wales river from 'devastating' disease', *North Wales Live*, 21 June. Available at: https://www.dailypost.co.uk/news/north-wales-news/hundreds-birds-die-beside-north-27171680 (Accessed: 8 January 2024).

outside the zone of influence. The farmland to the north currently have ongoing development (housing) which attracted two pairs of ringed plover. This species was also observed foraging along the riverbanks.

- The **mature trees and small copses** within and surrounding farmland and grasslands within the survey area could potentially support hobby, although only one observation of this species (in flight) was made. It is also likely that the surrounding area supports owl species such as barn owl, little owl and tawny owl.
- The **wastewater treatment works (WwTW)** was identified as an important foraging area for swifts, swallows and house martins. Although access to this area was limited, birds could be seen in numbers of 50+ foraging in the area.
- One small rook colony (rookery; minimum of six nests) located on the corner of Sealand Avenue off the B5441. Colonial nesting species are considered a priority species.

5 Recommendations and mitigation

The potential impacts of the Scheme's construction phase on breeding birds may include, but are not limited to:

- Increased levels of disturbance via construction activities, artificial light, the activity of plant and site personnel;
- A reduction in the physical extent of available habitat in terms of potentially suitable breeding and foraging areas and commuting habitat; and
- Pollution resulting from xenobiotic substances entering the watercourse.

These are discussed in turn below.

5.1 Increased levels of disturbance via construction activity, artificial light, the activity of plant and site personnel

Noise, vibration and general disturbance associated with the use of machinery, vehicle movements and personnel have the potential to disturb and / or displace bird species from otherwise suitable roosting, foraging or breeding habitat.

Given that part of the Scheme works is anticipated to be positioned directly above the River Dee and along the A494 road, the potential for disturbance of species breeding in the vicinity is likely to be relatively high. Any vibration, noise and an increase in human activity could potentially disturb and displace breeding notable and priority bird species and damage or destroy habitat they use for foraging, breeding and commuting.

International or reckless disturbance to breeding Schedule 1 species, as well as the damage or destruction of the nests of any wild bird species would constitute an offence under the Wildlife and Countryside Act 1981 (as amended).

5.2 Reduction in the physical extent of available in terms of potentially suitable breeding locations

Species recorded during breeding bird surveys using trees, scrub and neutral grassland surrounding the A494 road and access roads may be undergo permanent habitat loss and therefore could potentially be negatively impacted. BTO Data Report-designated notable species recorded in such areas include (but are not limited to) long-tailed tit, wood pigeon, collared dove and magpie. All species are considered to be notable within and near to the site vicinity due to their estimated breeding abundance population size which ranges between 0.8–1.7% of the Wales population.

Tits and feral pigeons were observed using the bridge during the breeding period. Such species may therefore be potentially negatively impacted by the works to the bridge.

During the construction phase there is likely to be some temporary habitat fragmentation and habitat loss for those species which utilise the banks beneath and surrounding the bridge. The priority species likely to be affected by this include greylag goose, oystercatcher, common sandpiper, lapwing, coot, and mallard.

At the time of writing, the Scheme design does not include the provision of compensatory habitat. Therefore, the extent of permanent habitat loss is unknown. It is advised that all areas of habitat loss are compensated, either via habitat translocation or habitat creation throughout the Scheme, with the planting of native vegetation strongly encouraged (see Section 6.3).

5.3 Pollution resulting from xenobiotic substances entering the watercourse

Any industrial discharge resulting from the construction phase of the Scheme could negatively impact the water quality of the River Dee and surrounding watercourses, potentially serving to reduce the availability of prey for this avifaunal assemblage.

Pollution events may exert a range of effects on birds, from lethal to behavioural impacts and could negatively impact the size and / or range of their local populations.

6 Recommendations, Mitigation and Habitat Enhancement

6.1 Timing of work

In order to avoid the risk of committing an offence under the Wildlife and Countryside Act 1981 (as amended), no work should be undertaken during the government-defined breeding bird season (i.e. during the period March to August inclusive). However, because many species can breed outside of this period, it is advised that during the construction phase an experienced ornithologist regularly attends site (at least once per week) to advise on the risk of breeding birds at all times of the year. This is especially important if the government-defined breeding bird season cannot be avoided (see below).

6.2 Habitat manipulation and enhancement

The following hierarchy (from ideal to least ideal) should be followed with respect to vegetation clearance:

1. It is advised that the removal of any vegetation is avoided as far as is reasonably practicable;
2. If clearance of vegetation is unavoidable, this must be undertaken only outside of the UK government-defined bird breeding season (i.e. outside the period March to August inclusive). Given that several species can nest outside of the March to August period, vegetation removal at any time of the year must be supervised by a suitably experienced ornithologist;
3. If clearance of vegetation during the period March to August inclusive is unavoidable, this must be under daily supervision by a suitably experienced ornithologist, including an initial check for nesting birds no more than 48 hours prior to the commencement of works. Should any active nests be found, an exclusion zone (this distance is species and habitat/site specific) must be installed around the nest site and any works within that exclusion zone cannot be undertaken until all young birds have successfully fledged and are no longer dependent on their parents or the nest becomes otherwise inactive. Records of such checks should be made and retained during and following works.

Furthermore, should ornithological checks reveal the presence of any bird species listed on Schedule 1 of the Wildlife and Countryside Act (1981) as amended, then further advice will be required depending on the specific circumstances and risk of disturbing that breeding attempt.

It is also important that any proposed works activities do not inadvertently create suitable nesting habitat during the construction phase. This includes the creation of vertical earth banks or stockpiles of felled trees with exposed roots. Such features are attractive nest sites for various species.

It is advised that habitat restoration and enhancement should be implemented throughout the Scheme prior to the operational phase and should be appropriately managed (see Section 6.3 for planting of native vegetation).

6.3 Noise

Construction methods such as percussive piling are known to be a particular issue in relation to disturbance,[20] with noise levels above 70db(A) at the receptor likely to cause moderate to high

[20] Hill, D., Hockin, D., Price, D., Tucker, G., Morris, R. and Treweek, J., 1997. Bird disturbance: improving the quality and utility of disturbance research. Journal of Applied Ecology 34, 275– 288.

effects. In general, birds tend to habituate to continual noises so long as there is no large amplitude 'startling' component, with vehicle movements being more greatly tolerated.[21]

Noise disturbance should be minimised by implementing good industry practice such as BS 5228-1:2009+A1:2014.[22] This standard advises that a noise barrier would provide approximately 5dB reduction in noise level if line of sight between the source and receptor is partially broken, or up to 10dB if the line of sight is fully broken. Despite these small decreases, they may potentially reduce noise impacts and provide visual screening to reduce further disturbance.

Good practice measures (including "Best Practicable Means") are outlined in BS 5228-1:2009+A1:2014 which should be employed to minimise noise impacts during construction. Other measures should also be considered, including selection of equipment for its lower noise generating properties (i.e. low noise generators and compressors for Ground Investigation and related works), attenuation to noise sources (i.e. silencers or enclosures/shrouds).

Where possible, native planting of trees and shrub species such as hawthorn *Crataegus monogyna*, oak *Quercus robur* / *Q. petraea*, beech *Fagus sylvatica* and holly *Ilex aquifolium* should be considered in the vicinity of the Scheme in order to act as natural sound barriers to absorb and deflect road noise and to lift bird flight (particularly barn owl) to reduce traffic mortalities,[23] particularly with the topography of land surrounding the road. This will also create available habitat to breeding birds, some of which are undergoing population declines in the vicinity of the Scheme.

6.4 Pollution

It is recommended that measures are put in place to prevent the possibility of any contamination of watercourses. These may include plant nappies and spill kits to ensure the correct control of hazardous chemicals, such as fuel, which will be required on site. The storage of hazardous materials must also be via appropriate containers at least 200m from the riverbank and away from any ditches and other watercourses closer to the working area.

The placement of construction compounds and laydown areas should be placed at least 0.5km from the riverbank to reduce the likelihood of a pollution incident.

6.5 Lighting

In order to avoid nocturnal disturbance to breeding birds via artificial lighting, it is advised that no work is undertaken during the hours of darkness within the government-defined breeding season (i.e. March to August inclusive). However, if this is unavoidable, a sensitive lighting design is recommended to minimise light spill onto linear features / site boundaries. Directional lighting and screening may be appropriate to alleviate light spill issues onto the banks.

6.6 Further surveys

At the time of writing, non-breeding bird surveys are currently taking place between September 2023 and March 2024.

[21] Hockin, D., Ounsted, M., Gorman, M., Hill, D., Keller, V. Barker, M., 1992. Examination of the effects of disturbance on birds with reference to its importance in ecological assessments. Journal of Environmental Management 36: 253–286.

[22] British Standards Institution, 2008. Code of practice for noise and vibration control on construction and open sites. BS 5228-1:2009+A1:2014. BSI, London.

[23] Shawyer C., 2012. Barn Owl *Tyto alba* Survey Methodology and Techniques for use in Ecological Assessment. Wildlife Conservation Partnership, Wheathampstead.

6.7 Validity of the survey data and assessment

In line with guidance from the Chartered Institute of Ecology and Environmental Management,[24] these survey results can be considered valid for up to 18 months. Following this, the survey data should be reviewed and, if appropriate, updated to ensure any assessment and mitigation approach remains valid.

[24] CIEEM (2019). Advice Note on the Lifespan of Ecological Reports and Surveys [online]. Available at: https://cieem.net/resource/advice-note-on-the-lifespan-of-ecological-reports-and-surveys/. Accessed November 2023.

7 Appendices

A. Cofnod data

Table 3: Existing Cofnod data for bird species within 2km of the proposed Scheme between 2008 and 2018

Species are listed in vernacular name alphabetical order.

Distance from Scheme footprint (m)	Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN2 Regional Red List	Rare Breeding Birds Panel (GB)	Schedule 1	BoCC Wales 4	EU Birds Directive Annex 1
1236	Avocet	*Recurvirostra avosetta*	Amber	LC	Regular (Less scarce)	x	Green	x
0	Barnacle goose	*Branta leucopsis*	Amber	LC			Unlisted	x
1754	Barn owl	*Tyto alba*	Green	LC		x	Green	
165	Black-headed gull	*Chroicocephalus ridibundus*	Amber	VU			Red	
1236	Black-tailed Godwit	*Limosa limosa*	Red	EN	Regular (Rare)	x	Amber	
1853	Bullfinch	*Pyrrhula pyrrhula*	Amber	LC			Amber	
200	Common gull	*Larus canus*	Amber	LC			Amber	
0	Cormorant	*Phalacrocorax carbo*	Green	NT			Green	
1236	Curlew	*Numenius arquata*	Red	EN			Red	
400	Dunlin	*Calidris alpina*	Red	VU			Red	x (*schinzii*)
30	Dunnock	*Prunella modularis*	Amber	LC			Amber	
1206	Firecrest	*Regulus ignicapilla*	Green	LC		x	Amber	
1267	Garganey	*Spatula querquedula*	Amber	EN	Regular (Rare)	x	Amber	
1233	Grasshopper warbler	*Locustella naevia*	Red	LC			Red	
100	Great Black-backed gull	*Larus marinus*	Amber	EN			Amber	
200	Greylag goose	*Anser anser*	Amber	LC			Unlisted	
165	Herring gull	*Larus argentatus*	Red	EN			Red	
1590	House sparrow	*Passer domesticus*	Red	LC			Amber	
1360	Kestrel	*Falco tinnunculus*	Amber	VU			Red	
1519	Kingfisher	*Alcedo atthis*	Green	VU		x	Green	x
309	Lapwing	*Vanellus vanellus*	Red	VU			Red	
250	Lesser black-backed gull	*Larus fuscus*	Amber	DD			Red	
717	Linnet	*Linaria cannabina*	Red	LC			Red	

Distance from Scheme footprint (m)	Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN2 Regional Red List	Rare Breeding Birds Panel (GB)	Schedule 1	BoCC Wales 4	EU Birds Directive Annex 1
30	Little egret	*Egretta garzetta*	Green	LC	Regular (Less scarce)		Green	x
1921	Little ringed plover	*Charadrius dubius*	Green	LC	Regular (Scarce)	x	Green	
0	Mallard	*Anas platyrhynchos*	Amber	VU			Green	
500	Meadow pipit	*Anthus pratensis*	Amber	LC			Red	
640	Mediterranean gull	*Ichthyaetus melanocephalus*	Amber	LC	Regular (Less scarce)	x	Amber	x
70	Oystercatcher	*Haematopus ostralegus*	Amber	VU			Amber	
290	Peregrine	*Falco peregrinus*	Green	LC	Regular (Less scarce)	x	Green	x
60	Redshank	*Tringa totanus*	Amber	VU			Red	
60	Ringed plover	*Charadrius hiaticula*	Red	VU			Red	
250	Shelduck	*Tadorna tadorna*	Amber	EN			Red	
692	Skylark	*Alauda arvensis*	Red	LC			Amber	
1530	Song thrush	*Turdus philomelos*	Amber	LC			Green	
492	Spotted flycatcher	*Muscicapa striata*	Red	NT			Red	
165	Starling	*Sturnus vulgaris*	Red	VU			Red	
540	Stock dove	*Columba oenas*	Amber	LC			Green	
1233	Tree sparrow	*Passer montanus*	Red	VU			Red	
654	Yellowhammer	*Emberiza citrinella*	Red	LC			Red	
153	Yellow wagtail	*Motacilla flava*	Red	NT	Occassional [*flava]*		Red	

B. Breeding bird survey data for 2023

Table 4: Breeding bird survey data obtained in 2023 by Mott MacDonald

Species are listed in vernacular name alphabetical order.

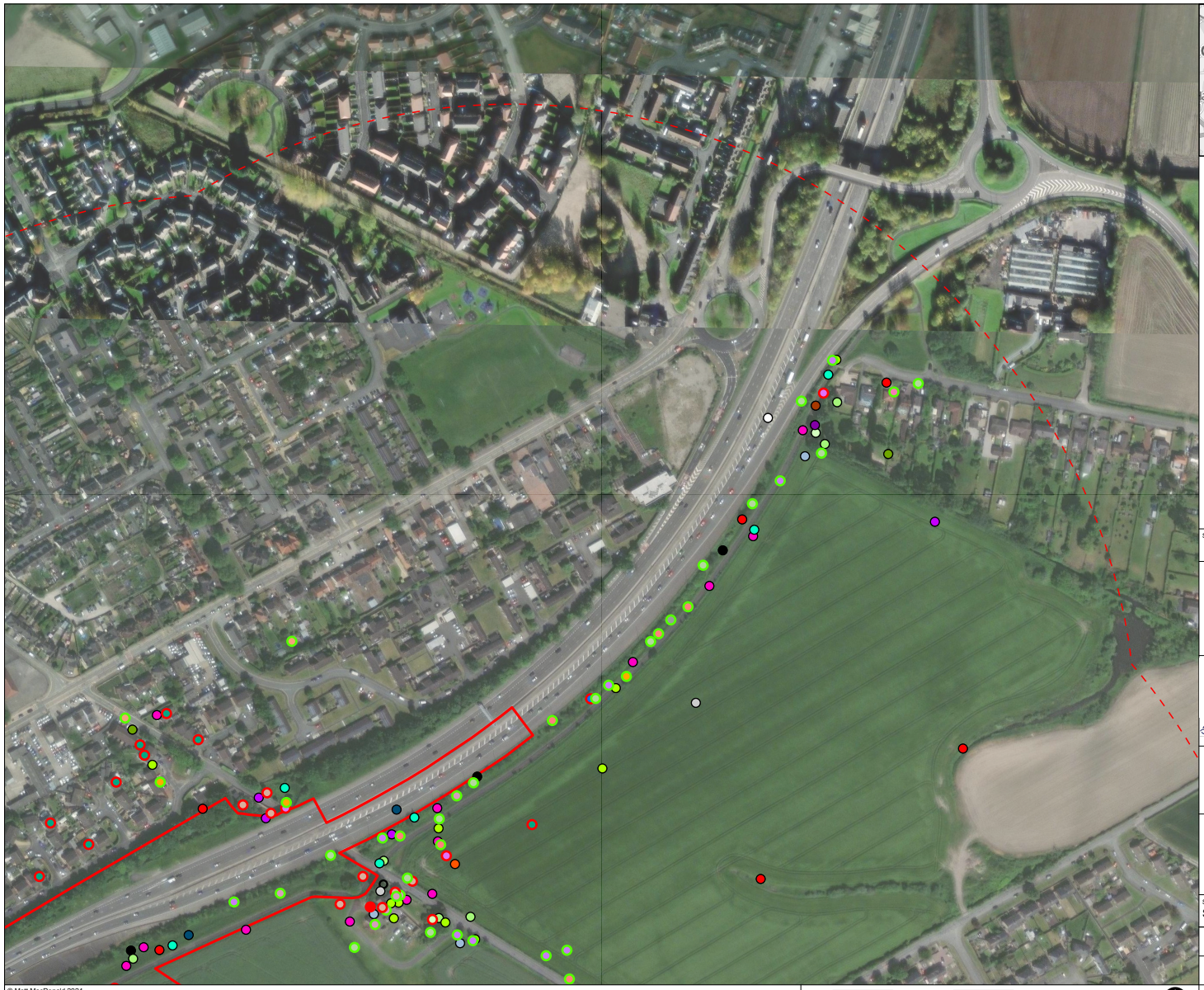
Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN2 Regional Red List	Rare Breeding Birds Panel (GB)	Schedule 1	Environment (Wales) Act Section 7	EU Birds Directive Annex 1	Peak Count
Blackbird	*Turdus merula*	Green	LC					39
Blackcap	*Sylvia atricapilla*	Green	LC					8
Black-headed gull	*Chroicocephalus ridibundus*	Amber	VU			x		64
Blue tit	*Cyanistes caeruleus*	Green	LC					13
Bullfinch	*Pyrrhula pyrrhula*	Amber	LC			x		2
Buzzard	*Buteo buteo*	Green	LC					3
Canada goose	*Branta canadensis*	Unlisted	Not Evaluated					12
Carrion crow	*Corvus corone*	Green	LC					17
Chaffinch	*Fringilla coelebs*	Green	EN					8
Chiffchaff	*Phylloscopus collybita*	Green	LC					15
Coal tit	*Periparus ater*	Green	LC					2
Collared dove	*Streptopelia decaocto*	Green	NT					6
Common sandpiper	*Actitis hypoleucos*	Amber	NT					4
Coot	*Fulica atra*	Green	VU					3
Cormorant	*Phalacrocorax carbo*	Green	NT					3
Curlew	*Numenius arquata*	Red	EN			x		1
Dunlin	*Calidris alpina*	Red	VU					1
Dunnock	*Prunella modularis*	Amber	LC			x		12
Goldcrest	*Regulus regulus*	Green	LC					1
Goldfinch	*Carduelis carduelis*	Green	LC					35
Grasshopper warbler	*Locustella naevia*	Red	LC			x		5
Great black-backed gull	*Larus marinus*	Amber	EN					35
Great crested grebe	*Podiceps cristatus*	Green	LC					1

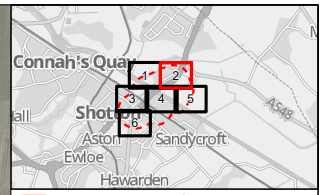
Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN2 Regional Red List	Rare Breeding Birds Panel (GB)	Schedule 1	Environment (Wales) Act Section 7	EU Birds Directive Annex 1	Peak Count
Great spotted woodpecker	*Dendrocopos major*	Green	LC					1
Great tit	*Parus major*	Green	LC					16
Greenfinch	*Chloris chloris*	Red	EN					5
Greylag goose	*Anser anser*	Amber	LC					1
Grey wagtail	*Motacilla cinerea*	Amber	NT					1
Herring gull	*Larus argentatus*	Red	EN			x		24
Hobby	*Falco subbuteo*	Green	NT	Regular (Less scarce)	x			1
House martin	*Delichon urbicum*	Red	NT					70
House sparrow	*Passer domesticus*	Red	LC			x		42
Jackdaw	*Coloeus monedula*	Green	LC					50
Kingfisher	*Alcedo atthis*	Green	VU		x		x	1
Lapwing	*Vanellus vanellus*	Red	VU			x		28
Lesser black-backed gull	*Larus fuscus*	Amber	DD					56
Little egret	*Egretta garzetta*	Green	LC	Regular (Less scarce)			x	6
Linnet	*Linaria cannabina*	Red	LC			x		10
Long-tailed tit	*Aegithalos caudatus*	Green	LC					21
Magpie	*Pica pica*	Green	LC					10
Mallard	*Anas platyrhynchos*	Amber	VU					27
Meadow pipit	*Anthus pratensis*	Amber	LC					2
Mistle thrush	*Turdus viscivorus*	Red	NT					3
Mute swan	*Cygnus olor*	Green	LC					2
Oystercatcher	*Haematopus ostralegus*	Amber	VU					26
Pied wagtail	*Motacilla alba*	Green	LC					6
Raven	*Corvus corax*	Green	LC					1
Redshank	*Tringa totanus*	Amber	VU					4
Reed bunting	*Emberiza schoeniclus*	Amber	LC			x		6
Ringed plover	*Charadrius hiaticula*	Red	VU			x		4
Robin	*Erithacus rubecula*	Green	LC					9
Rook	*Corvus frugilegus*	Amber	NT					4
Siskin	*Spinus spinus*	Green	LC					1

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN2 Regional Red List	Rare Breeding Birds Panel (GB)	Schedule 1	Environment (Wales) Act Section 7	EU Birds Directive Annex 1	Peak Count
Skylark	*Alauda arvensis*	Red	LC			x		5
Song thrush	*Turdus philomelos*	Amber	LC			x		4
Sparrowhawk	*Accipiter nisus*	Amber	VU					3
Starling	*Sturnus vulgaris*	Red	VU			x		92
Stock dove	*Columba oenas*	Amber	LC					1
Stonechat	*Saxicola rubicola*	Green	LC					2
Swallow	*Hirundo rustica*	Green	VU					39
Swift	*Apus apus*	Red	EN					16
Whitethroat	*Curruca communis*	Amber	LC					3
Woodpigeon	*Columba palumbus*	Amber	LC					32
Wren	*Troglodytes troglodytes*	Amber	LC					17

C. Maps


Connah's Quay
Shotton
Aston
Sandycroft
Ewloe
Hawarden
Site boundary
500m buffer
Status
Notable
Priority
Non-priority/Non-notable
Species
Blackbird
Bullfinch
Black-headed Gull
Blue Tit
Buzzard
Carrion Crow
Chiffchaff
Collared Dove
Canada Goose
Chaffinch
Coot
Curlew
Little Egret
Goldcrest
Grasshopper Warbler
Goldfinch
Greenfinch
Great Tit
Herring Gull
House Martin
House Sparrow
Hobby
KingFisher
Lapwing
Lesser Black-backed Gull
Mallard
Magpie
Oystercatcher
Pied Wagtail
Robin
Redshank
Raven
Ringed Plover
Skylark
Starling
Sparrow Hawk
Swift
Swallow
Song Thrush
Woodpigeon
Wren
Status Stamp
NOT FOR CONSTRUCTION
Coordinate system: British National Grid; Datum: OSGB 1936
Data sources: Maxar, Microsoft, Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack
Bird Survey Data: Mott MacDonald 2023
MOTT MACDONALD
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com
Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent
A494 River Dee Bridge Improvement
Breeding Bird Survey
Species Distribution and Status
Sheet: 1 of 6
Suitability Description
Suitable for Information
Drawn
M Hargest
GIS Checked
F Lumb
Checked
K Doneo
Approved
J Roberts
Scale at A3
1:3,000
Suit. Code
S2
Revision
02
Security
STD
395318-MMD-ZZ-XX-DR-Y-0210
© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.
0
50
100
150
200 m





Site boundary
500m buffer

Status
- Notable
- Priority
- Non-priority/Non-notable

Species
- Blackbird
- Blackcap
- Bullfinch
- Blue Tit
- Carrion Crow
- Collared Dove
- Canada Goose
- Chaffinch
- Dunnock
- Goldfinch
- Great Tit
- House Martin
- House Sparrow
- Jackdaw
- Lesser Black-backed Gull
- Long-tailed Tit
- Mistle Thrush
- Mallard
- Magpie
- Robin
- Rook
- Starling
- Swift
- Swallow
- Song Thrush
- Whitethroat
- Woodpigeon
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

RICHARDS PARTNERSHIP LTD
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Breeding Bird Survey
Species Distribution and Status
Sheet: 2 of 6

Suitability Description
Suitable for Information

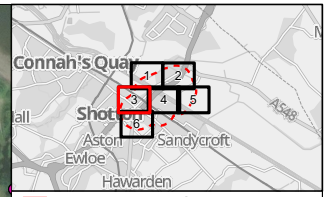
Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:3,000	S2	02	STD

395318-MMD-ZZ-XX-DR-Y-0210

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





Site boundary
500m buffer

Status
- Notable
- Priority
- Non-priority/Non-notable

Species
- Blackbird
- Bullfinch
- Blue Tit
- Buzzard
- Carrion Crow
- Collared Dove
- Chaffinch
- Little Egret
- Goldcrest
- Goldfinch
- Greenfinch
- Great Tit
- Herring Gull
- Lesser Black-backed Gull
- Magpie
- Oystercatcher
- Pied Wagtail
- Robin
- Ringed Plover
- Sparrow Hawk
- Swallow
- Song Thrush
- Whitethroat
- Woodpigeon
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Breeding Bird Survey
Species Distribution and Status
Sheet: 3 of 6

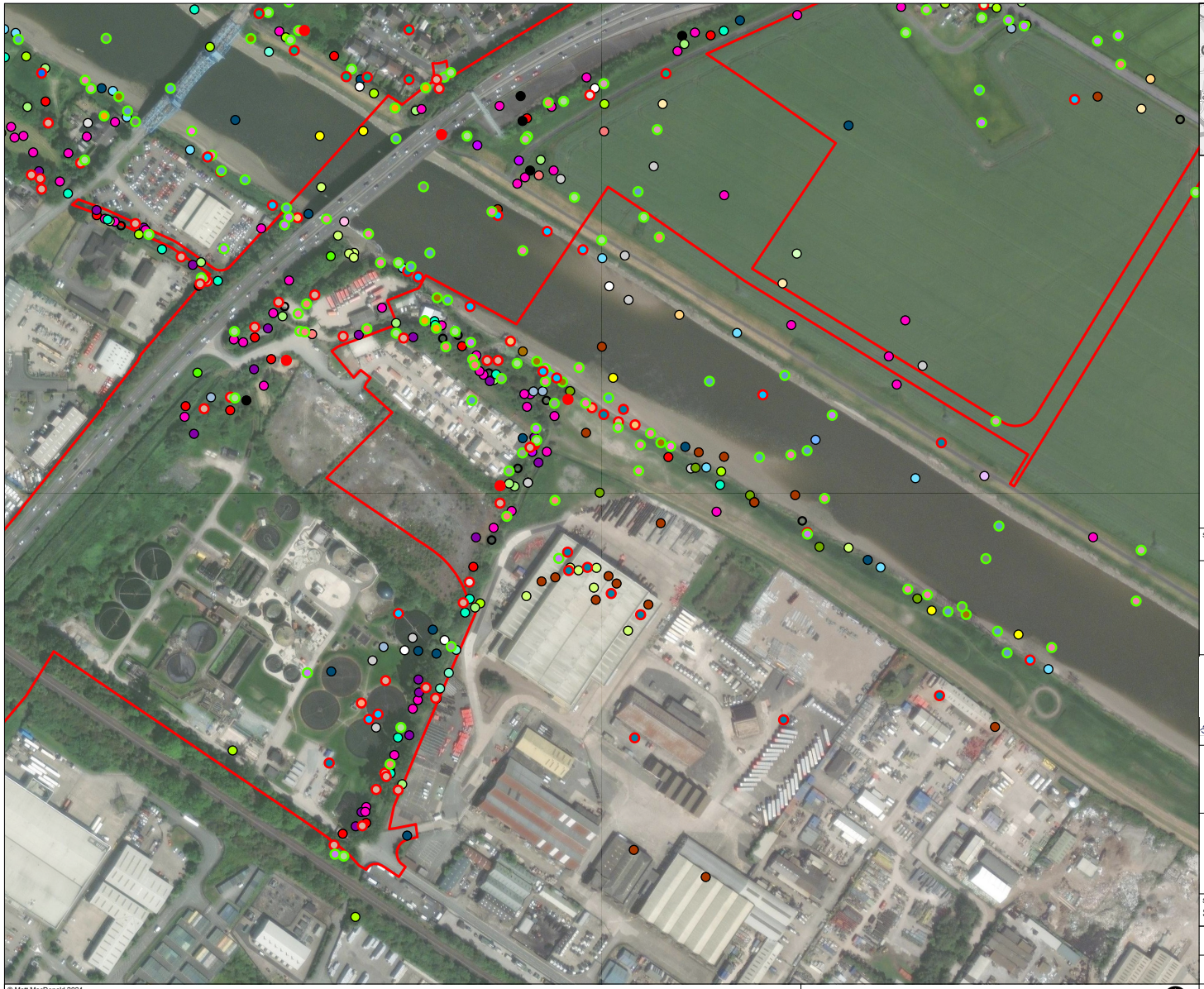
Suitability Description
Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:3,000	S2	02	STD

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m

395318-MMD-ZZ-XX-DR-Y-0210



Site boundary
500m buffer

Status
- Notable
- Priority
- Non-priority/Non-notable

Species
- Blackbird
- Blackcap
- Bullfinch
- Black-headed Gull
- Blue Tit
- Buzzard
- Carrion Crow
- Cormorant
- Chiffchaff
- Collared Dove
- Chaffinch
- Coot
- Common Sandpiper
- Dunlin
- Little Egret
- Goldcrest
- Grasshopper Warbler
- Greylag Goose
- Grey Wagtail
- Goldfinch
- Greenfinch
- Great Tit
- Herring Gull
- House Martin
- House Sparrow
- Jackdaw
- KingFisher
- Lapwing
- Lesser Black-backed Gull
- Little Egret
- Linnet
- Long-tailed Tit
- Mistle Thrush
- Mallard
- Magpie
- Oystercatcher
- Pied Wagtail
- Robin
- Reed Bunting
- Redshank
- Ringed Plover
- Stonechat
- Starling
- Swift
- Siskin
- Swallow
- Song Thrush
- Whitethroat
- Woodpigeon
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
RICHARDS MOORLAND
PLANNING | LANDSCAPE | ENVIRONMENT

Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Breeding Bird Survey
Species Distribution and Status
Sheet: 4 of 6

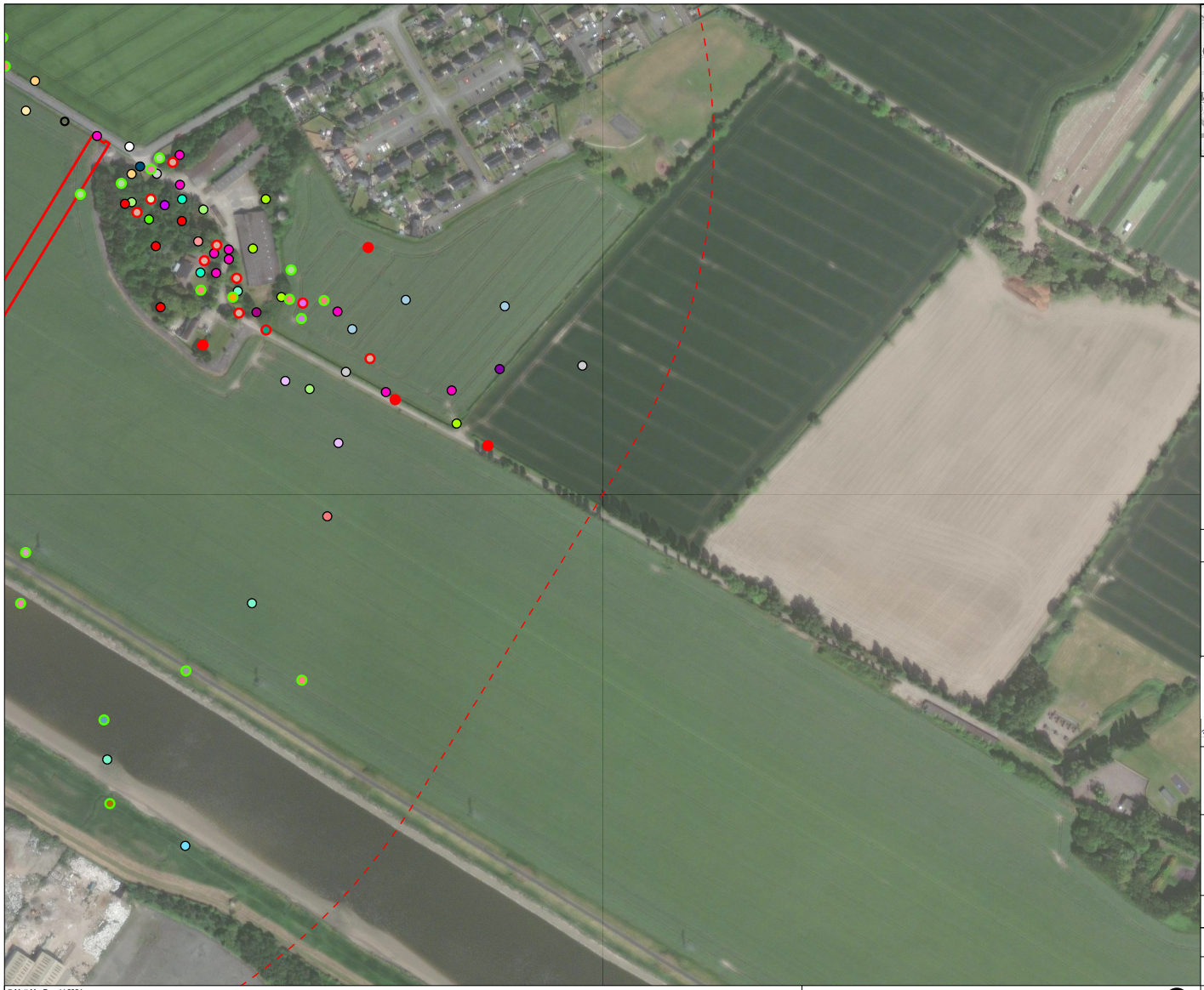
Suitability Description
Suitable for Information

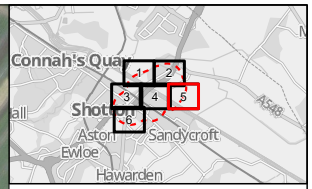
Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:3,000	S2	02	STD

395318-MMD-ZZ-XX-DR-Y-0210

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





Site boundary
500m buffer

Status
- Notable
- Priority
- Non-priority/Non-notable

Species
- Blackbird
- Blackcap
- Blue Tit
- Buzzard
- Carrion Crow
- Chiffchaff
- Collared Dove
- Chaffinch
- Coal Tit
- Dunnock
- Little Egret
- Goldfinch
- Great Spotted Woodpecker
- Great Tit
- House Martin
- House Sparrow
- Lapwing
- Linnet
- Long-tailed Tit
- Mistle Thrush
- Mallard
- Magpie
- Oystercatcher
- Pied Wagtail
- Robin
- Reed Bunting
- Skylark
- Stonechat
- Starling
- Swift
- Swallow
- Woodpigeon
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Breeding Bird Survey
Species Distribution and Status
Sheet: 5 of 6

Suitability Description
Suitable for Information

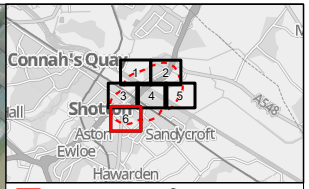
Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:3,000	S2	02	STD

395318-MMD-ZZ-XX-DR-Y-0210

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





Site boundary
500m buffer

Status
- Notable
- Priority
- Non-priority/Non-notable

Species
- Blackbird
- Blackcap
- Black-headed Gull
- Blue Tit
- Buzzard
- Carrion Crow
- Collared Dove
- Canada Goose
- Chaffinch
- Coal Tit
- Goldcrest
- Goldfinch
- Greenfinch
- Herring Gull
- House Sparrow
- Jackdaw
- Lesser Black-backed Gull
- Long-tailed Tit
- Mistle Thrush
- Mallard
- Magpie
- Mute Swan
- Robin
- Stock Dove
- Starling
- Sparrow Hawk
- Swallow
- Song Thrush
- Whitethroat
- Woodpigeon
- Wren

Status Stamp

NOT FOR CONSTRUCTION

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Maxar, Microsoft, Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack

Bird Survey Data: Mott MacDonald 2023

MOTT MACDONALD
Ground Floor, Royal Liver Building
Pier Head
Liverpool
L3 1JH
United Kingdom
T +44 (0)151482 9910
W mottmac.com

RICHARDS Mouchel Ltd
PLANNING | LANDSCAPE | ENVIRONMENT

Asiant Cefnffyrdd Gogledd a Chanolbarth Cymru
North & Mid Wales Trunk Road Agent

A494 River Dee Bridge Improvement
Breeding Bird Survey
Species Distribution and Status
Sheet: 6 of 6

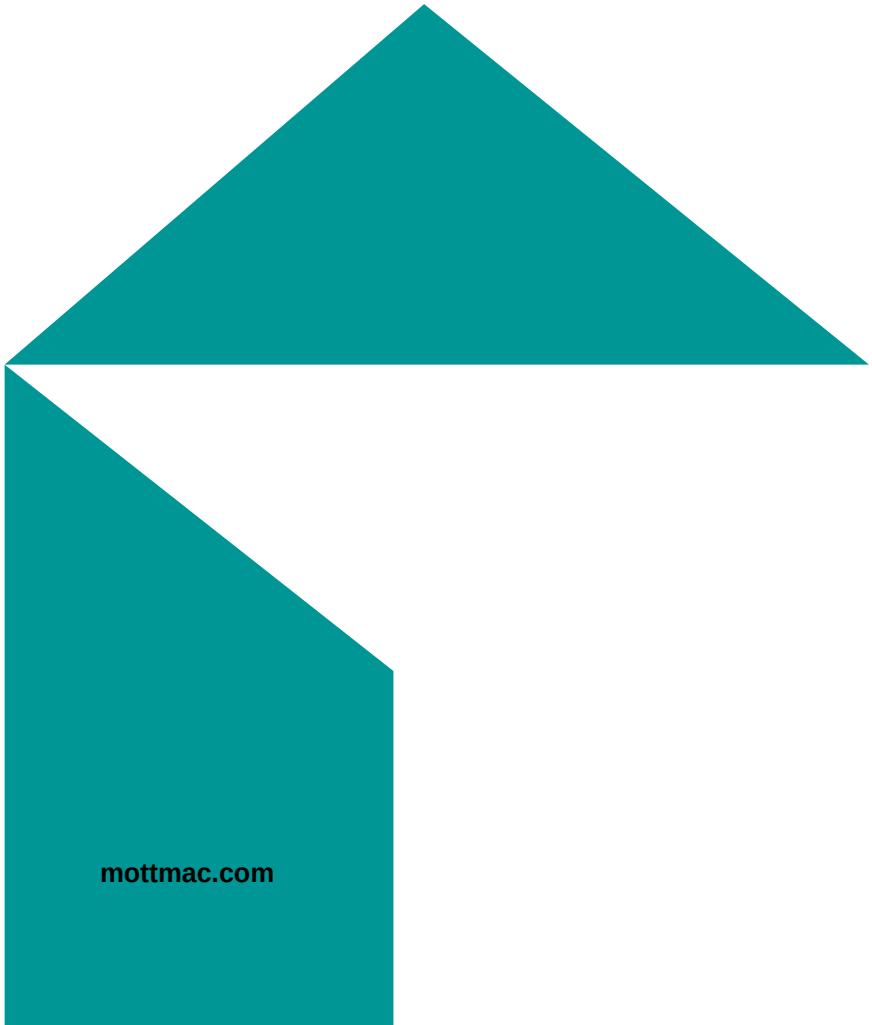
Suitability Description
Suitable for Information

Drawn	GIS Checked	Checked	Approved
M Hargest	F Lumb	K Doneo	J Roberts
Scale at A3	Suit. Code	Revision	Security
1:3,000	S2	02	STD

395318-MMD-ZZ-XX-DR-Y-0210

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m



mottmac.com

8.6 Breeding Bird Technical Report - November 2024

MOTT MACDONALD

A494 River Dee Bridge Improvement Scheme - Airbus Load Out Facility

Breeding Bird Technical Report

November 2024

This page left intentionally blank for pagination.

Mott MacDonald
4th Floor
Derwent House
150 Arundel Gate
Sheffield S1 2JY
United Kingdom

T +44 (0)114 2761242
mottmac.com

A494 River Dee Bridge Improvement Scheme - Airbus Load Out Facility

Breeding Bird Technical Report

December 2024

Mott MacDonald Limited. Registered in England and Wales no. 1243967.
Registered office: 10 Fleet Place, London EC4M 7RB, United Kingdom

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	12/12/24	B. Turner/B. Gray	K. Doneo	J Dunning	For client comment

Document reference: 395318-MMD-00-XX-RP-Z-0011 | P01 |

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

Executive summary 1

1 Introduction 2
1.1 Project background 2
1.2 Site description 2
1.3 Aims and objectives of this report 3
1.4 Nomenclature 4

2 Legislation, Policy and Guidance 5
2.1 Legislation 5
2.1.1 Wildlife and Countryside Act 1981 5
2.1.2 Birds of Conservation Concern Wales 4 and the IUCN regional Red List 5
2.1.3 Environment (Wales) Act 2016 5
2.1.4 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 6
2.2 The Conservation of Habitats and Species Regulations 2017, including the Wild Bird Habitat Duty 6
2.3 Planning Policy Wales 6
2.3.1 Step-Wise Approach, Biodiversity Protection and Ecosystem Resilience 6
2.3.2 Local Planning Policy 8

3 Methodology 9
3.1 Desktop study 9
3.2 BTO Data Report 9
3.3 Field survey 10
3.3.1 Survey area 10
3.4 Limitations and assumptions 12

4 Results 13
4.1 Desk study 13
4.1.1 Wild bird habitats 13
4.1.2 Cofnod 15
4.1.3 The BTO Data Report 15
4.1.4 Overview 15
4.1.5 Spatial scale context 17
4.1.6 BTO Data Report 17
4.2 Breeding bird survey data 17

5 Conclusion 22
5.1.1 Schedule 1 Species 23
5.2 Recommendations and mitigation 23
5.2.1 Increased levels of disturbance via construction activities, lighting and personnel 24
5.2.2 Avoidance of available habitat suitable for breeding and foraging 24
5.2.3 Noise 25
5.2.4 Artificial Lighting 26
5.2.5 Best practice measures during construction 26
5.3 Further surveys 26
5.4 Validity of the survey data and assessment 26

A. Breeding bird historical records 27

B. BTO notable species 33

C. Cofnod Dataset 38

D. Breeding bird maps 40

Executive summary

Mott MacDonald Limited was appointed by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake breeding bird surveys as part of the proposed A494 River Dee Bridge Improvements Scheme. Surveys in 2024 were commissioned to conduct surveys of the former Airbus Load Out Facility (ALOF), an area added to the Scheme boundary as it is required to assemble a jack up barge required for the construction of the river piers.

The purpose of this report is to document the results of the desk study and breeding bird surveys carried out. The desk study comprised of a review of designated sites and of existing species records within 2km of the proposed scheme footprint. It was undertaken using data from the Cofnod, a detailed Data Report commissioned from the British Trust for Ornithology (BTO) and the Multi Agency Geographical Information for the Countryside (MAGIC) website.

The proposed scheme footprint is located in an impact risk zone associated with the River Dee (England) SSSI, Inner Marsh Farm (SSSI) and Dee Estuary (SSSI, SPA and Ramsar). The proposed scheme is also located in a priority area for Countryside Stewardship measures which target curlew (*Numenius arquata*) and lapwing (*Vanellus vanellus*) conservation.

Biological records within 2km (Cofnod) identified 41 'priority' species, and the BTO Data Report highlighted 34 'notable' species within 10km (i.e. those deemed notable at various spatial scales by the BTO Data Report), respectively.

Breeding bird surveys were undertaken between May and August 2024 following the Bird Survey & Assessment Steering Group survey guidance (2023), to provide contemporary and site-specific information as to the breeding bird assemblage present. The field surveys recorded a total of 20 species to be 'notable' in terms of range and/or abundance at various spatial scales and 39 'priority' species, comprising:

- One Schedule 1 species (This species listed as Annex 1 and RBBP);
- 12 species listed on Section 7 of the Environment (Wales) Act 2016;
- Two species listed as designated features under the River Dee SPA/Ramsar;
- 13 Red Listed species;
- 12 Amber Listed species;
- One species listed by the Rare Breeding Birds Panel;
- One species listed by IUCN2 as Endangered;
- Eight species listed by IUCN2 as Vulnerable; and
- Five species listed by IUCN2 as Near Threatened

The results of the assessment show that the zone of influence and Scheme footprint supports a wide range of 'notable' and 'priority' species, particularly farmland, grassland and estuarine bird species assemblages. The desk and field data together highlight the importance of various habitats for birds in the survey area. Recommendations and advice are given based on these results in the report. Disturbances to breeding species are expected to temporary and limited to the construction phase, these are not thought to affect local breeding populations. The impacts of disturbances associated with increased barge traffic will be assessed in the 2025 breeding bird technical report. Recommendations involve following best practices to minimise disturbance to breeding and foraging birds and further surveys to determine the prescence or likely absence of two Schedule 1 species (barn owl *Tyto alba* and hobby *Falco subbuteo*) through habitat suitability assessments.

1 Introduction

1.1 Project background

Mott MacDonald Limited was commissioned by the North and Mid Wales Trunk Road Agency (NMWTRA) to undertake a desk study and a suite of breeding bird surveys in support of an on-line improvement of approximately 1.75km of the A494 between the River Dee and the Queensferry Interchange in collaboration with Richards Moorehead & Laing Ltd (RML), hereafter referred to as the 'Scheme'

As part of the Scheme, RML were assigned to carry out ecological surveys for the A494 River Dee Bridge Improvements Scheme (Key Stage 3-4). In 2018, a preliminary ecological survey was undertaken which highlighted the requirement for breeding bird surveys. These recommended breeding bird surveys were undertaken between April 2023 and July 2023 and a breeding bird technical report was published by Mott MacDonald in January 2024[1]. This report assessed the baseline conditions and outlined recommendations applicable to the Scheme, in relation to breeding birds. The results of these surveys formed the basis for the assessment present in Chapter 08 – Nature Conservation of the Environmental Statement (ES) and Statement to Inform an Appropriate Assessment (SIAA)[2].

In March 2024 Mott MacDonald Ltd were commissioned to undertake a desk study and suite of breeding bird surveys of the former Airbus Load Out Facility (ALOF), this area was added to the Scheme boundary as it is required to assemble a jack up barge required for the construction of the river piers. The ALOF is a ramped access to a jetty that was formerly used to load wings manufactured at the Airbus factory onto a barge that transported the wings down river to Mostyn Docks. When operational, regular dredging of the river was required to ensure sufficient depth of water to float the barge. The ALOF is likely to be required for the construction of the jack up barge in the early stages of the project and at the end for the dismantling of the barge. There is also likely to be barge traffic during construction. Localised dredging of the river may be required subject to further investigation of the riverbed and detailed operational requirements of the appointed Contractor (hereafter referred to as the ALOF proposed works).

This report provides the baseline conditions and outlines recommendations applicable to the ALOF (hereafter referred to as the ALOF area), upstream of the Scheme footprint only, following a suite of breeding bird surveys conducted in the 2024 breeding season.

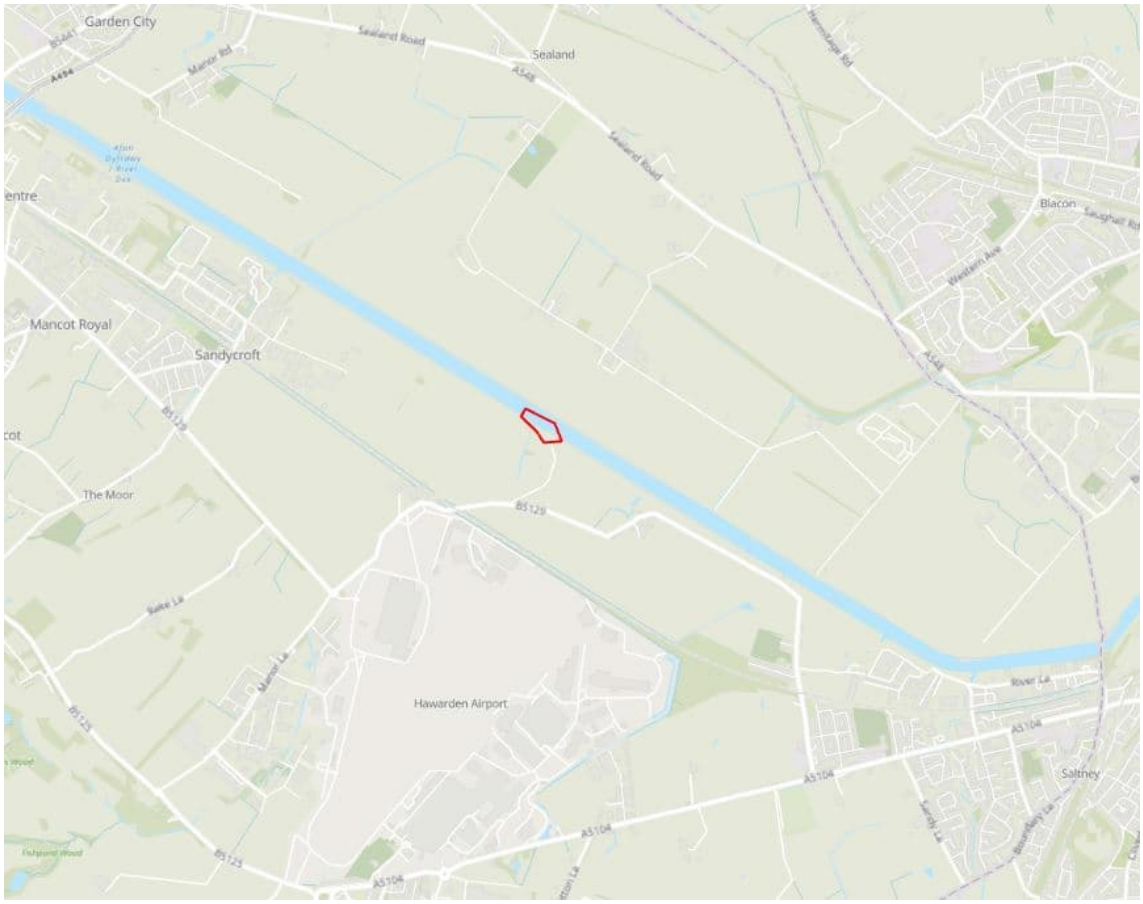
1.2 Site description

The River Dee is a river flowing through North Wales and Cheshire and discharges into the Irish sea in an estuary between the Wirral peninsula and Flintshire. The ALOF area is located on the south bank of the River Dee on a between Sandycroft, Flintshire and Chester, Cheshire (central National Grid Reference SJ 35382 66714). Breeding bird surveys in 2024 focused on the ALOF area upstream from the A494 bridge (refer to Figure 1.1 for ALOF area extents) approximately 3.5km to the southeast (central National Grid Reference SJ 35364 66724). Both the bridge and the ALOF can be found on a canalised section of the river which has been dredged. The river is tidal at both the A494 bridge and the ALOF area.

[1] A494 River Dee Bridge Improvement Scheme, Mott MacDonald (2024), document reference: 395318-0175

[2] June 2022 (Issued for review prior to publication): A494 River Dee Bridge Improvements Scheme Key Stage 3-4. Environmental Statement: Volume 1 Chapter 2: The Project Document Reference 395318-0039-CH02-F Welsh Government

Figure 1.1: ALOF area



Source: OS Zoomstack, Esri UK, Esri, TomTom, Garmin, FourSquare, METI/NASA, USGS

At the point of the ALOF, both riverbanks are dominated by arable and pastoral fields. The wider landscape comprises a mix of urban and industrial built-up area and farmland with the closest urban centres being Chester, approximately 3km east, and Sandycroft, approximately 2km west. Approximately 0.80km to the south of the ALOF area lies Hawarden airport. The 2024 survey area comprised the arable and pastoral farmland on the riverbanks, boundary habitat features such as hedgerows, scrub and lines of trees, and the River Dee and it's intertidal zone.

The ALOF area is functionally linked to the River Dee Estuary Special Protection Area (SPA) and Ramsar site which is designated for its wintering and migrant bird assemblages and for breeding little tern *Sternula albifrons* and common tern *Sterna hirundo*.

1.3 Aims and objectives of this report

The aim of this report is to present the baseline conditions within, and surrounding, the ALOF area with respect to potential impacts on breeding birds. This report includes the results of a desk study together with the results of a suite of breeding bird surveys undertaken during 2024.

1.4 Nomenclature

Vernacular and scientific bird names follow those of the 10th Edition of the British Ornithologists' Union (BOU) official list of species recorded in Great Britain.[3]

[3] British Ornithologists' Union, 2022. The British List: A Checklist of Birds of Britain (10th edition). Ibis 164: 860–910.

2 Legislation, Policy and Guidance

2.1 Legislation

2.1.1 Wildlife and Countryside Act 1981

In the UK, all wild birds (irrespective of species), their nests and their eggs are protected by the Wildlife and Countryside Act 1981 (as amended). Offences under this act include:

- Intentionally killing, injuring or taking any wild bird;
- Intentionally taking, damaging or destroying the nest of any wild bird whilst it is in use or being built; and
- Intentionally taking or destroying the egg of any wild bird.

Birds listed on Schedule 1 of the Wildlife and Countryside Act are afforded have further protection making it an offence to disturb, either intentionally or recklessly, disturb any wild bird listed on Schedule 1 species when breeding. This period runs from the commencement of while it is nest building until the young are independent.

2.1.2 Birds of Conservation Concern Wales 4 and the IUCN regional Red List

Birds of Conservation Concern Wales 4 (BoCCW is the fourth review of the status of bird species in Wales. The authors use a 'Red', 'Amber' and 'Green' system to classify the conservation status of the most regularly occurring 220 species in the Wales. Published in December 2022, it updates the last assessment undertaken in 2015.[4]

Birds of Conservation Concern 5 (BoCC5 – the fifth review of the status of bird species in the UK, Channel Islands and Isle of Mann)[5] is incorporated the second IUCN Red List ('IUCN2' hereafter) assessment of extinction risk for birds in Great Britain. Each species was assessed against various thresholds, which if met or exceeded, qualified it for one of the standard IUCN Red List threat categories, i.e. Extinct, Regionally Extinct, Critically Endangered, Endangered, Vulnerable, Near Threatened and Least Concern.

2.1.3 Environment (Wales) Act 2016

The 1981 Act is also supplemented by the Environment (Wales) Act 2016, which enhances the protection to certain habitats and species and places a duty on governments and public bodies/authorities 'to manage natural resources sustainably'. Section 6 of the Environment (Wales) Act introduces an enhanced duty to maintain and enhance biodiversity, whilst Section 7 requires biodiversity lists to be produced. These lists include types of habitats which are of 'principal importance' for the purpose of maintain and enhancing biodiversity in relation to Wales and supersedes the duty of the Natural Environment and Rural Communities Act 2006 (NERC)

[4] Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. & Taylor, R.C. 2022. *Birds of Conservation Concern Wales 4: the population status of birds in Wales.* Available at: https://www.bto.org/sites/default/files/birds_of_conservation_concern_wales_4_2022.pdf..

[5] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win, I., 2021. *The status of our bird populations: The fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723–747.* Available at: https://www.bto.org/sites/default/files/publications/bocc-5-a5-4pp-single-pages.pdf.

Mott MacDonald Restricted

in Wales. The Local Authority therefore must consider the impact on biodiversity of the proposed development.

2.1.4 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 ('the 'EIA regulations') requires an EIA to identify, describe and assess the significant effects with particular attention to amongst other things, species listed on Annex 1 of the birds EU Birds Directive.[6]

2.2 The Conservation of Habitats and Species Regulations 2017, including the Wild Bird Habitat Duty

These regulations comprise elements of domestic law that transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Birds Directive (Directive 2009/147/EC) (known as the Nature Directives) predominantly in England and Wales following the UK's departure from the European Union. Any planning permission granted by a general development order which is:

- Likely to result in a significant effect upon a "Habitats Site' (either alone or in-combination with other plans or projects);
- Is not directly connected with or necessary to the management of the site;
- Cannot commence without prior approval from the local planning authority.
  Under the Wild Bird Habitat Duty, competent authorities must take appropriate steps to help:
- Preserve, manage and re-establish habitat that is large and varied enough for wild birds to support and maintain their populations in the long term; and
- Avoid any pollution or deterioration of wild bird habitat as far as possible.

2.3 Planning Policy Wales

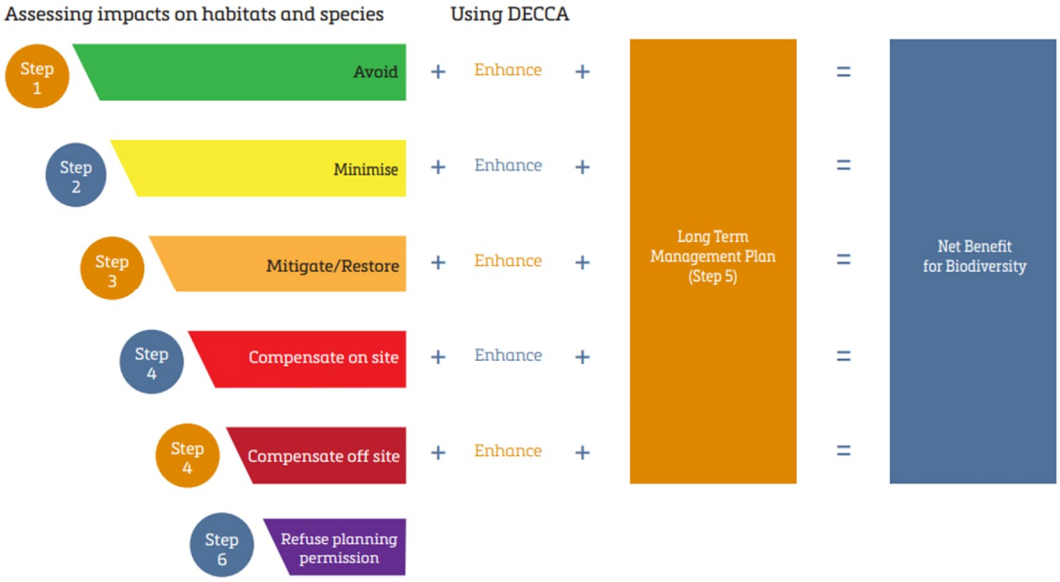
2.3.1 Step-Wise Approach, Biodiversity Protection and Ecosystem Resilience

In terms of planning policy, under Chapter 6 of Planning Policy Wales (PPW) 2024, planning authorities follow a Step-wise Approach (see Figure 2.1) to maintain and enhance biodiversity, build resilient ecological networks and deliver net benefits for biodiversity.[7]

[6] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Codified version). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147.

[7] Welsh Government. (2024). Planning Policy Wales (PPW). Chapter 6: Biodiversity and Ecological Networks. Cardiff: Welsh Government.

Figure 2: The Step-wise Approach (Mitigation Hierarchy)



Source: Planning Policy Wales 12 (2024)

This places a requirement on development to evidence consideration of biodiversity and the Step-wise Approach in decision making, which will include a need to:

- Support the conservation of native habitats and species, thus conserving biodiversity at a landscape scale and contributing to international responsibilities and obligations;
- Ensure statutory and non-statutory designated sites are properly protected and managed;
- Safeguard protected and/or Priority Habitats and Species from impacts which directly affect their nature conservation interests, comprises the resilience of ecological networks or the components which underpin them, such as water and soil, including peat deposits; and
- Secure enhancement of, and improvements to, ecosystem resilience by improving Diversity, Extent, Condition, Connectivity and Adaptability of ecological networks (otherwise known as the DECCA framework).

A particular weight is placed on the importance of irreplaceable habitats and on peatlands, loss of which would only be permitted under wholly exceptional circumstances. Additionally, any development within the boundary of a designated site is considered unacceptable and will only be granted planning permission in exceptional circumstances.

The importance of safeguarding hedgerows, woodland and trees is also promoted under PPW. Loss of these habitats is only permitted where the development will achieve significant and clearly defined public benefits. Under this circumstance, PPW states that compensatory planting is required at a ratio proportionate to the biodiversity, landscape and carbon capture value of the trees lost. This should be a minimum of 3:1 for trees lost or, for woodland planting, at a density of 1600 trees per hectare for broadleaves and 2500 trees per hectare for conifers.

2.3.2 Local Planning Policy

The site lies within the administrative area of Flintshire Council (FC). Policies considered to be of ecological relevance and their objectives to this site as part of the FC Local Development Plan (LDP) 2015-2030 (2023)[8] area as follows:

- **STR13 Natural and Built Environment, Green Networks and Infrastructure** – landscapes and coastline will be protected and where feasible, enhanced.
  - Conserve, protect and enhance the quality and diversity of Flintshire's natural environment including landscape, biodiversity, the Dee Estuary and the Clwydian Range and Dee Valley Area of Outstanding Natural Beauty (AONB)
- **STR14 Climate Change and Environmental Protection** – Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution levels.
  - Encouraging the use and development of appropriate or suitable brownfield land;
  - Ensuring that new developments have regard to the protection of the environment in terms of air, noise and light pollution, unstable and contaminated land and former landfill sites, and;

Designing developments to be adaptable and resilient to future effects of climate change.

[8] Flintshire County Council (2023). *Flintshire Local Development Plan 2015-2030*. Available at: https://www.flintshire.gov.uk/en/PDFFiles/Planning/Examination-Library-Documents/FINAL-LDP-Written-Statement-English.pdf.

3 Methodology

Baseline breeding bird data were obtained via both a desk study and on-site surveys undertaken in 2024.

3.1 Desktop study

Site of special scientific Interest (SSSI) impact risk zones (IRZ) used to inform the study. These were developed by Natural England to assess potential adverse impacts of development on SSSI designated features, Ramsar Sites and the National Site Network, within England. Whilst the site is in Wales it is 2.02km from the English border and as such IRZ may extend into Wales towards the Site. The IRZ buffers reflect different types of development proposal and their associated potential adverse impacts.

Statutory sites designated for their local, county and national importance with bird species as a reason for designation (i.e., SSSI's) within 2.0km of the proposed scheme, and sites designated for their international importance with bird species as a reason for designation (i.e., SPA/SAC/Ramsar) within 10.0km of the proposed scheme have also been considered, have also been considered.

A desk study was undertaken in 2023 to collate existing breeding bird data in the vicinity of the Scheme. Data was also obtained British Trust for Ornithology (BTO)[9] and relevant publicly available data, publications, reports and online databases. These include:

- Cofnod (https://www.cofnod.org.uk);
- Previous survey data report (Mott MacDonald, 2023);
- Defra's MAGIC.gov website; (https://magic.defra.gov.uk/MagicMap.aspx); and

3.2 BTO Data Report

The BTO Data Report covered the 10km Ordnance Survey grid square in which the site is located (SJ36). The BTO Data Report collated and analysed comprehensive (2007–2011) and contemporary (2019–2023) bird data relating to this grid square. For contextual analyses, data from relevant squares are related to equivalent data from one vice-county, one county, one region, one country and the UK to assess species' importance in the vicinity of the site.

BTO Data Reports pay particular attention to 'notable species'. Notable species are defined as those for which the species' percentage range and / or relative abundance is at least twice the site's percentage size, except at the UK scale, where species are described as notable if the site and vicinity account for ≥2% of the species' range and / or relative abundance. The BTO Data Report, summarised in Appendix B, includes a comprehensive species list of all notable breeding bird species.

[9] BTO (2023). BTO Data Report A494. BTO services Ltd, the Nunnery, Thetford, Norfolk.

3.3 Field survey

A total of six breeding bird surveys were carried out between May 2024 and August 2024, inclusive, by experienced ornithologists. All six surveys commenced in the early morning as per standard industry guidance.[10]

3.3.1 Survey area

The survey area comprised the intertidal areas of the River Dee, farmland, woodland, grassland, and some rural residential and industrial buildings within the ALOF area and a suitable zone of influence (see below) most likely used by wild birds. These habitats are important in the context of the rural and built-up environment within which the wider Scheme is located, and most likely to support important ecological features, i.e. those species that are considered important and may potentially be impacted by the ALOF proposed works[11].

A zone of influence was defined by experienced ornithologists. This zone of influence comprises:

- Habitats of principal importance within the survey area include lowland fens and reedbeds and traditional orchards;
- Areas directly within the land take for the proposed Scheme and access (i.e. the Scheme footprint); and
- Areas which may be temporarily and permanently affected during construction. This includes habitats within a 400m zone around the Scheme footprint.

Survey transect routes and listening points were devised to enable the surveyors to access a representative sample of the habitats and included all open water, wetland, farmland, grassland, dense scrub, and buildings within the survey area.

The route walked was reversed on alternate visits to avoid potential temporal bias.[12] Surveyors walked at a slow ambling pace, stopping to scan and listen at priority habitats and features, where appropriate. All species of birds observed within and considered to be using or associated with the survey area and proposed scheme footprint were recorded.

3.3.1.1 Visit timings

Survey visits were conducted within the 2024 breeding season (1 April–31 July) defined by Gillings [13] and the Bird Survey & Assessment Steering Group within the guidance survey windows (CIEEM, 2019). The final survey visit took place on 19th August 2024, whilst this is outside of the optimal survey season, August surveys allow for the improved detection of late-arriving migrant breeding species.

In order to maintain detection of breeding bird activity, the surveys were conducted where practicable in optimal or near optimal conditions and avoided periods of heavy rainfall and / or strong winds (i.e. above Beaufort Force 4) wherever possible. Table 3.1 details weather conditions on the survey visits completed over each week.

[10] Bird Survey & Assessment Steering Group. (2023). Bird Survey Guidelines for assessing ecological impacts, v.1.1.0. Accessed at: https://birdsurveyguidelines.org.

[11] Chartered Institute of Ecology and Environmental Management, 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

[12] Marchant, J.H. (1983). Common Birds Census Instructions. Tring: British Trust for Ornithology

[13] Gillings, S., Balmer, D. E., Caffrey, B. J. & Swann, B., (2013). Survey methods and data sources. In: Balmer, D. E., Gillings, S., Caffrey, B. J., Swann, R. L., Downie, I. S. & Fuller, R. J. (eds), 2013. Bird Atlas 2007–11 The Breeding and Wintering Birds of Britain and Ireland. BTO Books, Thetford, UK. pp.34–45.

Table 3.1: Breeding bird survey conditions.

Visit number	Dates	Times (start/finish)	Temperature (ºC) (start/finish)	Wind (Beaufort) (start/finish)	Cloud cover (Okta) (start/finish)
1	1 May 2024	06:30/09.45	10/15	2/2	4/2
2	15 May 2024	05:30/09:45	14/18	2/2	6/7
3	30 May 2024	05:30/09:00	12/14	3/4	6/8
4	28 June 2024	05:15/08:45	14/16	3/3	4/5
5	23 July 2024	05:30/08:30	16/20	2/2	4/5
6	19 August 2024	07:00/11:00	12/16	½	5/6

Source: Mott MacDonald, 2024

3.3.1.2 Data collection

All of the following priority species, either seen or heard, were recorded using ESRI's FieldMaps for ArcGIS on Android mobile or tablet devices and mapped across the survey area:

3.3.1.3 Priority bird species

- Birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);
- Qualifying interest features of a statutory or non-statutory designated site;
- A species of principal importance for maintaining and enhancing biodiversity as listed under Section 7 of the Environment (Wales) Act 2016;
- Red and Amber listed bird species in Birds of Conservation Concern (BoCC) Wales 4 (2022);
- Localised or highly specialised species regardless of inclusion above;
- Nationally- or locally- declining species regardless of inclusion above;
- Rare Breeding Bird Panel Species;[14]
- Colonial nests or roost sites containing more than one individual or any species;
- Exceptional counts or aggregations of any species (in the context of habitats on site);
- Species evaluated as Critically Endangered, Endangered or Vulnerable on the International Union for Conservation of Nature (IUCN) Regional Red List assessment of extinction risk for Great Britain (IUCN2); and / or
- Species listed under Annex I of the European Birds Directive.

3.3.1.4 Notable bird species

For the purposes of this report, species which are listed by the BTO Data Report as 'notable' are categorised at each of the following spatial scales:

- Vice-county (Flintshire);
- County (Clwyd);
- Region (East Wales);
- Country (Wales);
- United Kingdom

[14] Rare Breeding Bird Panel website: Species – overview – UK Rare Breeding Birds Panel. Available at:https://www.rbbp.org.uk.

Whilst the primary aim of the data collection is to support the planning process, the British Standards Institution's Biodiversity Code of Conduct for Planning and Development (BS 42020:201310)[15] recommends data are collected in a way that facilitates the process of making the data available to local, county and / or national recording schemes, when this has the agreement with the project proponent.

3.4 Limitations and assumptions

- Survey transects were limited to public rights of way (PRoW) due to land ownership constraints. This is not considered to have impacted results as surveying from PRoWs allowed for the sufficient coverage of the survey area;
- Biological records obtained from third parties and presented in the desk study do not represent a full and complete species list for the area. They are given voluntarily by individuals on an ad-hoc basis, often meaning there may potentially be areas of deficiency in the data;
- Local historic records from Cofnod and the BTO data report used for the desk study was commissioned in 2023, this is not considered a significant constraint as comprehensive and contemporary data sets provide a long-term overview of the species assemblage across many years, as such it is not expected that a single years data would have a significant impact to the desk study data;
- The absence of a species is not conclusive proof that a species is not present or that it will not be present in the future. However, the desk data coupled with the field surveys provide a good comprehensive understanding of breeding bird species that exist within the Scheme footprint and surrounding areas which are potentially likely to be impacted by the Scheme; and
- The field surveys are a snapshot of the current breeding bird assemblage within the survey area during the 2024 breeding season

[15] British Standards Institution, 2013. British Standard 42020:2013. Biodiversity – Code of practice for planning and development. BSI, London.

Mott MacDonald Restricted

4 Results

4.1 Desk study

The proposed scheme footprint is located in an impact risk zone associated with the River Dee (England) SSSI, Inner Marsh Farm (SSSI) and Dee Estuary (SSSI, SPA and Ramsar).

4.1.1 Wild bird habitats

The ALOF area includes no priority habitats, however zone of influence includes lowland fens and reedbeds, and traditional orchards (priority habitat under section 7 of the Environment (Wales) Act[16]. Further to the priority habitats, the Zone of Influence includes estuarine mud, and a channel which provides foraging opportunities for wetland species as well as cropland and neutral grassland suitable to support ground nesting birds. The wider landscape also includes, intertidal mudflats, deciduous woodland, industrial and residential buildings, neutral and amenity grasslands, and cropland.

The Dee Estuary is a Special Protection Area (SPA), a Special Area of Conservation (SAC) and a Ramsar Site (Table 2) located 7.45km to the northwest of the ALOF area. The estuary contains vital intertidal mudflat and saltmarsh habitats that provide optimal feeding and roosting opportunities for large populations of coastal birds, and can be considered functionally linked to the site via the tidal section of the River Dee and its floodplains. In addition, the site is also particularly important during migration periods for birds and in the breeding, season supports populations of two Annex I species: common tern *Sterna hirundo* and little tern *Sternula albifrons*. Tables 4.1 and 4.2 outline the qualifying features of the River Dee Estuary's SPA and Ramsar's designations respectively.

Table 4.1: River Dee SPA Qualifying species.

Annex 1 Species	Count and Season	Period	% of GB population
Bar-tailed godwit *Limosa lapponica*	1,150 individuals – wintering	5 year peak mean 1994/95-1998/99	2.2%
Common tern *Sterna hirundo*	392 pairs - breeding	5 year mean 1995-1991	3.2%
Little tern *Sterna albifrons*	69 pairs - breeding	5 year mean 1995-1991	2.9%
Sandwich tern *Sterna sandvicensis*	957 individuals - autumn passage	5 year mean 1995-1991	2.3%
Migratory species	**Count and Season**	**Period**	**% of population**
Redshank *Tringa tetanus*	8,795 individuals - passage	5 year peak mean 1994/95-1998/99	5.9% Eastern Atlantic (wintering)
	5,293 individuals - wintering	5 year peak mean 1994/95-1998/99	3.5% Eastern Atlantic (wintering)
Shelduck *Tadorna tadoma*	7,725 individuals - wintering	5 year peak mean 1994/95-1998/99	2.6% Northewestern Europe
Teal *Anas cracca*	5,251 individuals – wintering	5 year peak mean 1994/95-1998/99	1.3% Northwestern Europe

[16] Welsh Government (2016) Environment (Wales) Act 2016. Available at: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted

Annex 1 Species	Count and Season	Period	% of GB population
Pintail *Anas acuta*	5,407 individuals - wintering	5 year peak mean 1994/95-1998/99	9.0% Northwestern Europe
Oystercatcher *Haematopus ostralegus*	22,677 individuals - wintering	5 year peak mean 1994/95-1998/99	2.5% Europe & NW Africa (wintering)
Grey plover *Pluvialis squatarola*	1,643 individuals - wintering	5 year peak mean 1994/95-1998/99	1.1% Eastern Atlantic (wintering)
Knot *Calidris canutus*	12,394 individuals - wintering	5 year peak mean 1994/95-1998/99	3.5% NE Canada/ Greenland/Iceland/NW Europe
Dunlin *Calidris alpina*	27,769 individuals - wintering	5 year peak mean 1994/95-1998/99	2.0% N Siberia/Europe/W Afroca
Black-tailed godwit *Limosa limosa islandica*	1,747 individuals - wintering	5 year peak mean 1994/95-1998/99	2.5% Iceland (breeding)
Curlew *Numenius arquata*	3,899 individuals - wintering	5 year peak mean 1994/95-1998/99	1.1% Europe (breeding)
Assemblage Qualification			
The site qualifies under article 4.2 of the Directive (79/409/EEC) as it is used regularly by over 20,000 waterbirds (waterbirds as defined by the Ramsar Convention) in any season: In the non-breeding season, the area regularly supports 120,726 individual waterbirds (5 year peak mean 1994/95 - 1998/99), including: Great Crested Grebe *Podiceps cristatus*, Cormorant *Phalacrocorax carbo*, Shelduck *Tadorna tadorna*, Wigeon *Anas penelope*, Teal *Anas crecca*, Pintail *Anas acuta*, Oystercatcher *Haematopus ostralegus*, Grey Plover *Pluvialis squatarola*, Lapwing *Vanellus vanellus*, Knot *Calidris canutus*, Sanderling *Calidris alba*, Dunlin *Calidris alpina*, Black-tailed Godwit *Limosa limosa islandica*, Bar-tailed Godwit *Limosa lapponica*, Curlew *Numenius arquata* and Redshank *Tringa totanus*.			

Table 4.2: River Dee Ramsar Qualifying features.

Assemblages of international importance – Ramsar criterion 5			
A 5 year peak mean between the 1998/9 and 2002/3 found the site to support 74,230 waterfowl during the winter period			
Species/populations occurring at levels of international importance – Ramsar Criterion 6			
Species	**Count and Season**	**Period**	**% of population**
Shelduck *Tadorna tadoma*	9,346 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	3.1% NW Europe
Oystercatcher *Haematopus ostralegus*	19,174 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	1.8% Europe & NW Africa
Curlew *Numenius arquata*	4,195 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	2.8% GB
Redshank *Tringa tetanus*	8,281 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	3.3% Eastern Atlantic
Teal *Anas cracca*	3,058 individuals - winter	5 year peak mean 1998/9 - 2002/3	1.5% GB
Pintail *Anas acuta*	4,976 individuals - winter	5 year peak mean 1998/9 - 2002/3	8.2% NW Europe

Assemblages of international importance – Ramsar criterion 5			
Grey plover *Pluvialis squatarola*	603 individuals - winter	5 year peak mean 1998/9 - 2002/3	1.1% GB
Knot *Calidris canutus*	3,729 individuals - winter	5 year peak mean 1998/9 - 2002/3	1.3% GB
Dunlin *Calidris alpina*	19,157, individuals – winter	5 year peak mean 1998/9 - 2002/3	1.4% W Siberia/W Europe
Black-tailed godwit *Limosa limosa islandica*	2,791 individuals - winter	5 year peak mean 1998/9 - 2002/3	7.9% Iceland/W Europe
Bar-tailed godwit *Limosa lapponica*	322 individuals - winter	5 year peak mean 1998/9 - 2002/3	0.5% W Palearctic
Turnstone *Arenaria interpres*	291 individuals - winter	5 year peak mean 1998/9 - 2002/3	0.5% GB
Noteworthy bird populations occurring at levels of national importance			
Species	**Count and Season**	**Period**	**% of population**
Cormorant *Phalacrocorax carbo*	475 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	2% GB
Ruff *Philomachus pugnax*	10 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	1.4% GB
Whimbrel *Numenius phaeopus*	30 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	1.0% GB
Greenshank *Tringa nebularia*	52 individuals - spring/autumn	5 year peak mean 1998/9 - 2002/3	8.7% GB
Spotted redshank	6 individuals - winter	5 year peak mean 1998/9 - 2002/3	4.4% GB

4.1.2 Cofnod

Cofnod data returned records for a total of 41 priority species within 2km of the Scheme. These are listed in Appendix C and comprised:

- 18 species listed under the Environment (Wales) Act Section 7;
- Seven Annex I species;
- Eight Rare Breeding Birds Panel species;
- 19 ‘Red Listed’ species of BoCCW
- 11‘Amber Listed’ species of BoCCW

4.1.3 The BTO Data Report

4.1.4 Overview

The BTO Data Report considered a total of 269 species, of which 221 are breeding species, that regularly occur in Britain and Ireland within the 10km Ordnance Survey grid square (i.e. SJ36) in which the site is located. These included 221 breeding species and 226 wintering species. Breeding species are defined as those that were recorded with confirmed breeding evidence in at least one 10-km square in Britain or Ireland in the 2007-11 Bird Atlas. Wintering species are defined as those recorded in at least fifty 10-km squares in the 2007-11 Bird Atlas in

the non-breeding season, plus six rare residents that the 50-square rule excluded. It should be noted that an absence of evidence in the data should not be assumed to indicate absence of breeding.

The BTO Data report identified a total of 34 notable species during the breeding season at various spatial scales, as discussed below. Notable species listed on the BoCC5 Red and Amber Lists are highlighted in the corresponding colour.

At the UK scale, no records for notable species were found for breeding or winter range and abundance for the site's 10km Ordnance Survey grid square.

At the spatial scale of country (Wales), notable species are listed below:

Breeding range, 15 species: Greylag Goose *Anser anser*, mandarin duck *Aix galericulata*, teal *Anas crecca*, tufted duck *Anthya fuligula*, grey partridge *Perdix perdix*, quail *Coturnix coturnix*, red-legged partridge *Alectoris rufa*, oystercatcher *Haematopus ostralegus*, common sandpiper *Actitis hypoleucos*, little owl *Athene noctua*, lesser-spotted woodpecker *Dryobates minor*, hobby *Falco subbuteo*, reed warbler *Acrocephalus scirpaceus*, tree sparrow *Passer montanus*, yellow wagtail *Motacilla flava*.

Breeding abundance, 26 species: Greylag goose, mallard, teal, tufted duck, grey partridge, swift *Apus apus*, rock dove *Columba livia*, stock dove *Columba oenas*, woodpigeon *Columbas palumbas*, collared dove *Sterptopelia decaocto*, moorhen *Gallinula chloropus*, coot *Fulica atra*, lapwing *Vanellus vanellus*, little owl, kestrel *Falco tinnunculus*, hobby, magpie *Pica pica*, rook *Corvus frugilegus*, house martin *Delichon urbicum*, long-tailed tit *Aegithalos caudatus*, reed warbler, lesser whitethroat, starling *Sturnus vulgaris*, tree sparrow, yellow wagtail, goldfinch *Carduelis carduelis*.

At the regional (East Wales) scale, notable species are listed below:

Breeding range, 13 species: Greylag goose, mandarin duck, teal, grey partridge, quail, red-legged partridge, oystercatcher, common sandpiper, little owl, lesser spotted woodpecker, reed warbler, tree sparrow, yellow wagtail.

Breeding abundance, 28 species: Greylag goose, mallard, teal, tufted duck, grey partridge, swift, rock dove, stock dove, woodpigeon, collared dove, moorhen, coot, oystercatcher, lapwing, little owl, kestrel, hobby, magpie, rook, swallow *Hirundo rustica*, house martin, long-tailed tit, sedge warbler *Acrocephalus schoenobaenus*, reed warbler, lesser whitethroat, tree sparrow, yellow wagtail, goldfinch.

At the county (Clwyd) scale, notable species are listed below:

Breeding range, eight species: Mandarin duck, teal, grey partridge, quail, lesser spotted woodpecker, hobby, reed warbler, yellow wagtail.

Breeding abundance, 22 species: Greylag goose, mallard, teal, tufted duck, grey partridge, swift, stock dove, woodpigeon, coot, lapwing, little owl, hobby, magpie, rook, house martin, long-tailed tit, sedge warbler, reed warbler, lesser whitethroat, tree sparrow, yellow wagtail, goldfinch.

At the vice- county (Flintshire) scale, notable species are listed below:

Breeding range, seven species: Mandarin duck, teal, quail, common sandpiper, lesser spotted woodpecker, hobby, yellow wagtail.

Breeding abundance, 17 species: Greylag goose, teal, tufted duck, grey partridge, swift, stock dove, woodpigeon, lapwing, little owl, hobby, rook, house martin, long-tailed tit, reed warbler, lesser whitethroat, tree sparrow, yellow wagtail.

Mott MacDonald Restricted

4.1.5 Spatial scale context

In a regional context for both breeding and non-breeding species, the site's 10-km squares accounted for up to 20.3% of regional population size. Fifty species were notable in at least one region or season. In a county context, the site's 10-km squares accounted for up to 27.1% of county population size. Forty-five species were notable in at least one county or season. In a vice-county context, the site's 10-km squares accounted for up to 100% of vice-county population size. Thirty-three species were notable in at least one vice-county or season.

4.1.6 BTO Data Report

A total of 127 bird species were described in the comprehensive (2007–2011) and contemporary (2019–2024) bird data from the BTO Data report data within 2.0km of the Scheme boundary (Appendix A). Of these there were 34 notable species during the breeding season across varying geographic scales and the following priority species:

- Two Schedule 1 species;
- Six species listed under Section 7 of the Environment (Wales) Act (2016);
- Eight Red listed species and 12 Amber listed species on the BoCC5; and
- Seven species listed as Near Threatened, 11 species listed as Vulnerable, and three species listed as Endangered on the IUCN2.

4.2 Breeding bird survey data

A total of 58 species were recorded during the breeding bird field surveys.

Of those 58 species, a total of 39 priority species were recorded (Table 4.3), comprising:

- One Schedule 1 species (This species listed as Annex 1 and RBBP);
- 12 species listed on Section 7 of the Environment (Wales) Act 2016;
- Two species listed as designated features under the River Dee SPA/Ramsar;
- 13 Red Listed species;
- 12 Amber Listed species;
- One species listed by the Rare Breeding Birds Panel;
- One species listed by IUCN2 as Endangered;
- Eight species listed by IUCN2 as Vulnerable; and
- Five species listed by IUCN2 as Near Threatened

A total of 20 notable bird species (as defined by the BTO Data Report) were recorded during the surveys.

It should be noted that a species' conservation status and level of the legal protection are not discrete categories and there is considerable overlap between them (i.e. a species may occur in more than one category). Therefore, the total number of species in each category does not relate to the total number of priority bird species recorded as present within the survey area during the breeding period.

Mott MacDonald Restricted

Table 4.3: Priority and notable species recorded during 2024 breeding bird surveys

			Priority species						Notable		
Vernacular Name	**Scientific Name**	**BoCCW**	**IUCN Regional Red List (GB)**[17]	**Rare Breeding Birds Panel (GB)**	**Wildlife & Countryside Act Schedule 1 Part 1 (GB)**	**Environment (Wales) Act 2016 Section 7**	**EU Birds Directive Annex 1**	**Dee Estuary SPA/Ramsar Designated feature**		**High count**	**Breeding status**
Greylag goose	*Anser anser*	Green	LC						x	23	Possible
Mallard	*Anas platyrhynchos*	Green	VU						x	82	Confirmed
Swift	*Apus apus*	Red	EN						x	10	Non-breeding
Stock dove	*Columba oenas*	Green	LC						x	7	Possible
Woodpigeon	*Columba palumbus*	Green	LC						x	97	Probable
Collared dove	*Streptopelia decaocto*	Green	NT						x	2	Possible
Moorhen	*Gallinula chloropus*	Green	VU						x	3	Probable
Coot	*Fulica atra*	Amber	VU						x	1	Non-breeding
Oystercatcher	*Haematopus ostralegus*	Amber	VU					x	x	8	Possible

[17] IUCN threat status categories: Critically endangered (CR), Endangered, (EN), Vulnerable (VU), Near Threatened (NT), Least Concern (LC), Data Deficient (DD) and Not Evaluated (NE).

Mott MacDonald Restricted

				Priority species					Notable		
Lapwing	*Vanellus vanellus*	Red	VU			x			x	115	Confirmed
Common sandpiper	*Actitis hypoleucos*	Amber	NT						x	1	Non-breeding
Redshank	*Tringa totanus*	Red	LC					x		2	Non-breeding
Black-headed gull	*Chroicocephalus ridibundus*	Red	VU			x				18	Breeding colony present within 5km
Common gull	*Larus canus*	Amber	LC							207	Non-breeding
Great black-backed gull	*Larus marinus*	Amber	EN							4	Non-breeding
Herring gull	*Larus argentatuts*	Red	LC			x				21	Non-breeding
Lesser black-backed gull	*Larus fuscus*	Red	DD							9	Non-breeding
Cormorant	*Phalacrocorax carbo*	Green	LC					x		9	Non-breeding
Little owl	*Athene noctua*	Green	NE						x	1	Possible
Kestrel	*Falco tinnunculus*	Red	VU			x			x	1	Possible
Hobby	*Falco*	Green	NT	x	x				x	1	Possible
Magpie	*Pica pica*	Amber	LC						x	20	Probable
Skylark	*Alauda arvensis*	Amber	LC			x				5	Possible

Mott MacDonald Restricted

				Priority species	Notable		
Swallow	*Hirundo rustica*	Green	VU		x	46	Non-breeding
House martin	*Delichon urbicum*	Amber	NT		x	50	Confirmed
Long-tailed tit	*Aegithalos caudatus*	Green	LC		x	4	Confirmed
Sedge warbler	*Acrocephalus schoenobaenus*	Green	NT		x	2	Possible
Grasshopper Warbler	*Locustella naevia*	Red	LC	x		2	Possible
Whitethroat	*Curruca communis*	Red	LC			7	Possible
Starling	*Sturnus vulgaris*	Red	VU	x	x	22	Possible
Song thrush	*Turdus philomelos*	Green	LC	x		3	Possible
Wheatear	*Oenanthe oenanthe*	Amber	LC			2	Possible
House sparrow	*Passer domesticus*	Amber	LC	x		10	Possible
Dunnock	*Prunella modularis*	Amber	LC	x		3	Possible
Grey wagtail	*Motacilla cinerea*	Amber	NT		x	1	Possible
Greenfinch	*Chloris chloris*	Red	EN			2	Possible
Linnet	*Linaria cannabina*	Red	LC	x		3	Possible

Mott MacDonald Restricted

				Priority species	Notable	
Yellowhammer	*Emberiza citrinella*	Red	LC	x	1	Possible
Reed bunting	*Emberiza schoeniclus*	Green	LC	x	1	Probable

Source: Mott MacDonald, 2024.

Mott MacDonald Restricted

5 Conclusion

The ALOF area is located in an impact risk zone associated with a Special Sites of Special Scientific Interest (SSSI) which forms part of the Dee Estuary SPA/Ramsar and is located in a priority area for Countryside Stewardship measures which target curlew *Numenius arquata* and lapwing conservation. No curlew were recorded onsite however, one adult lapwing was observed on a nest during the second survey visit confirming that the species is breeding.

Three Dee Estuary SPA designated species (redshank *Tringa totanus*, oystercatcher, cormorant *Phalacrocorax carbo*) were recorded within the zone of influence; of these species, only cormorant exhibited evidence of breeding (recently fledged young). No species associated with the SPA designated for their breeding abundance (common tern or little tern) were recorded.

Overall, the zone of influence appears to support a range of breeding bird species of conservation concern, particularly wetland, farmland, grassland and woodland species assemblages. Evidence indicating confirmed or probable breeding was observed across nine species of which four (lapwing and house martin – confirmed; magpie and reed bunting – probable) are priority species. A house martin, colony of approximately 20 nests was identified on Higher Ferry Saltney Footbridge 1.70km southeast of the ALOF area. A single lapwing was recorded incubating a nest in an arable field 0.40km west of the ALOF area.

The open water and inter-tidal habitats support functional species assemblages such as black-headed gull *Chroicocephalus ridibundus*, common sandpiper, coot, cormorant, herring gull *Larus argentatus*, mallard, moorhen, oystercatcher and redshank which typically thrive in wetland, estuarine and coastal habitats. It should be noted that a large breeding black-headed gull colony (1000+) is located within approximately 5.0km of the ALOF area, however during 2023 the colony experienced a high number of mortalities due to avian flu. There is the potential that some individuals from this colony use the area for foraging purposes during the breeding season.

Drains and outflows leading into the River Dee supported species more commonly associated with smaller rivers and streams such as grey heron *Ardea cinerea*, little egret *Egretta garzetta* and grey wagtail.

The grassland and scrubland area immediately to the southwest of the ALOF supports a variety of species closely associated with these habitats including song thrush *Turdus philomelos*, wood pigeon, goldfinch, whitethroat *Curruca communis*, chiffchaff *Phylloscopus collybita* and buzzard *Buteo buteo* and generally supported a higher abundance of warbler and thrush species. In contrast the hedgerows and lines of trees forming arable field boundaries across the remainder of the site supported a higher proportion of wrens *Troglodytes troglodytes*, robins *Erithacus rubecula*, corvids and finches.

Farmland within the zone of influence was predominantly arable and supported an assemblage comprising corvids, thrushes, wood pigeon, and farmland passerines including linnet *Linaria cannabina*, dunnock *Prunella modularis*, reed bunting, yellowhammer *Emberiza citrinella* and skylark *Alauda arvensis*. Furthermore, two wading species were recorded in open farmland, oystercatcher and lapwing, with breeding evidence recorded for the latter.

Of the 20 notable species recorded during the field survey, the majority of breeding species relative abundance and range appear to be stable and (or) increasing as a collective when focusing on all spatial scales as a collective. Exceptions to this were moorhen which was decreasing more (or increasing less) at/near the site compared to the county, region and

Mott MacDonald Restricted

country level, and house martin which was decreasing more (or increasing less) at/near the site compared to all spatial scales.

The bird species recorded during the field surveys accurately represent the habitats within the zone of influence, as confirmed by both field and desk study data. A total of 121 bird species were identified during the desk study, which covered all 1-km, 2-km ('tetrad') and 10-km Ordnance Survey grid squares which overlapped with the survey area. There is also the potential for some species identified in the desk study to appear in the future, as birds are highly mobile. These could include but are not limited to lesser spotted woodpecker, cuckoo *Cuculus canorus*, and grey partridge.

Further to breeding habitat, the site provides suitable roosting and foraging habitat for notable resident and over-wintering species described in the BTO report. The constraints and opportunities of which will be discussed in a non-breeding bird report.

5.1.1 Schedule 1 Species

One Schedule 1 species, Hobby *Falco subbuteo*, was recorded during field surveys. One individual was recorded on one occasion flying over the River Dee. Whilst no breeding behaviour was observed, individual trees and copses within the zone of influence offered suitable breeding habitat for Hobby and as such the presence of breeding hobby cannot be discounted. Hobby are typically described as being of 'medium' sensitivity to disturbance with suggested buffer zones varying between 200m and 450m depending on the level of disturbance.[18]

An owl box was recorded 0.50km to the southwest of the ALOF area indicating suitable nesting habitat for barn owl *Tyto alba*. Although none were recorded during the survey efforts, barn owl is present in the desk study data indicating the possibility of the species being present and breeding within the zone of influence. Distances at which barn owl are disturbed are relatively low (up to 175m for major construction works), should the species nest in the identified box no further action is deemed necessary as works during the construction and operational phase will not disturb this species at this location. However, mature trees which may provide suitable nesting habitat can be found within 175m of the ALOF area. [19]

Records of a further 13 Schedule 1 species were identified during the desk study, some of these species, such as fieldfare and redwing, are typically over-wintering or migrant species and as such are not considered a constraint during the breeding season. Suitable breeding habitat for six Schedule 1 species recorded in the desk study data and not recorded during field surveys was identified onsite.

5.2 Recommendations and mitigation

The potential impacts of the proposed works at the ALOF area on breeding birds may include, but are not limited to:

- Increased levels of disturbance from construction activities, increases in artificial light, increases in activity of plant and site personnel.

[18] Goodship, N.M. and Furness, R.W. 2022. Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. A report from MacArthur Green to NatureScot.

[19] Shawyer, C. R.(2011) *Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment: Developing Best Practice in Survey and Reporting.* IEEM, Winchester.

5.2.1 Increased levels of disturbance via construction activities, lighting and personnel

Noise, vibration and general disturbance associated with the use of construction machinery, vehicle movements and site personnel have the potential to disturb and / or displace bird species from otherwise suitable roosting, foraging or breeding habitat.

Given that the works in the ALOF area are anticipated to be positioned in an area where human disturbance is considered high, due to the proximity of the site to Hawarden airport and public footpaths aligning the river, the potential for disturbance of species breeding in the vicinity is likely to be relatively low as local populations have likely habituated to such disturbances. Nonetheless, vibration, noise and an increase in human activity could potentially disturb and displace breeding, notable and / or priority bird species.

Intentional or reckless disturbance to breeding Schedule 1 species, as well as the damage or destruction of the nests of any wild bird species would constitute an offence under the Wildlife and Countryside Act 1981 (as amended).

5.2.1.1 Potential disturbances to be assessed in 2025

The ALOF area was historically used for transporting aeroplane wings from 2007 to 2020. Consequently, the arrival of the jack up barge and subsequent barge traffic associated with the Scheme may cause visual and acoustic disturbances. Local bird populations may have habituated to barge traffic owing to the historic use of the ALOF. However, sensitivity to such activity has likely increased since airbus ceased transporting wings. The final construction details are yet to be confirmed but it is anticipated that barge traffic will pose some degree of disturbance to foraging activity. The potential impact of this will be assessed in updated breeding bird surveys scheduled for 2025.[20]

5.2.2 Avoidance of available habitat suitable for breeding and foraging

At present it is not known that any suitable, breeding or commuting habitats will be removed, damaged or destroyed. The hardstanding slipway in the ALOF area is currently opportunistically used by loafing seabirds (gulls and cormorant) and waterbirds (moorhen, coot, mallard), and the adjacent intertidal mud is used by foraging waders (oystercatcher and redshank). The proposals will remove the availability of this area for foraging and loafing species. However, the extent of this temporary loss is unlikely to affect local populations as there is sufficient habitat to support the small number of birds which may be displaced, and no compensation or mitigation is required.

Should the removal or manipulation of breeding habitats be required, the following hierarchy (from ideal to least ideal) should be followed with respect to vegetation clearance:

1. It is advised that the removal of any vegetation is avoided as far as is reasonably practicable;
2. If clearance of vegetation is unavoidable, it is recommended that this is undertaken only outside of the UK government-defined bird breeding season (i.e. outside the period March to August inclusive). Given that several species can nest outside of the March to August period, vegetation removal at any time of the year must be completed under the advice of a suitably experienced ornithologist;
    a. If habitat is removed outside of the breeding season, it is advised that these are continually monitored and managed up until March, to deter and (or) delay breeding bird species.

[20] History Points. (n.d.). Airbus wing jetty, Deeside. Available at: https://historypoints.org/index.php?page=airbus-wing-jetty-deeside (Accessed: 28 November 2024)

3. If clearance of vegetation during the period March to August inclusive is unavoidable for small areas of hedgerow or single trees, this must be under daily supervision by a suitably experienced ornithologist, including an initial check for nesting birds no more than 48 hours prior to the commencement of works. Should any active nests be found, an exclusion zone (this distance is species and habitat/site specific) must be installed around the nest site and any works within that exclusion zone cannot be undertaken until all young birds have successfully fledged and are no longer dependent on their parents or the nest becomes otherwise inactive. Records of such checks should be made and retained during and following works.
    a. Large areas of habitat used by wild birds that are intended to be removed should not be completed and (or) checked for nests during the breeding season. Large sections should only be removed outside of breeding season only under the guidance of an ornithologist.

Furthermore, should ornithological checks reveal the presence of any bird species listed on Schedule 1 of the Wildlife and Countryside Act (1981) as amended, then further advice will be required depending on the specific circumstances and risk of disturbing that breeding attempt.

It is also important that any proposed works activities do not inadvertently create suitable nesting habitat during the construction phase. This includes the creation of vertical earth banks or stockpiles of felled trees with exposed roots. Such features are attractive nest sites for various species including Schedule 1 species such as kingfisher *Alcedo atthis*. Whilst kingfisher was recorded in the desk study much of the canalised section of the River Dee is probably unsuitable to support them due to the lack of fishing perches and dense cover, and the shallow gradient of the riverbanks. Kingfishers create nests within vertical banks, should such banks be created during the construction process they should be regularly checked by a suitably qualified ornithologist for evidence of nesting.

5.2.3 Noise

Due to industrial activity close to the site, and regular departures from Hawarden airport over the river Dee, all species are likely to be accustomed to some level of disturbance. However, during the construction phase of the proposal there is likely to be increased levels of disturbances. Disturbance to birds will mostly be attributed to noise from construction activities which is typically of low frequency but high amplitude. Construction methods such as percussive piling are known to be a particular issue in relation to disturbance[21], with noise levels above 70db(A) at the receptor likely to cause moderate to high effects. In general, birds tend to habituate to continual noises so long as there is no large amplitude 'startling' component, with vehicle movements being more greatly tolerated.

Noise disturbance should be minimised by implementing good industry practice such as BS 5228-1:2009+A1:2 014.22[22]. This standard advises that a noise barrier would provide approximately 5dB reduction in noise level if line of sight between the source and receptor is partially broken, or up to 10dB if the line of sight is fully broken. Despite these small decreases, they may potentially reduce noise impacts and provide visual screening to reduce further disturbance. Good practice measures (including "Best Practicable Means") are outlined in BS 5228- 1:2009+A1:2014[23] which should be employed to minimise noise impacts during construction. Other measures should also be considered, including selection of equipment for its

[21] Hill, D., Hockin, D., Price, D., Tucker, G., Morris, R. and Treweek, J., 1997. Bird disturbance: improving the quality and utility of disturbance research. Journal of Applied Ecology 34, 275– 288

[22] BS 5228-1:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites" (2014) BSI Group, available at: https://landingpage.bsigroup.com/LandingPage/Standard?UPI=000000000030258086

[23] British Standards Institution, 2008. Code of practice for noise and vibration control on construction and open sites. BS 5228-1:2009+A1:2014. BSI, London.

Mott MacDonald Restricted

lower noise generating properties (i.e. low noise generators and compressors for Ground Investigation and related works), attenuation to noise sources (i.e. silencers or enclosures/shrouds).

5.2.4 Artificial Lighting

To avoid nocturnal disturbance to breeding birds via artificial lighting, it is advised that no work is undertaken during the hours of darkness within the government-defined breeding season (i.e. March to August, inclusive). However, if this is unavoidable, a sensitive lighting design is recommended to minimise light spill onto linear features / site boundaries. Directional lighting and screening may be appropriate to alleviate light spill issues onto other habitats such as grasslands, farmlands and buildings.

5.2.5 Best practice measures during construction

In addition to the measures outlined above, best practice safeguards during construction should be followed, these include the below:

- Avoid leaving vehicles and machines parked near boundary fences, walls and close to vegetation;
- Any gaps larger than 22mm in diameter may be sufficient for birds to enter. Where possible, vehicles and other machinery that is not in use can have any holes and ledges temporarily blocked with soft packaging materials;
- As set out above, daily checks of vehicles and other machinery, for nests should be undertaken before any vehicles or machines are started;
- Stockpiling of natural material should be avoided where possible;
- Should any nests be found, the ornithologist will be immediately contacted for advice with this advice acted upon; and
- Best practice pollution control measures followed to prevent negative impacts upon retained habitats and likely secondary effects upon bird species in the local area.

5.3 Further surveys

Further breeding bird surveys are recommended should the extent of the Scheme areas change and encroach into areas which have not been surveyed.

Stages one and two barn owl surveys should be considered to investigate the nesting suitability of mature trees within 175m of the ALOF area.

Should works commence during the breeding season for hobby (mid-April to early-September) hobby surveys should also be made to determine presence/likely absence of hobby within 450m of the ALOF area.

5.4 Validity of the survey data and assessment

With reference to guidance from the 'Chartered Institute of Ecology and Environmental Management', [24] these survey results can be considered valid for up to 18 months from the point of survey. Following this, the survey data should be reviewed by an appropriately qualified ecologist and, if appropriate, updated to make sure that any assessment and mitigation approach remains valid.

[24] CIEEM (2019). Advice Note on the Lifespan of Ecological Reports and Surveys [online]. Available at: https://cieem.net/resource/advice-note-on-the-lifespan-of-ecological-reports-and-surveys/. Accessed October 2024.

A. Breeding bird historical records

Table A.1: Local records of bird species within the 10km Ordnance Survey grid square in which the site is located as described by the BTO data report.

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN Regional Red List (GB)	Rare Breeding Birds Panel (GB)	Wildlife & Countryside Act Schedule 1 Part 1 (GB)	Environment (Wales) Act 2016 Section 7	Annex 1	Notable
Avocet	*Recurvirostra avosetta*	Amber	LC	x	x		x	
Barn owl	*Tyto alba*	Green	LC		x			
Blackbird	*Turdus merula*	Green	LC					
Blackcap	*Sylvia atricapilla*	Green	LC					
Black-headed Gull	*Chroicocephalus ridibundus*	Amber	VU			x		
Blue tit	*Cyanistes caeruleus*	Green	LC					
Bullfinch	*Pyrrhula pyrrhula*	Amber	LC			x		
Buzzard	*Buteo buteo*	Green	LC					
Canada goose	*Branta canadensis*	Unlisted	LC					
Carrion crow	*Corvus corone*	Green	LC					
Cetti's Warbler	*Cettia cetti*	Green	LC		x			
Chaffinch	*Fringilla coelebs*	Green	EN					
Chiffchaff	*Phylloscopus collybita*	Green	LC					
Coal tit	*Periparus ater*	Green	LC					
Collared dove	*Streptopelia decaocto*	Green	NT					x
Common Crossbill	*Loxia curvirostra*	Green	LC		x			
Common gull	*Larus canus*	Amber	LC					
Common sandpiper	*Actitis hypoleucos*	Amber	NT					x

Mott MacDonald Restricted

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN Regional Red List (GB)	Rare Breeding Birds Panel (GB)	Wildlife & Countryside Act Schedule 1 Part 1 (GB)	Environment (Wales) Act 2016 Section 7	Annex 1	Notable
Common Scoter	*Melanitta nigra*	Red	LC	x	x	x		
Common Tern	*Sterna hirundo*	Amber	NT				x	
Coot	*Fulica atra*	Green	VU					x
Cormorant	*Phalacrocorax carbo*	Green	NT					
Cuckoo	*Cuculus canorus*	Red	LC			x		
Curlew	*Numenius arquata*	Red	EN			x		
Dunlin	*Calidris alpina*	Red	VU				x	
Dunnock	*Prunella modularis*	Amber	LC			x		
Fieldfare	*Turdus pilaris*	Red	CR	x	x			
Gadwall	*Mareca strepera*	Amber	LC					
Garden Warbler	*Sylvia borin*	Green	LC					
Goldcrest	*Regulus regulus*	Green	LC					
Golden plover	*Pluvialis apricaria*	Green	LC			x	x	
Goldfinch	*Carduelis carduelis*	Green	LC					x
Goosander	*Mergus merganser*	Green	LC					
Grasshopper Warbler	*Locustella naevia*	Red	LC			x		
Great black-backed gull	*Larus marinus*	Amber	EN					
Great spotted woodpecker	*Dendrocopos major*	Green	LC					
Great tit	*Parus major*	Green	LC					
Green woodpecker	*Picus viridis*	Green	NT					
Greenfinch	*Chloris chloris*	Red	EN					
Grey heron	*Ardea cinerea*	Green	VU					
Grey partridge	*Perdix perdix*	Red	VU			x		x

Mott MacDonald Restricted

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN Regional Red List (GB)	Rare Breeding Birds Panel (GB)	Wildlife & Countryside Act Schedule 1 Part 1 (GB)	Environment (Wales) Act 2016 Section 7	Annex 1	Notable
Grey wagtail	*Motacilla cinerea*	Amber	NT					
Greylag goose	*Anser anser*	Amber	LC					x
Herring gull	*Larus argentatus*	Red	EN					
Hobby	*Falco subbuteo*	Green	NT	x	x		x	
House martin	*Delichon urbicum*	Red	NT					x
House sparrow	*Passer domesticus*	Red	LC			x		
Jackdaw	*Coloeus monedula*	Green	LC					
Jay	*Garrulus glandarius*	Green	LC					
Kestrel	*Falco tinnunculus*	Amber	VU			x		x
Kingfisher	*Alcedo atthis*	Green	VU		x		x	
Lapwing	*Vanellus vanellus*	Red	VU			x		x
Lesser Black-backed Gull	*Larus fuscus*	Amber	DD					
Lesser redpoll	*Acanthis cabaret*	Red	LC			x		
Lesser spotted woodpecker	*Dryobates minor*	Red	EN	x		x		x
Lesser whitethroat	*Curruca curruca*	Green	LC					x
Linnet	*Linaria cannabina*	Red	LC			x		
Little egret	*Egretta garzetta*	Green	LC	x			x	
Little grebe	*Tachybaptus ruficollis*	Green	LC					
Little owl	*Athene noctua*	Unlisted	LC					x
Little ringed plover	*Charadrius dubius*	Green	LC	x	x			
Long-tailed Tit	*Aegithalos caudatus*	Green	LC					x
Magpie	*Pica pica*	Green	LC					x
Mallard	*Anas platyrhynchos*	Amber	VU					x

Mott MacDonald Restricted

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN Regional Red List (GB)	Rare Breeding Birds Panel (GB)	Wildlife & Countryside Act Schedule 1 Part 1 (GB)	Environment (Wales) Act 2016 Section 7	Annex 1	Notable
Mandarin duck	*Aix galericulata*	Unlisted	LC					x
Meadow pipit	*Anthus pratensis*	Amber	LC					
Mediterranean gull	*Ichthyaetus melanocephalus*	Amber	LC	x	x		x	
Mistle thrush	*Turdus viscivorus*	Red	NT					
Moorhen	*Gallinula chloropus*	Amber	VU					x
Mute swan	*Cygnus olor*	Green	LC					
Nightjar	*Caprimulgus europaeus*	Amber	LC			x	x	
Nuthatch	*Sitta europaea*	Green	LC					
Oystercatcher	*Haematopus ostralegus*	Amber	VU					x
Peregrine	*Falco peregrinus*	Green	LC	x	x		x	
Pheasant	*Phasianus colchicus*	Unlisted	LC					
Pied flycatcher	*Ficedula hypoleuca*	Amber	NT			x		
Pied wagtail	*Motacilla alba*	Green	LC					
Pink-footed goosse	*Anser brachyrhynchus*	Amber	LC	x				
Quail	*Coturnix coturnix*	Amber	EN	x	x			x
Raven	*Corvus corax*	Green	LC					
Red kite	*Milvus milvus*	Green	LC		x		x	
Red-breasted merganser	*Mergus serrator*	Amber	VU	x				
Red-legged partridge	*Alectoris rufa*	Unlisted	LC					x
Redshank	*Tringa totanus*	Amber	VU					
Redstart	*Phoenicurus phoenicurus*	Amber	LC					
Redwing	*Turdus iliacus*	Amber	CR	x	x			
Reed bunting	*Emberiza schoeniclus*	Amber	LC			x		

Mott MacDonald Restricted

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN Regional Red List (GB)	Rare Breeding Birds Panel (GB)	Wildlife & Countryside Act Schedule 1 Part 1 (GB)	Environment (Wales) Act 2016 Section 7	Annex 1	Notable
Reed warbler	*Emberiza schoeniclus*	Green	LC					x
Ring ouzel	*Turdus torquatus*	Red	NT			x		
Ringed plover	*Charadrius hiaticula*	Red	VU			x		
Robin	*Erithacus rubecula*	Green	LC					
Rock dove	*Columba livia*	Green	NT					x
Rook	*Corvus frugilegus*	Amber	NT					x
Sand martin	*Riparia riparia*	Green	LC					
Sedge warbler	*Acrocephalus schoenobaenus*	Amber	NT					x
Shelduck	*Tadorna tadorna*	Amber	EN					
Short-eared owl	*Asio flammeus*	Amber	EN	x			x	
Shoveler	*Spatula clypeata*	Amber	LC	x				
Siskin	*Spinus spinus*	Green	LC					
Skylark	*Alauda arvensis*	Red	LC			x		
Snipe	*Gallinago gallinago*	Amber	VU					
Song thrush	*Turdus philomelos*	Amber	LC			x		
Sparrowhawk	*Accipiter nisus*	Amber	VU					
Spotted flycatcher	*Muscicapa striata*	Red	NT			x		
Starling	*Sturnus vulgaris*	Red	VU			x		x
Stock dove	*Columba oenas*	Amber	LC					x
Stonechat	*Saxicola rubicola*	Green	LC					
Swallow	*Hirundo rustica*	Green	VU					
Swift	*Apus apus*	Red	EN					x
Tawny owl	*Strix aluco*	Amber	NT					

Mott MacDonald Restricted

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN Regional Red List (GB)	Rare Breeding Birds Panel (GB)	Wildlife & Countryside Act Schedule 1 Part 1 (GB)	Environment (Wales) Act 2016 Section 7	Annex 1	Notable
Teal	*Anas crecca*	Amber	LC					x
Tree sparrow	*Passer montanus*	Red	VU			x		x
Treecreeper	*Certhia familiaris*	Green	LC					
Tufted duck	*Aythya fuligula*	Green	VU					x
Wheatear	*Oenanthe oenanthe*	Amber	EN					
Whimbrel	*Numenius phaeopus*	Red	EN	x	x			
Whinchat	*Saxicola rubetra*	Red	NT					
Whitethroat	*Curruca communis*	Amber	LC					
Wigeon	*Anas penelope*	Amber	LC	x				
Willow warbler	*Phylloscopus trochilus*	Amber	LC					
Wood warbler	*Phylloscopus sibilatrix*	Red	VU			x		
Woodcock	*Scolopax rusticola*	Red	VU					
Woodpigeon	*Columba palumbus*	Amber	LC					x
Wren	*Troglodytes troglodytes*	Amber	LC					
Yellow wagtail	*Motacilla flava*	Red	NT			x		x
Yellowhammer	*Emberiza citrinella*	Red	LC			x		

Mott MacDonald Restricted

B. BTO notable species

Table B.1: Notable breeding species extracted from the BTO Data report.

Species name and spatial scale	Breeding relative abundance (%)	Breeding range (%)
Collared dove		
Country	0.793012943	0.377358491
County	1.763770098	0.833333333
Region	3.871369803	2.083333333
Vice-county	8.381836302	6.666666667
Common sandpiper		
Country	0	0.826446281
County	0	1.612903226
Region	0	4
Vice-county	0	20
Coot		
Country	0.636942675	1.382292266
County	1.136363636	2.65517457
Region	2.777777778	5.272176486
Vice-county	7.142857143	12.47748425
Goldfinch		
Country	0.840311023	0.358422939
County	1.797029219	0.793650794
Region	5.052154708	2.083333333
Vice-county	11.40838542	6.666666667
Grey partridge		
Country	17.95182769	2.5
County	18.62036693	3.703703704
Region	21.62279433	7.142857143
Vice-county	83.33333333	11.11111111
Greylag goose		
Country	2.561662638	0.917431193
County	17.37756589	3.125
Region	11.80939625	2.702702703
Vice-county	26.52332416	8.333333333
House martin		
Country	1.102854331	0.362318841
County	2.440745798	0.8
Region	6.466911697	2.083333333
Vice-county	13.91056956	6.666666667

Kestrel		
Country	0.920612086	0.431034483
County	2.131763817	0.925925926
Region	2.881307356	2.127659574
Vice-county	8.866790558	7.142857143
Lapwing		
Country	5.824216122	0.684931507
County	11.66062743	1.234567901
Region	11.94888947	2.564102564
Vice-county	18.36549517	7.142857143
Lesser spotted woodpecker		
Country	0	1.234567901
County	0	2.127659574
Region	0	5.555555556
Vice-county	0	25
Lesser whitethroat		
Country	1.268796254	0.588235294
County	2.579322935	1.369863014
Region	7.330693369	2.857142857
Vice-county	16.12256658	7.692307692
Little owl		
Country	1.87098209	1.052631579
County	3.015219432	1.960784314
Region	5.669972992	3.846153846
Vice-county	16.04938271	11.11111111
Long-tailed tit		
Country	1.331211368	0.381679389
County	2.401779732	0.81300813
Region	6.448228005	2.127659574
Vice-county	15.49053879	6.666666667
Magpie		
Country	0.751187191	0.36101083
County	1.715245536	0.8
Region	4.67907837	2.083333333
Vice-county	10.49728197	6.666666667
Mallard		
Country	0.98023307	0.373134328
County	1.757378006	0.806451613
Region	4.399098789	2.083333333
Vice-county	11.83898488	6.666666667

Mandarin duck		
Country	0	3.03030303
County	0	4
Region	0	5.882352941
Vice-county	0	16.66666667
Moorhen		
Country	0.906082745	0.452488688
County	1.857444618	0.99009901
Region	3.539880742	2.380952381
Vice-county	11.17659408	6.666666667
Oystercatcher		
Country	0.313308591	0.862068966
County	1.707205703	2.564102564
Region	0.864466407	3.846153846
Vice-county	0.999684312	9.090909091
Quail		
Country	0	1.639344262
County	0	2.941176471
Region	0	6.25
Vice-county	0	16.66666667
Red-legged partridge		
Country	0	1.063829787
County	0	1.724137931
Region	0	3.571428571
Vice-county	0	9.090909091
Reed Warbler		
Country	1.868955392	0.847457627
County	3.520528916	2.083333333
Region	15.88952132	4.761904762
Vice-county	43.52498657	12.5
Rock dove		
Country	0.747100367	0.515463918
County	2.456107975	1.265822785
Region	2.706479111	2.5
Vice-county	3.41015135	6.666666667
Rook		
Country	0.863029263	0.393700787
County	2.080349722	0.854700855
Region	4.178635107	2.272727273
Vice-county	13.67564118	7.142857143

Sedge Warbler		
Country	0.472979088	0.448430493
County	2.270229345	1.086956522
Region	4.722830384	2.5
Vice-county	10.4570805	7.142857143
Starling		
Country	0.733179692	0.4
County	1.431492954	0.833333333
Region	2.977948401	2.272727273
Vice-county	5.028496668	6.666666667
Stock dove		
Country	1.966604499	0.476190476
County	2.503512418	0.909090909
Region	7.275316083	2.43902439
Vice-county	23.92294711	7.142857143
Swift		
Country	1.07916437	0.390625
County	1.937105068	0.833333333
Region	4.418552019	2.127659574
Vice-county	16.05495499	6.666666667
Teal		
Country	3.19722498	1.298701299
County	5.252422342	3.225806452
Region	13.13563802	5.263157895
Vice-county	31.91489362	14.28571429
Tree sparrow		
Country	5.890044447	1.612903226
County	7.189493925	2.325581395
Region	12.73623124	3.703703704
Vice-county	33.99014778	11.11111111
Tufted duck		
Country	4.083543972	0.847457627
County	8.784808206	1.388888889
Region	17.91097677	3.225806452
Vice-county	31.49941162	8.333333333
Woodpigeon		
Country	1.673524339	0.36101083
County	2.874645441	0.793650794
Region	6.823906256	2.083333333
Vice-county	16.05539773	6.666666667

Yellow Wagtail		
Country	2.400825587	2.777777778
County	2.261812051	2.857142857
Region	10.99917107	14.28571429
Vice-county	100	50

C. Cofnod Dataset

Table C.1: Local records of bird species within the 2km of the site is located as described by Cofnod.

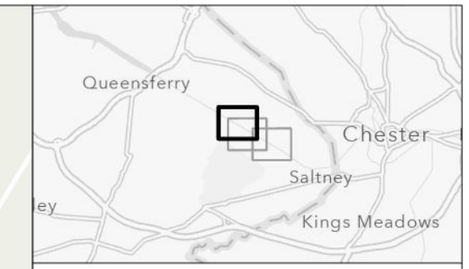
Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN2 Regional Red List	Rare Breeding Birds Panel (GB)	Schedule 1	BoCCW	EU Birds Directive Annex 1
Barnacle goose	Branta leucopsis	Amber	LC			Unlisted	x
Greylag goose	Anser anser	Amber	LC			Unlisted	
Shelduck	Tadorna tadorna	Amber	EN			Red	
Garganey	Spatula querquedula	Amber	EN	Regular (Rare)	x	Amber	
Mallard	Anas platyrhynchos	Amber	VU			Green	
Stock dove	Columba oenas	Amber	LC			Green	
Oystercatcher	Haematopus ostralegus	Amber	VU			Amber	
Avocet	Recurvirostra avosetta	Amber	LC	Regular (Less scarce)	x	Green	x
Lapwing	Vanellus vanellus	Red	VU			Red	
Ringed plover	Charadrius hiaticula	Red	VU			Red	
Little ringed plover	Charadrius dubius	Green	LC	Regular (Scarce)	x	Green	
curlew	Numenius arquata	Red	EN			Red	
Black-tailed Godwit	Limosa limosa	Red	EN	Regular (Rare)	x	Amber	
Dunlin	Calidris alpina	Red	VU			Red	x (schinzii)
Rredshank	Tringa totanus	Amber	VU			Red	
Black-headed gull	Chroicocephalus ridibundus	Amber	VU			Red	
Mediterranean gull	Ichthyaetus melanocephalus	Amber	LC	Regular (Less scarce)	x	Amber	x
Common gull	Larus canus	Amber	LC			Amber	
Great Black-backed gull	Larus marinus	Amber	EN			Amber	
Herring gull	Larus argentatus	Red	EN			Red	
Lesser black-backed gull	Larus fuscus	Amber	DD			Red	
Cormorant	Phalacrocorax carbo	Green	NT			Green	

Mott MacDonald Restricted

Vernacular Name	Scientific Name	BoCC 5 (UK)	IUCN2 Regional Red List	Rare Breeding Birds Panel (GB)	Schedule 1	BoCCW	EU Birds Directive Annex 1
Little egret	Egretta garzetta	Green	LC	Regular (Less scarce)		Green	x
Barn owl	Tyto alba	Green	LC		x	Green	
Kingfisher	Alcedo atthis	Green	VU		x	Green	x
Kestrel	Falco tinnunculus	Amber	VU			Red	
Peregrine	Falco peregrinus	Green	LC	Regular (Less scarce)	x	Green	x
Skylark	Alauda arvensis	Red	LC			Amber	
Grasshopper warbler	Locustella naevia	Red	LC			Red	
Firecrest	Regulus ignicapilla	Green	LC		x	Amber	
Starling	Sturnus vulgaris	Red	VU			Red	
Song thrush	Turdus philomelos	Amber	LC			Green	
Spotted flycatcher	Muscicapa striata	Red	NT			Red	
Tree sparrow	Passer montanus	Red	VU			Red	
House sparrow	Passer domesticus	Red	LC			Amber	
Dunnock	Prunella modularis	Amber	LC			Amber	
Yellow wagtail	Motacilla flava	Red	NT	Occassional [flava]		Red	
Meadow pipit	Anthus pratensis	Amber	LC			Red	
Bullfinch	Pyrrhula pyrrhula	Amber	LC			Amber	
Linnet	Linaria cannabina	Red	LC			Red	
Yellowhammer	Emberiza citrinella	Red	LC			Red	

D. Breeding bird maps

Mott MacDonald Restricted



Airbus Load Out Facility (ALOF) area

500m buffer

Behaviour

- Flying over
- Present

Notable bird species

- Collared dove
- Common sandpiper
- Coot
- Greylag goose
- House martin
- Kestrel
- Lapwing
- Little owl
- Long-tailed tit
- Magpie
- Mallard
- Moorhen
- Oystercatcher
- Sedge warbler
- Starling
- Stock dove
- Swallow
- Swift
- Wood pigeon
- Grey wagtail
- Hobby

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Bird data; Mott MacDonald, 2024. Red Line Boundary; Mott MacDonald, 2024. Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

MOTT MACDONALD

Spring Bank House
33 Stamford Street
Altrincham, WA14 1ES
United Kingdom
T +44 (0)161 926 4000
mottmac.com

North and Mid Wales Trunk Road Agent
Unit 5 Llys Britannia
Ffordd Y Parc, Parc Menai,
Bangor LL57 4BN

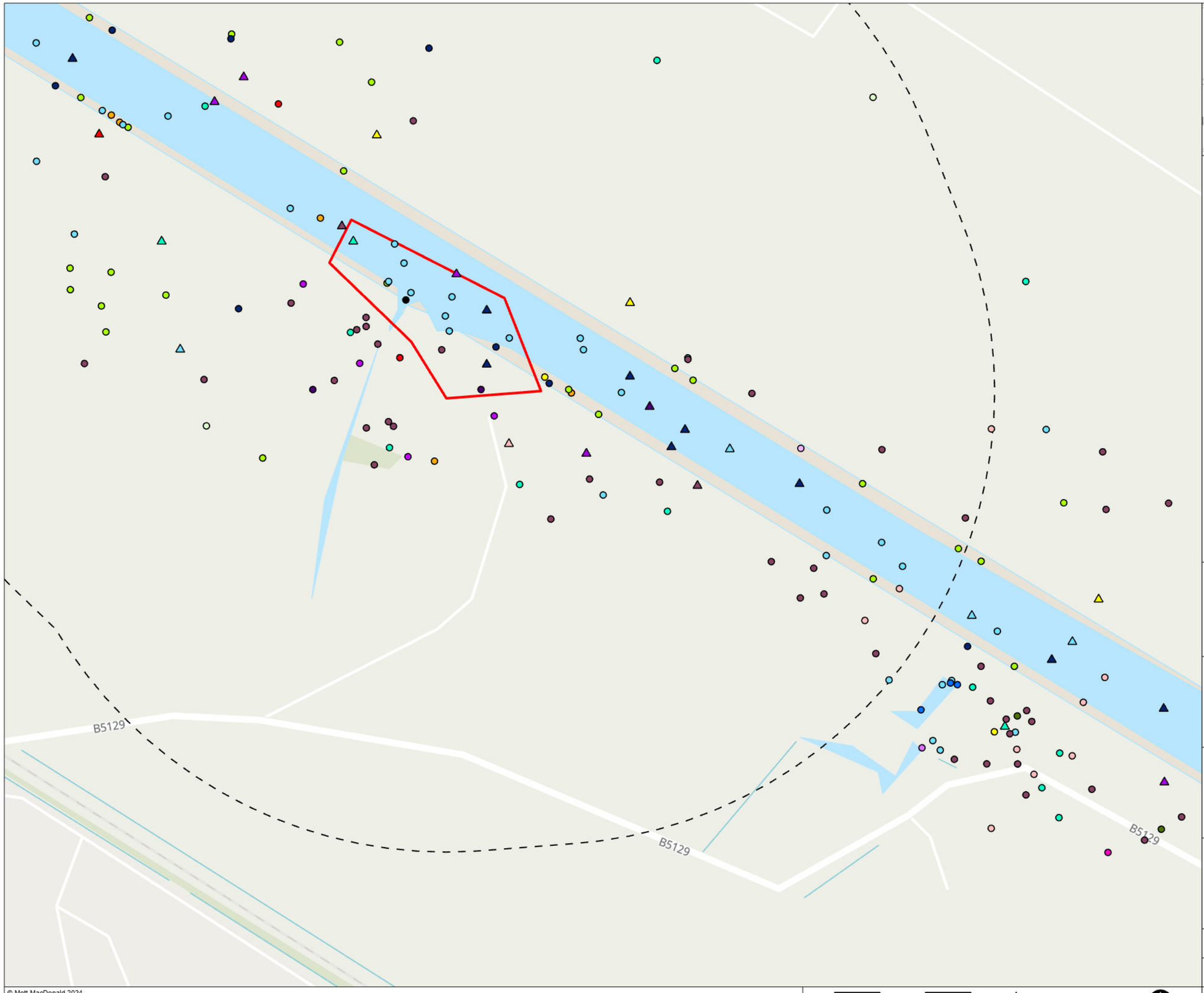
A494 River Dee Bridge Improvement Scheme
Notable breeding bird species
Sheet 1 of 3

Drawn	GIS Checked	Checked	Approved
M Hergest	M Hargest	K Doneo	J Dunning
Scale at A3	Status	Revision	Security
1:4,000	INF	01	STD

395318-MMD-00-XX-DR-Z-0002

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





Airbus Load Out Facility (ALOF) area

500m buffer

Behaviour

- Flying over
- Present

Notable bird species

- Collared dove
- Common sandpiper
- Coot
- Greylag goose
- House martin
- Kestrel
- Lapwing
- Little owl
- Long-tailed tit
- Magpie
- Mallard
- Moorhen
- Oystercatcher
- Sedge warbler
- Starling
- Stock dove
- Swallow
- Swift
- Wood pigeon
- Grey wagtail
- Hobby

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Bird data; Mott MacDonald, 2024. Red Line Boundary; Mott MacDonald, 2024. Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

MOTT MACDONALD

Spring Bank House
33 Stamford Street
Altrincham, WA14 1ES
United Kingdom
T +44 (0)161 926 4000
mottmac.com

North and Mid Wales
Trunk Road Agent
Unit 5 Llys Britannia
Ffordd Y Parc, Parc Menai,
Bangor LL57 4BN

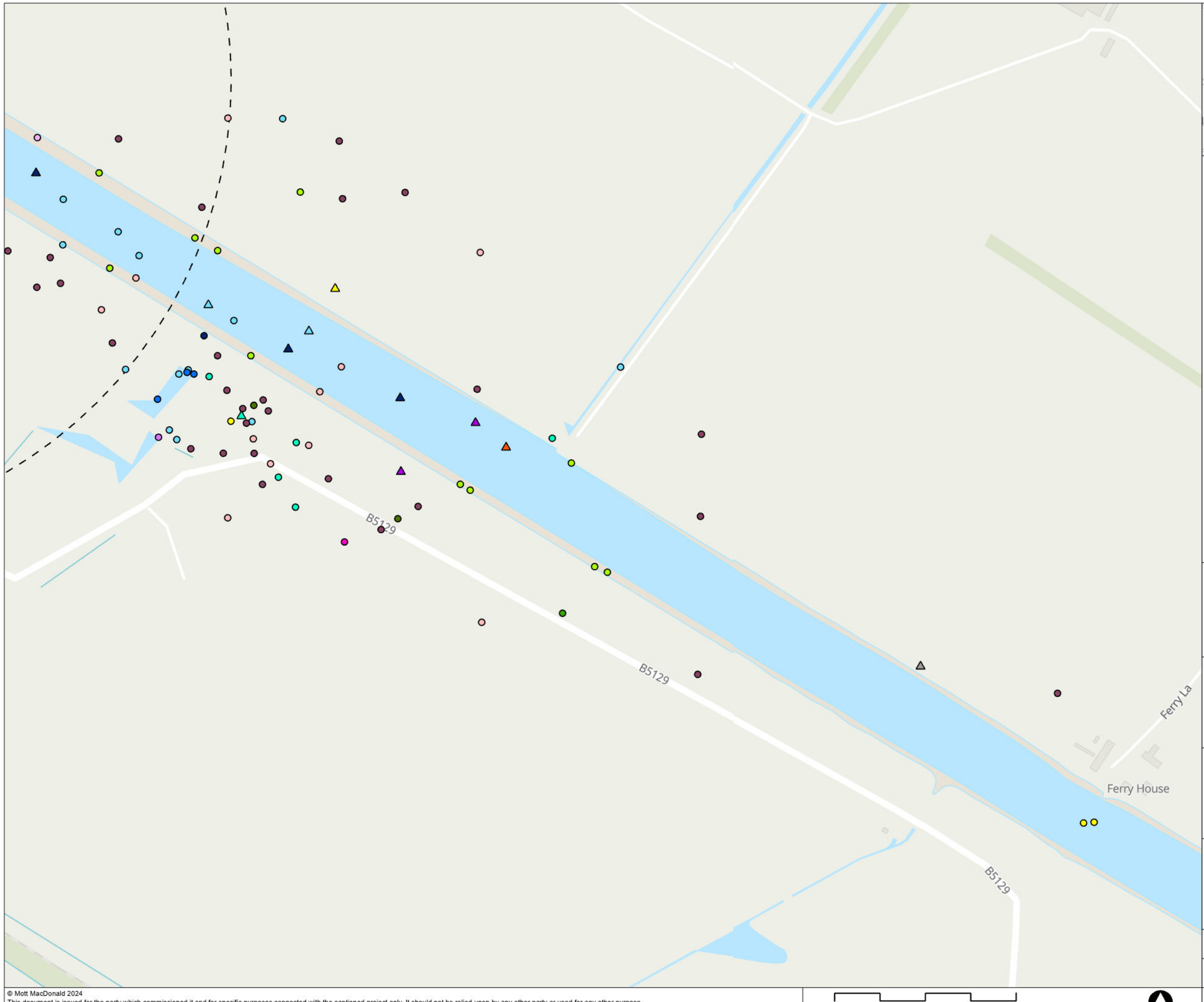
A494 River Dee Bridge Improvement Scheme
Notable breeding bird species
Sheet 2 of 3

Drawn	GIS Checked	Checked	Approved
M Hergest	M Hargest	K Doneo	J Dunning
Scale at A3	Status	Revision	Security
1:4,000	INF	01	STD

395318-MMD-00-XX-DR-Z-0002

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





500m buffer

Behaviour

- Flying over
- Present

Notable bird species

- Collared dove
- Common sandpiper
- Coot
- Greylag goose
- House martin
- Kestrel
- Lapwing
- Little owl
- Long-tailed tit
- Magpie
- Mallard
- Moorhen
- Oystercatcher
- Sedge warbler
- Starling
- Stock dove
- Swallow
- Swift
- Wood pigeon
- Grey wagtail
- Hobby

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Bird data; Mott MacDonald, 2024. Red Line Boundary; Mott MacDonald, 2024. Contains OS data © Crown Copyright and database right 2023
Contains data from OS Zoomstack, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

MOTT MACDONALD

Spring Bank House
33 Stamford Street
Altrincham, WA14 1ES
United Kingdom
T +44 (0)161 926 4000
mottmac.com

North and Mid Wales
Trunk Road Agent
Unit 5 Llys Britannia
Ffordd Y Parc, Parc Menai,
Bangor LL57 4BN

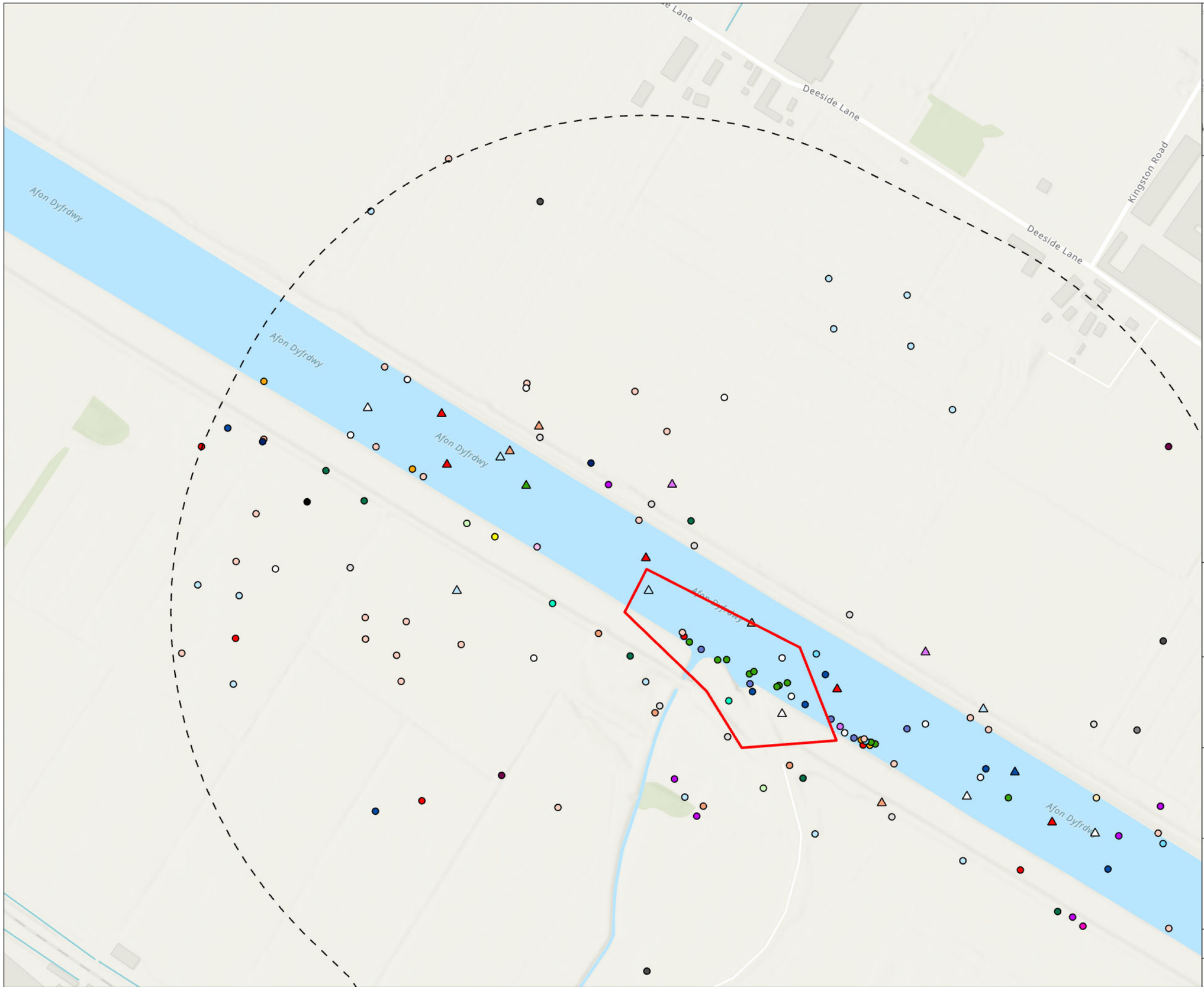
A494 River Dee Bridge Improvement Scheme
Notable breeding bird species
Sheet 3 of 3

Drawn	GIS Checked	Checked	Approved
M Hergest	M Hargest	K Doneo	J Dunning
Scale at A3	Status	Revision	Security
1:4,000	INF	01	STD

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m

395318-MMD-00-XX-DR-Z-0002





Airbus Load Out Facility (ALOF) area

500m buffer

Behaviour

- Flying over
- Present

Priority bird species

- Black-headed gull
- Common gull
- Common sandpiper
- Coot
- Cormorant
- Dunnock
- Grasshopper warbler
- Great black-backed gull
- Greenfinch
- Herring gull
- House martin
- House sparrow
- Kestrel
- Lapwing
- Lesser black-backed gull
- Linnet
- Magpie
- Oystercatcher
- Redshank
- Reed bunting
- Song thrush
- Starling
- Swift
- Whitethroat
- Yellowhammer
- Grey wagtail
- Hobby
- Skylark
- Wheatear
- Whitethroat

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Bird data; Mott MacDonald, 2024. Red Line Boundary; Mott MacDonald, 2024. Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

MOTT MACDONALD

Spring Bank House
33 Stamford Street
Altrincham, WA14 1ES
United Kingdom
T +44 (0)161 926 4000
mottmac.com

North and Mid Wales Trunk Road Agent
Unit 5 Llys Britannia
Ffordd Y Parc, Parc Menai,
Bangor LL57 4BN

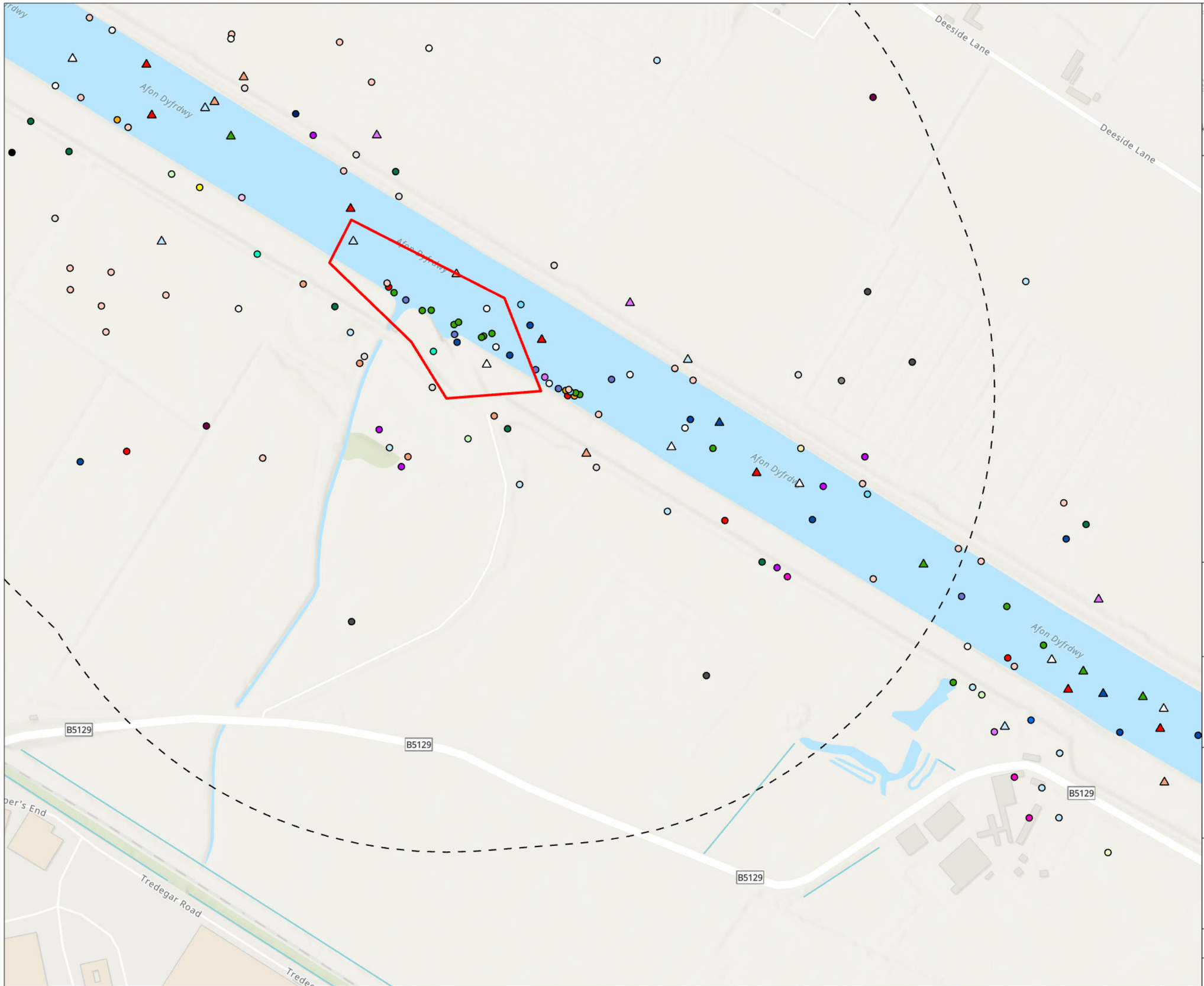
A494 River Dee Bridge Improvement Scheme
Priority bird species
Sheet 1 of 3

Drawn	GIS Checked	Checked	Approved
M Hergest	M Hargest	K Doneo	J Dunning
Scale at A3	Status	Revision	Security
1:4,000	INF	01	STD

395318-MMD-00-XX-DR-Z-0003

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





Airbus Load Out Facility (ALOF) area

500m buffer

Behaviour

- Flying over
- Present

Priority bird species

- Black-headed gull
- Common gull
- Common sandpiper
- Coot
- Cormorant
- Dunnock
- Grasshopper warbler
- Great black-backed gull
- Greenfinch
- Herring gull
- House martin
- House sparrow
- Kestrel
- Lapwing
- Lesser black-backed gull
- Linnet
- Magpie
- Oystercatcher
- Redshank
- Reed bunting
- Song thrush
- Starling
- Swift
- Whitethroat
- Yellowhammer
- Grey wagtail
- Hobby
- Skylark
- Wheatear
- Whitethroat

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Bird data; Mott MacDonald, 2024. Red Line Boundary; Mott MacDonald, 2024. Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

MOTT MACDONALD

Spring Bank House
33 Stamford Street
Altrincham, WA14 1ES
United Kingdom
T +44 (0)161 926 4000
mottmac.com

North and Mid Wales
Trunk Road Agent
Unit 5 Llys Britannia
Ffordd Y Parc, Parc Menai,
Bangor LL57 4BN

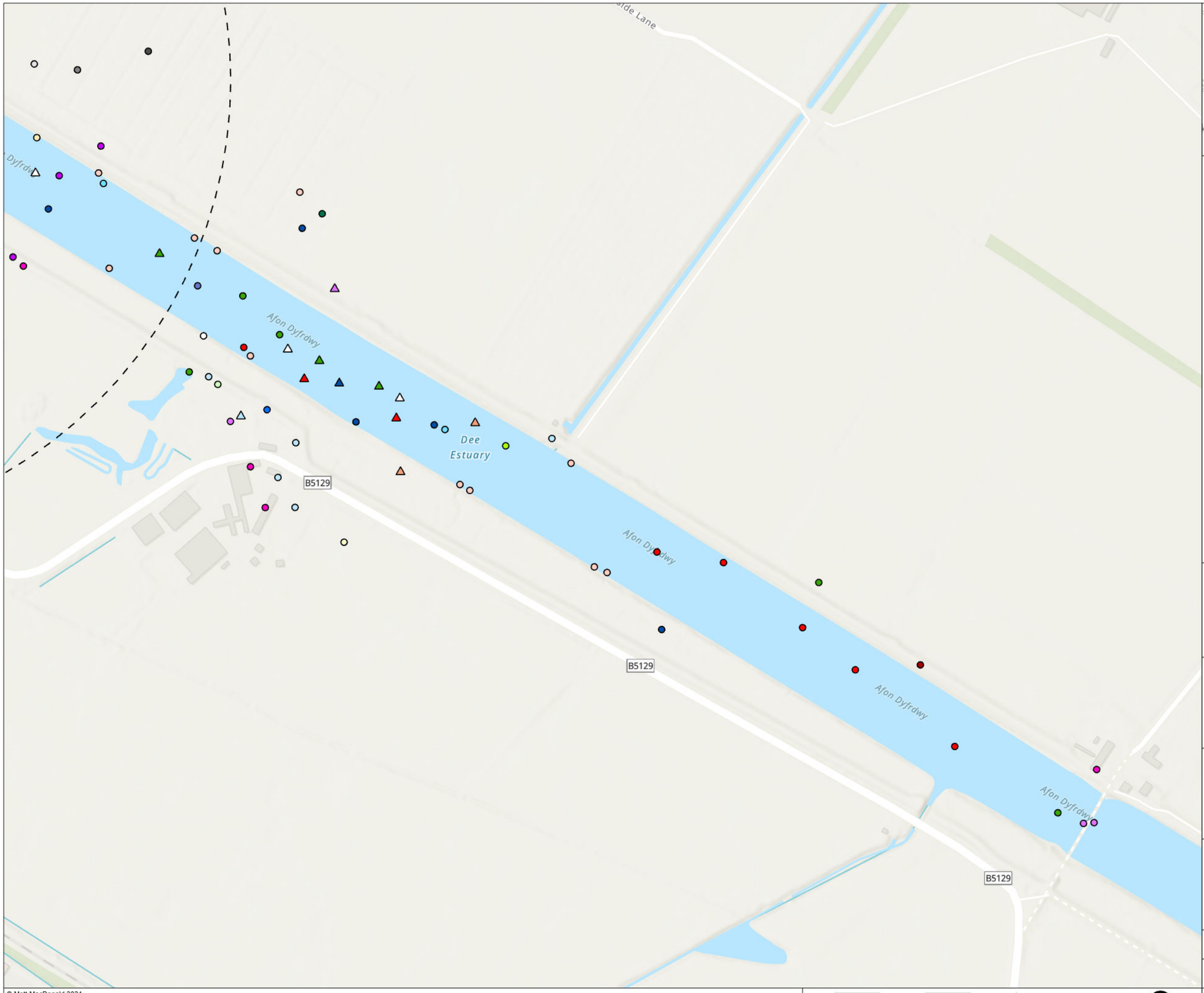
A494 River Dee Bridge Improvement Scheme
Priority bird species
Sheet 2 of 3

Drawn	GIS Checked	Checked	Approved
M Hergest	M Hargest	K Doneo	J Dunning
Scale at A3	Status	Revision	Security
1:4,000	INF	01	STD

395318-MMD-00-XX-DR-Z-0003

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m





500m buffer

Behaviour

- Flying over
- Present

Priority bird species

- Black-headed gull
- Common gull
- Common sandpiper
- Coot
- Cormorant
- Dunnock
- Grasshopper warbler
- Great black-backed gull
- Greenfinch
- Herring gull
- House martin
- House sparrow
- Kestrel
- Lapwing
- Lesser black-backed gull
- Linnet
- Magpie
- Oystercatcher
- Redshank
- Reed bunting
- Song thrush
- Starling
- Swift
- Whitethroat
- Yellowhammer
- Grey wagtail
- Hobby
- Skylark
- Wheatear
- Whitethroat

Coordinate system: British National Grid; Datum: OSGB 1936

Data sources: Bird data; Mott MacDonald, 2024. Red Line Boundary; Mott MacDonald, 2024. Esri Community Maps Contributors, Esri UK, Esri, TomTom, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Esri UK, Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS

MOTT MACDONALD

Spring Bank House
33 Stamford Street
Altrincham, WA14 1ES
United Kingdom
T +44 (0)161 926 4000
mottmac.com

North and Mid Wales
Trunk Road Agent
Unit 5 Llys Britannia
Ffordd Y Parc, Parc Menai,
Bangor LL57 4BN

A494 River Dee Bridge Improvement Scheme
Priority bird species
Sheet 3 of 3

Drawn	GIS Checked	Checked	Approved
M Hergest	M Hargest	K Doneo	J Dunning
Scale at A3	Status	Revision	Security
1:4,000	INF	01	STD

395318-MMD-00-XX-DR-Z-0003

© Mott MacDonald 2024
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 50 100 150 200 m



This title page to be deleted before formal publication to external parties.

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix C

Pond Locations and Descriptions

Document reference: 395318 | RML-00-XX-RP-Y-8013 | P01

First Issue | Revision P01 | September 2025

Issue and Revision Record

Revision	Date	Originator	Checker	Co-ordination check	Description
Rev A	11/07/25	A. Lynch	J. Stoddard		First Draft

This document is issued for the party which commissioned it and for specific purposes connected with the above captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, ore being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It shouldnot be shown to other parties without consent from us and from the party which commissioned it.

Mott MacDonald Limited
First Floor, Bryn Eirias,
Abergele Road, Colwyn Bay, LL29 8BY

Richards, Moorehead & Laing Ltd
Office 1, Llys Clwyd, Cwrt Y Dderwen
Ffprdd Celyn, Ruthin, LL15 1NJ

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix C

Pond Locations and Descriptions

395318 | RML-00-XX-RP-Y-8011

First Issue | Revision P01 | September 2025



Contents

8. C. Pond Locations and Descriptions 1

Tables

Table 8-1 Pond descriptions 1

8. C. Pond Locations and Descriptions

8.1.1 Pond descriptions are provided in Table 8-1. Pond locations are provided on Figures 8.4A – 8.4C in Volume 2 of the ES.

Table 8-1 Pond descriptions

	
RMLP1	A surface water drainage attenuation lagoon associated with the Makro retail unit. This pond is located immediately adjacent to the proposed new road Scheme. The lagoon was created to accommodate storm water from the adjacent carpark and buildings. During an initial inspection in 2018, this pond was completely dry. However, during an updated site visit conducted in June 2020, the pond was found to contain a small amount of water. The pond contains dense stands of Bulrush (Typha latifolia) as well as Willow (Salix sp.). scrub. During the updated surveys in 2021 the pond contained very little open water and was dry in 2022 and 2024.

	
RMLP2	A duck pond located within the corner of grazed fields. The pond had minimal marginal vegetation and was heavily disturbed by waterfowl and to the margins by livestock. No access was possible in 2022 owing to cattle in the field. Inspections were possible in 2024.
	
RMLP2a	Small body of water which has a tendency to dry up. A small drain/ditch connects this to pond RMLP2. There is limited emergent or submerged vegetation, and the pond is subject to disturbance by horses which are kept in the fields.

	
RML P3	An area which looked like it may hold a little water during times of high rainfall. Pond located in the corner of a grazed field and was found to be dry on all occasions.
	
RML P4	A manmade pond located within a residential garden surrounded by arable fields. The pond is covered in duckweed (Lemna minor) has steep banks and is shaded by trees to one side. The garden consists of mown grassland. During the updated site visits in 2022, the water level within the pond had dropped considerably and was very silty. No access was permitted in 2024.

	
RMLP5	Dry. This is a small field drain and appeared to have been dry for quite a while. It consisted of a line of trees no water.

	
RMLP6	A large holding pond approximately 800 m2 which has an inlet along the west edge located within the SPEN site. An initial inspection conducted in September 2020 showed the pond to contain water and at the time of the survey there was a flow of water into the pond over the silt that had built up near the outlet to the river, indicating that the tidal flap is not functioning effectively. As a result, the pond may be slightly brackish, though this is unconfirmed. The pond was quite silty, with a slight film during the initial inspection. During the updated surveys in 2021 and 2022 the pond was completely dry, as can be seen in the photo. No access was permitted in 2024.

2021	
2024	
Pentre Retail Attenuation Pond	A large attenuation which was dry in 2021 and in 2022. Pond was found to contain water in 2024

	
RMLP7	A small heavily shaded pond located in the corner of an industrial unit. Steep sides, with dense scrub to margins. No access was permitted in 2024 owing to tree works.

	
Queensferry Drain	Queensferry Drain is located between the A494 and the wastewater treatment works. The southern end of the drain emerges as a canalised, concrete-sided ditch from a long culvert beneath the Chester-Holyhead railway. The northern end of the drain also ends in a culvert below the track to the Traveller site, leading to the NRW Queensferry Land drainage pumping station (GR: SJ 3228 6846) and out into the river Dee. The ditch section between these culverts is approximately 260 m long and is subject to the influences of road runoff. The drain has a slight flow, a gravel/silt substrate, steep banks with tall ruderal habitat and to the banks. The bank profile is approximately 45o either side of the ditch. The width of the ditch is approximately 2m. The water level fluctuates from 0.2 – 0.5 m.

This title page to be deleted before formal publication to external parties.

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix D

Bat Survey Results Tables 2018-2024

Document reference: 395318 | RML-00-XX-RP-Y-9014 | P01

First Issue | Revision P01 | September 2025

Issue and Revision Record

Revision	Date	Originator	Checker	Co-ordination check	Description
Rev A	11/07/25	A. Lynch	J. Stoddard		First Draft

This document is issued for the party which commissioned it and for specific purposes connected with the above captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, ore being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It shouldnot be shown to other parties without consent from us and from the party which commissioned it.

Mott MacDonald Limited
First Floor, Bryn Eirias,
Abergele Road, Colwyn Bay, LL29 8BY

Richards, Moorehead & Laing Ltd
Office 1, Llys Clwyd, Cwrt Y Dderwen
Ffprdd Celyn, Ruthin, LL15 1NJ

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix D

Bat Survey Results Tables 2018-2024

395318 | MMD-00-XX-RP-Y-8014

First Issue | Revision P01 | September 2025



Contents

8. D. Bat Survey Results Tables 2018-2024 2

Tables

Table 8-1 Abbreviations used 2
Table 8-2 Emergence / Return to roost survey results – Structures 2018 3
Table 8-3 Transect survey results - 2018 11
Table 8-4 Static detector results ST1 within DCWW land north – September 2018 14
Table 8-5 Table 8-4 Static detector results ST2 within DCWW land south – September 2018 15
Table 8-6 Static detector results ST3 Queensferry Drain - July. 2018 16
Table 8-7 Static detector results ST4 Terrace Garden – August 2018 17
Table 8-8 Emergence / Return to roost survey results – structures and trees 2020 19
Table 8-9 Transect survey results 2020 37
Table 8-10 Static detector results 2020 40
Table 8-11 Emergence / Return to roost survey results – structures 2022 42
Table 8-12 Transect survey results 2022 56
Table 8-13 Static detector results 2022 59
Table 8-14 Transect survey results 2023 – Spring season only 61
Table 8-15 Static detector results 2023 – Spring season only 64
Table 8-16 Emergence / Return to roost survey results – structures 2024 65
Table 8-17 Transect survey results 2024 87
Table 8-18 Static detector results 2024 90

8. D. Bat Survey Results Tables 2018-2024

8.1.1 The following tables detail the results of the bat surveys conducted between 2018 and 2024. Raw sonograms are available upon request. Survey locations, static locations and bat activity are present in Figures 8.5A to 8.5N, in Volume 2 of the ES.

Table 8-1 Abbreviations used

Abbr.	Common name	Species
Mbra	Brandts bat	*Myotis brandtii*
Mdau	Daubentons bat	*Myotis daubentonii*
Mmys	Whiskered bat	*Myotis mystacinus*
Mnat	Natterers bat	*Myotis nattereri*
Nnoc	Noctule	*Nyctalus noctula*
Ppip	Common pipistrelle	*Pipistrellus pipistrellus*
Ppyg	Soprano pipistrelle	*Pipistrellus pygmaeus*
Paur	Brown long-eared bat	*Plecotus auritus*
Rhip	Lesser horseshoe bat	*Rhinolophus hipposideros*

Bat Survey Results Tables 2018

8.1.2 Tables 2 to 7 detail the results of the bat surveys conducted in 2018. Survey locations, static locations and bat activity are present in Figures 8.5A – 8.5C, Volume 2 of the ES.

Table 8-2 Emergence / Return to roost survey results – Structures 2018

Building Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Temperature**	**Species Recorded Time / Species / Location and/or Activity**
Garage 1	09/08/2018	Sunset 20:53 20:50 / 22:10	Calm / Dry 10% / 15°C	22:00 / Ppip / heard not seen x 1 pass 22:09 / Nnoc / heard not seen x 1 pass **No bats seen to emerge**
Electricity sub-station adjacent to Garage 1	09/08/2018	Sunset 20:53 20:50 / 22:10	Calm / Dry 10% / 15°C	21:13 / Ppip / one pass from west to east 21:19 / Pipp / one pass from west to east 21:21 / Pipp / heard not seen 21:24 – 21:26 / Ppip / continual forage over trees to the SW. 21:30 – 21:36 / Ppip / continual forage over trees to the SW 21:40 – 22:09 / Ppip / and Ppyg quite constant recordings around trees and some passes heard not seen **No bats seen to emerge**

Building Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Temperature**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 1	25/07/2018	Sunset: 21:19 21:05 / 22:45	Calm / Dry 20% / 20°C	21:41 / Nnoc / heard not seen x 1 pass 21:52 / Nnoc / heard not seen x 1 pass 21:53 / Ppip / heard not seen x 1 pass 22:09 / Ppip / x 1 pass towards River Dee 22:13 / Ppip / forage between properties 22:29 / Ppip / forage in front of properties 22:33 / Ppip / heard not seen x 1 pass 22:35 / Ppip /heard not seen x 1 pass **No bats were seen to emerge**
Terrace property 1	23/08/2018	Sunrise: 06:00 04:15 / 06:00	Calm / Dry 40% / 13°C	04:41 / Ppip / foraging at south gable end 04:52 / Ppip / heard not seen **No bats were seen to emerge**
Terrace property 1	13/09/2018	Sunset: 19:34 19:24 / 20:30	Calm / Dry 90% / 16.5°C	19:55 / Ppip / heard not seen 19:59 / Ppip / commute along trees line W to E 20:00 / Ppip / heard not seen 20:11 / Ppyg / heard not seen 20:15 / Ppip / heard not seen 20:24 / Ppip / heard not seen x 2 passes and social calls **No bats were seen to emerge**

Building Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Temperature**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 2	25/07/2018	Sunset: 21:19 21:05 / 22:45	Calm / Dry 20% / 20°C	21:36 / Ppip / heard not seen 21:41 / Ppip / foraging in garden 21:48 / Ppip & Ppyg / foraging in garden 21:50 / Ppip / foraging in garden 21:52 / Ppip / foraging in garden 22:00 / Ppip / foraging in garden 22:03 / Ppip / commute between buildings 22:08 / Ppip / commute between buildings 22:14 / Ppyg / commute across gardens 22:21 / Ppyg / commute between buildings 22:27 / Ppip / foraging in garden 22:28 / Ppip & Ppyg / commute across garden 22:30 / Ppyg / heard not seen 22:34 / Ppip / commute between buildings 22:35 / Ppyg / foraging in garden 22:36 / Ppyg / commute between buildings 22:39 / Ppip / heard not seen **No bats were seen to emerge**
Terrace property 2	23/08/2018	Sunrise: 06:00 04:15 / 06:00	Calm / Dry 40% / 13°C	04:41 / Ppip / heard not seen x 1 pass 04:52 / Ppip / heard not seen x 1 pass **No bats were seen to emerge**

Building Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Temperature**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 2	13/09/2018	Sunset: 19:34 19:24 / 20:30	Calm / Dry 90% / 16.5°C	19:55 / Ppip / foraging in garden came from between the buildings from the front of the properties 19:58 / MbraMmys / foraging in garden 20:00 / Ppip / foraging in garden 20:04 / MbraMmys /foraging in garden 20:06 / Ppip / heard not seen 20:12 / Ppyg / heard not seen 20:15 / Ppip / heard not seen 20:17 / Ppip / heard not seen 20:19 / Ppip / foraging in garden 20:21 / Ppip / heard not seen 20:24 / Ppip / heard not seen 20:25 / Ppip / heard not seen 20:30 / Ppyg / heard not seen **No bats were seen to emerge**

Building Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Temperature	Species Recorded Time / Species / Location and/or Activity
Terrace property 3	25/07/2018	Sunset: 21:19 21:05 / 22:45	Calm / Dry 20% / 20°C	**21:37 / Ppip / possible emerge from back of property from bottom of roof and foraging around garden.** 21:41 – 21:47 / Ppip / continual foraging around garden 21:47 / Ppyg / foraging in garden 21:50 / Ppip x 2 / bats foraging and chasing around garden 21:51 / Nnoc / heard not seen x 1 pass 21:54 – 22:00 / Ppip / continual foraging around garden 22:03 / Ppip / foraging x 2 passes 22:08 / Ppip / foraging x 1 pass 22:13 / Ppip / x 1 pass in garden 22:15 / Ppyg / x 1 pass in garden 22:21 / Ppyg / x 2 passes in garden 22:27 – 22:40 / Ppip and Ppyg near constant foraging activity in garden
Terrace property 3	23/08/2018	Sunrise: 06:00 04:15 / 06:00	Calm / Dry 40% / 13°C	04:42 / Ppip / heard not seen x 1 pass 04:53 / Ppip / heard not seen x 1 pass 05:11 / Ppip / heard not seen x 1 pass **05:49 / Ppip / seen to enter roof space under soffit board or behind boarding covering the window, east aspect**

Building Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Temperature	Species Recorded Time / Species / Location and/or Activity
Terrace property 3	13/09/2018	Sunset: 19:34 19:24 / 20:30	Calm / Dry 90% / 16.5°C	20:01 / MbraMmys / foraging in front of building and garden area 20:05 / Ppip / heard not seen 1 pass 20:12 / Ppip / heard not seen x 1 pass 20:16 / Ppip / heard not seen few passes 20:18 / Ppip / heard not seen few passes 20:19 / Ppip / heard not seen x 1 pass and social calls **No bats were seen to emerge**
Terrace property 4	25/07/2018	Sunset: 21:19 21:05 / 22:45	Calm / Dry 20% / 20°C	21:59 / Nnoc / heard not seen x 1 pass **No bats were seen to emerge**
Terrace property 4	23/08/2018	Sunrise: 06:00 04:15 / 06:00	Calm / Dry 40% / 13°C	**No records**
Terrace property 4	13/09/2018	Sunset: 19:34 19:24 / 20:30	Calm / Dry 90% / 16.5°C	20:12 / Ppip / heard not seen x 1 pass **No bats were seen to emerge**

Building Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Temperature**	**Species Recorded Time / Species / Location and/or Activity**
Flintshire Depot 1	29/08/2018	Sunset: 20:09 20:00 / 21:30	Light breeze / Dry 5% / 14°C	20:48 / Ppyg / flying across yard from S to N 20:51 / Ppip / heard not seen 20:53 / Ppyg / commute along tree line and over building due E 20:55 / Ppyg / heard not seen 20:57 / Ppip / commute along tree line and over building due E 21:00 / Ppyg / heard not seen 21:01 / Ppip / flying around yard 21:07 / Nnoc / heard not seen x 1 pass **No bats were seen to emerge**
Flintshire Depot 2	29/08/2018	Sunset: 20:09 20:00 / 21:30	Light breeze / Dry 5% / 14°C	20:51 / Ppip / heard not seen **No bats were seen to emerge**
Electricity sub-station adjacent to Queensferry Drain pumping station				21:08 / Ppip / foraging along tree line 21:15 / Nnoc / heard not seen 21:16 / Nnoc / heard not seen 21:33 / Ppyg / foraging along tree and shrubs few passes 21:35 / Ppyg / foraging, few passes 21:36 / Ppip / heard not seen 21:38 – 21:52 / Ppyg / near constant passes and foraging activity 21:52 / Ppip / foraging along tree line **No bats were seen to emerge**

Building Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Temperature	Species Recorded Time / Species / Location and/or Activity

Key

Ppip = Common pipistrelle (*P. pipistrellus*)

Ppyg = Soprano pipistrelle (*P. pygmaeus*)

MbraMmys = Whiskered / Brandts (*M. mystacinus / M.brandtii agg*)

Nnoc = Noctule (*N. noctula*)

Table 8-3 Transect survey results - 2018

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature	Species Recorded Time / Species / Location and/or Activity
26/07/2018	Sunset: 21:31 21:00 / 23:03	Route 1 / 1 of 3	Moderate breeze / Dry 30% / 21°C	**South of the River Dee (Queensferry)** 21:25 / Nnoc / commuting high up towards the River Dee over the drainage ditch 22:03 / Nnoc / SP3 near to Queensferry pumping stn, heard not seen 22:07/ Nnoc / as above **North of the River Dee (Sealand)** 22:35 / Ppip / SP1 foraging along grassland and tree planting heading towards the River Dee 22:37 / Ppip / as above 22:39 / Ppip / foraging along grassland and tree line which lines the footpath x 1 pass 22:43 & 22:45 / Ppip / as above 22:50 / Ppyg / SP2 under Dee Bridge heard not seen 22:52 / Ppip / SP2 as above 23:01 / Ppip foraging along the hedgerow at Fox's Lane.

15/08/2018	Sunrise: 05:53 03:43 / 05:52	Route 1 / 2 of 3	Calm / Light drizzle 100% / 18°C	**North of the River Dee (Sealand)** 03:58 / Ppip / SP2 one faint pass 04:04 / Ppip / foraging along grassland and tree line which lines the footpath x 1 pass 04:06 / Ppip / SP1 foraging near to tree planting **South of the River Dee (Queensferry)** 04:24 / Ppip / west side of the A494 near to the River Dee Bridge 04:26 / Ppip / SP4 under Dee Bridge heard not seen 04:27 / Ppip / as above, possible foraging along intertidal habitat 04:30 / Ppip / as above heard not seen x 2 passes 04:33 / Ppyg / SP3 heard not seen next to Queensferry pumping stn 04:36 / Ppip / SP3 as above 04:37 / Ppyg / SP3 as above 04:43 / Ppip / heard not seen between haulage depot and caravan park 04:48 / Ppip / SP7 heard not seen 04:50 / Ppip / SP7 x 1 pass heard not seen 04:52 / Ppyg / SP7 x 1 pass heard not seen 04:55 / Ppip / SP6 x 2 passes foraging along footpath 04:58 / Ppip / SP6 x 2 passes 05:02 / Ppip / SP1 heard not seen x 1 pass at the end of the footpath

06/09/2018	Sunset: 19:50 19:30 / 22:07	Route 1 / 3 of 3	Calm / No rain 20% / 15°C	**South of the River Dee (Queensferry)** 20:31 – 20:36 / Ppip and Ppyg / SP1 x continual foraging along footpath leading up from Chemistry Lane, adjacent to the water treatment works 20:53 – 20:54 / Ppip / SP3 x 4 passes foraging around trees next to the pumping station 20:57 – 20:58 / Nnoc / heard not seen between SP3 and SP4 x 3 passes 20:59 / Ppip / SP4 x 1 pass heard not seen, River Dee bridge 21:03 / Ppip / SP4 x 1 pass heard not seen, River Dee bridge 21:06 / Nnoc / heard not seen, near to poplars located on the west side of the dee bridge between SP 4 and SP5 21:08 – 21:09 / Ppip and Nnoc / SP5 x 1 pass of each, heard not seen 21:13 / Ppip / SP5 x 1 faint pass heard not seen 21:15 / Ppyg / x 1 pass heard not seen between SP5 and SP4 near to tree line adjacent to footpath 21:26 / Ppip and Ppyg / SP6 foraging and social calls along footpath adjacent to the water treatment works. **North of the River Dee (Sealand)** No bat calls were detected on the north side of the Dee during this transect

Key

Ppip = Common pipistrelle (P. pipistrellus)

Ppyg = Soprano pipistrelle (P. pygmaeus)

Nnoc = Noctule (N. noctula)

SP# = Stopping Point reference

8.1.3 Tables 4 to 7 detail the results obtained from the static detectors deployed in 2018 including species and total number of passes per minute.

Table 8-4 Static detector results ST1 within DCWW land north – September 2018

Date	Sunset / Sunrise	Minimum temperature (°C)	Species recorded / number of passes per minute	Time of recordings First / Last
17/09/2018	19:23 / 06:49	15.3	Ppip / 7 passes Ppyg / 16 passes	20:32 / 23:34 21:10 / 04:32
18/09/2018	19:20 / 06:50	14.5	Nnoc / 5 passes Ppip / 108 passes Ppyg / 238 passes	00:13 / 06:26 20:09 / 03:35 20:08 / 04:53
19/09/2018	19:18 / 06:52	13.6	Nnoc / 1 pass Ppip / 81 passes Ppyg / 55 passes	04:41 20:04 / 01:52 19:55 / 04:06
20/09/2018	19:15 / 06:54	10.6	Mnat / 1 pass MbraMmys / 1 pass	01:31 22:36
21/09/2018	19:13 / 06:55	10.6	Ppip / 2 passes Ppyg / 5 passes	21:27 / 23:11 20:21 / 04:37
22/09/2018	19:10 / 06:57	9.4	Nnoc / 3 passes Ppip / 2 passes Ppyg / 1 passes	18:54 / 07:15 20:00 19:54
23/09/2018	19:08 / 06:59	10.5	Ppyg / 2 passes	20:19 / 04:29

Date	Sunset / Sunrise	Minimum temperature (°C)	Species recorded / number of passes per minute	Time of recordings First / Last
Key Ppip = Common pipistrelle (P. pipistrellus) Ppyg = Soprano pipistrelle (P. pygmaeus) MbraMmys = Whiskered / Brandts (M. mystacinus / M.brandtii agg) Mnat = Natterers (M. nattereri) Nnoc = Noctule (N. noctula)				

Table 8-5 Table 8-4 Static detector results ST2 within DCWW land south – September 2018

Date	Sunset / Sunrise	Minimum temperature (°C)	Species recorded / number of passes per minute	Time of recordings First / Last
17/09/2018	19:23 / 06:49	15.5	Mdaub / 5 passes Nnoc / 1 pass Ppip / 444 passes Ppyg / 1536 passes Rhip / 1 pass	22:37 / 03:54 00:16 20:06 / 06:08 20:25 / 06:24 02:51
18/09/2018	19:20 / 06:50	15.2	Nnoc / 2 passes Ppip / 758 passes Ppyg / 1993 passes	05:06 / 05:21 20:01 / 06:15 20:09 / 05:54
19/09/2018	19:18 / 06:52	13.8	Mdaub / 4 passes Nnoc / 5 passes Ppip / 272 passes Ppyg / 1747 passes	20:38 / 04:06 21:58 / 04:27 20:01 / 06:17 19:56 / 06:15

Date	Sunset / Sunrise	Minimum temperature (°C)	Species recorded / number of passes per minute	Time of recordings First / Last
20/09/2018	19:15 / 06:54	12.9	MbraMmys / 1 pass Ppip / 19 passes Ppyg / 181 passes	03:18 23:58 / 03:00 00:19 / 06:21
21/09/2018	19:13 / 06:55	9.1	Ppip / 81 passes Ppyg / 67 passes	20:03 / 06:24 20:00 / 06:26
22/09/2018	19:10 / 06:57	9.1	Mdaub / 1 pass Ppip / 18 passes Ppyg / 6 passes	00:11 19:57 / 06:12 19:46 / 05:31
23/09/2018	19:08 / 06:59	9	Nnoc / 1 pass Ppip / 18 passes	19:46 19:48 / 05:38

Key

Ppip = Common pipistrelle (*P. pipistrellus)*

Ppy = Soprano pipistrelle (*P. Pygmaeus)*

MbraMmys = Whiskered / Brandts (*M. mystacinus / M. brandtii agg)*

Nnoc = Noctule (*N. noctula)*

Mdaub = Daubentons (*M. daubentoniid)*

Rhip = Lesser horseshoe (*R. hipposideros)*

Table 8-6 Static detector results ST3 Queensferry Drain - July. 2018

Date	Sunset / Sunrise	Minimum temperature (°C)	Species recorded / number of passes per minute	Time of recordings First / Last
10/07/2018	21:36 / 04:57	13	Ppip / 730 Ppyg / 190	22:10 / 04:23 22:35 / 03:40

Date	Sunset / Sunrise	Minimum temperature (°C)	Species recorded / number of passes per minute	Time of recordings First / Last
11/07/2018	21:35 / 04:58	13.9	Nnoc / 1 Ppip / 582 Ppyg / 745	02:09 22:31 / 04:17 22:29 / 04:01
12/07/2018	21:34 / 05:00	16.3	Ppip / 15 Ppyg / 37	22:10 / 23:34* 22:43 / 23:14*
13/07/2018	21:33 / 05:01	13.1	Nnoc / 2 Ppip / 656 Ppyg / 528	02:01 22:10 / 04:18 22:37 / 04:18
14/07/2018	21:32 / 05:02	12.7	Nnoc / 3 Ppip / 707 Ppyg / 400	22:49 / 03:00 22:21 / 04:15 22:45 / 04:23
15/07/2018	21:31 / 05:03	17.1	Nnoc / 1 Ppip / 894 Ppyg / 698	04:17 22:17 / 04:22 23:11 / 04:17

Key

Ppip = Common pipistrelle (*P. pipistrellus)*

Ppyg = Soprano pipistrelle (*P. pygmaeus)*

Nnoc = Noctule (*N. noctula)*

* SD card full so ceased recording

Table 8-7 Static detector results ST4 Terrace Garden – August 2018

Date	Sunset / Sunrise	Minimum temperature (°C)	Species recorded / number of passes per minute	Time of recordings First / Last
23/08/2018	20:22 / 06:06	12.1	Ppip / 27	20:42 / 05:43

Date	**Sunset / Sunrise**	**Minimum temperature (**°C)	**Species recorded / number of passes per minute**	**Time of recordings First / Last**
24/08/2018	20:20 / 06:07	11.7	Ppip / 4	20:39 / 22:17
25/08/2018	20:17 / 06:09	10.0	Ppip / 103 Ppyg / 4	20:31 / 23:49 20:42 / 21:36
26/08/2018	20:15 / 06:11	12.4	Ppip / 76 Ppyg / 2	20:20 / 06:00 21:01 / 01:46
27/08/2018	20:13 / 06:12	13.9	Ppip / 107 Ppyg / 2	20:10 / 06:01 00:03 / 04:24
28/08/2018	20:10 / 06:14	13.9	Ppip / 177 Ppyg / 2	20:03 / 06:06 00:14 / 02:00
Key Ppip = Common pipistrelle (*P. pipistrellus)* Ppyg = Soprano pipistrelle (*P. pygmaeus)*				

Bat Survey Results Tables 2020

8.1.4 Tables 8 to 10 detail the results of the bat surveys conducted in 2020. Survey locations, static locations and bat activity are present in Figures 8.5D – 8.5F, Volume 2 of the ES.

Table 8-8 Emergence / Return to roost survey results – structures and trees 2020

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity	Species Recorded Time / Species / Location and/or Activity
Garage 1 South of Chester Road East	06/08/2020	Sunset 20:59 20:44 / 22:00	Calm / Dry 50% / 20°C	21:15 / Ppip / foraging near to north gable 21:18 / Ppip / Commute due north 21:20 / Ppip / Commute from south heading north 21:23 / Ppip / no visual 21:27 / Nnoc / no visual 21:30 / Ppip / two passes due north 21:23 / Ppip / no visual x 2 passes 21:35 / Ppip / commute due north 21:39 / Nnoc / x 2 passes no visual 21:41 / Ppip / x 1 pass no visual 21:49 / Ppip / no visual 21:59 / Ppip and Nnoc / no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station adjacent to Garage 1	06/08/2020	Sunset 20:59 20:44 / 22:00	Calm / Dry 50% / 20°C	21:16 / Ppip / x two passes foraging 21:18 / Ppip / x one pass from south to north along footpath 21:19 / Ppip / x one pass from east to treeline adjacent to footpath 21:21 / Ppip / x two bats foraging over grass verge and treeline along footpath 21:23 / Ppip / foraging 21:25 / Ppip / foraging 21:27 / Nnoc / x 1 pass no visual 21:28 / Ppip / x two bats few passes foraging 21:30 / Ppip / foraging 21:32 / Ppip /few passes foraging 21:32 / Nnoc / x 1 pass no visual 21:35 / Ppip and Ppyg / no visual 21:37 / Ppip / x two passes no visual 21:39 / Nnoc / x 2 passes no visual 21:45 / Ppip / x two passes no visual 21:51 / Ppip / x two passes no visual 22:00 / Ppip / x four passes no visual **No bats were seen to emerge, south and west elevation subject to light spill from streetlamp**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 1	24/06/2020	Sunset 21:44 21:30 / 23:00	Calm / No rain 0% / 18.9°C / 58%	21:56 / Ppip / commute to the west of building 1 along tree line 22:03 / Ppip /commute from west to east to treeline behind properties 22:07 / Ppip / x 2 from west to east to gardens and tree line to the rear of the property 22:11 / Ppip / several passes from west to east to gardens and tree line to the rear of the property **No bats were seen to emerge**

Terrace property 1	21/07/2020	Sunset 21:23 20:44 / 22:00	Calm / No rain 20% / 14°C / 58%	21:40 / Ppip / x 1 pass from footpath to the front of the property heading to the rear of the property 21:42 / Ppip / x 1 pass from footpath to east along treeline to the rear of the property 21:44 / Ppip / along treelined footpath to the front of the property 21:45 / Ppip / from footpath to the rear of the property 21:46 / Ppip / x 2 along footpath and between the front of properties 2 and 3 21:50 / Ppip / x 2 along footpath to the front of the property 21:51 / Ppip / x 1 as above 21:52 / Ppip / along footpath and between the front of properties 2 and 3 21:55 / Ppip / along hedgerow due east along Chester Road East 22:03 / Ppip / as above 22:06 / Ppip / x 1 pass from footpath to the front of the property heading to the rear of the property 22:10 / Ppip / along footpath and between the front of properties 2 and 3 22:15 / Ppip / foraging 22:20 / Ppip / along footpath and between the front of properties 2 and 3 22:29 / Ppip / as above 22:33 / Ppip / foraging along footpath 22:35 / Ppip / as above 22:40 / Ppip / as above **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 1	29/09/2020	Sunset 18:52 18:35 / 20:00	Calm / No rain 100% / 15°C / 57%	19:15 / Ppip / foraging along footpath to the front of the properties 19:32 / Ppip / as above 19:35 / Nnoc / no visual 19:38 / Ppip / no visual 19:43 / Ppip / no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 2 (rear)	24/06/2020	Sunset 21:44 21:30 / 23:00	Calm / No rain 0% / 18.9°C / 58%	22:01 / Ppip / one pass no visual 22:05 / Ppip / one pass and foraging within garden at the rear of the property 22:07 / Ppip / x 3 foraging within garden at the rear of the property 22:10 / Ppip / x 2 foraging along tree line to the front of the properties 22:11 / Ppip / x 3 foraging within garden at the rear of the property and between the properties to the front of the properties 22:16 / Ppip / x 1 bat foraging within garden 22:19 / Ppip / commute over tree line heading due west towards the A494 22:30 / Ppyg / x 1 pass no visual 22:51 / Ppyg / commute over buildings due east 22:52 / Ppip / x 1 pass no visual 22:55 / Ppyg / x 1 pass no visual **No bats were seen to emerge**

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity	Species Recorded Time / Species / Location and/or Activity
Terrace property 2 (rear)	21/07/2020	Sunset 21:23 20:44 / 22:00	Calm / No rain 20% / 14°C / 58%	21:40 / Ppip / x 1 pass no visual 21:43 / Ppip / foraging within garden at the rear of the property 21:46 / Ppip / flew across garden due east to property 1 21:50 / Ppip / x 2 bats pass from west to east across gardens 21:51 / Ppip / along front of property and then between properties 2 and 3 to the rear of the properties 21:52 / Ppip / x 1 bat foraging at canopy height around trees to the rear of the property 21:54 / Ppip / from west to east across gardens 21:55 / Ppip / as above 22:00 / Ppip / no visual 22:07 / Ppip / no visual 22:15 – 22:40 / Ppip / foraging along land to the front of the property 22:36 / Ppip / x 1 pass no visual 22:39 / Ppip / few passes no visual 22:42 / Ppip / x 1 pass no visual 22:44 / Ppip / x 1 pass np visual 22:46 / Ppip / x 1 pass no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 2 (rear)	29/09/2020	Sunset 18:52 18:35 / 20:00	Calm / No rain 100% / 15°C / 57%	19:15 / Ppip / x 1 pass no visual 19:23 / Ppip / x 1 pass no visual 19:25 / Ppip / x 1 pass no visual 19:28 / Ppip / foraging along footpath to the front of the properties 19:29 / Ppip / few passes foraging at the rear of the property 19:38 / Ppip / x 1 pass no visual 19:42 / Ppip / no visual 19:48 / Ppip / x 1 pass no visual 19:50 / Ppyg / x 1 pass no visual 19:51 / Ppyg / as above 19:53 / MbraMmys / x 1 pass no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 3 (rear)	24/06/2020	Sunset 21:44 21:30 / 23:00	Calm / No rain 0% / 18.9°C / 58%	22:01 / Ppip / one pass no visual 22:05 / Ppip / one pass and foraging within garden at the rear of the property 22:08 / Ppip / x 3 foraging within garden at the rear of the property 22:11 / Ppip / x 3 foraging within garden at the rear of the property continual 22:16 / Ppip / x 1 bat forging within garden 22:18 / Ppip / commute over tree line heading due west towards the A494 22:23 / Ppip / x 1 bat foraging 22:30 / Ppyg / x 1 pass no visual 22:51 / Ppyg /commute over buildings due east 22:52 / Ppip / x 1 pass no visual 22:53 / Nnoc / no visual 22:55 / Ppip / x 1 pass no visual 22:59 / Nnoc / x 1 pass no visual 23:00 / Ppip / no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 3 (rear)	21/07/2020	Sunset 21:23 20:44 / 22:00	Calm / No rain 20% / 14°C / 58%	21:40 / Ppip / foraging 21:42 / Ppip / foraging within garden at the rear of the property 21:49 / Ppip / foraging 21:52 / Ppip / x 1 bat foraging at canopy height around trees to the rear of the property 21:55 / Ppip / no visual 22:00 / Ppip / no visual 22:07 / Ppip / foraging in garden area 22:19 / Ppyg / foraging in garden area 22:20 / Ppyg / foraging in garden area 22:27 / Ppip / foraging in garden area 22:35 / Ppip / x 1 pass no visual 22:39 / Ppip / few passes no visual 22:42 / Ppip / x 1 pass no visual 22:44 / Ppip / x 1 pass no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 3 (rear)	29/09/2020	Sunset 18:52 18:35 / 20:00	Calm / No rain 100% / 15°C / 57%	19:15 / Ppip / foraging 19:23 / Ppyg / foraging 19:29 / Ppip / no visual 19:31 / Ppip / x 1 pass commute toward tree line to the rear of the properties 19:32 / MbraMmys / no visual multiple passes 19:39 / Ppip / no visual 19:48 / Ppip / no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 4 (front)	24/06/2020	Sunset 21:44 21:30 / 23:00	Calm / No rain 0% / 18.9°C / 58%	22:01 / Ppip / one pass no visual 22:05 / Ppip / two passes no visual 22:11 / Ppip / multiple passes foraging 22:16 / Ppip / x 2 bat foraging within garden 22:18 / Ppip / commute over tree line heading due west towards the A494 22:23 / Ppip / x 1 pass 22:24 / Nnoc / no visual 22:28 / Ppip / x 1 pass no visual 22:35 / Ppyg / x 1 pass no visual 22:49 / Nnoc / x 1 pass no visual 22:50 / Ppyg / x 1 pass no visual 22:52 / Ppip / x 1 pass no visual 22:53 / Nnoc / no visual 22:55 / Ppip / x 1 pass no visual 22:58 / Nnoc / x 1 pass no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 4 (front)	21/07/2020	Sunset 21:23 20:44 / 22:00	Calm / No rain 20% / 14°C / 58%	21:45 / Ppip / no visual 21:49 / Ppip / foraging over gardens 21:54 / Ppip / commute due east 21:55 / Ppip / as above 22:00 / Ppip / no visual 22:04 / Ppip / couple of passes then flew due north towards Flintshire Depot 22:08 / Ppip / foraging in garden area then headed towards Flintshire Depot 22:15 / Ppip / commute along rear of property along tree line towards Flintshire Depot 22:19 / Ppip / as above 22:19 / Ppyg / no visual 22:22 / Ppyg / no visual 22:27 / Ppip / no visual 22:28 / Ppyg / foraging along fence line towards tree line to the rear of the property 22:32 / Ppip / x 1 pass no visual 22:39 / Ppip / few passes no visual 22:43 / Ppip / x 1 pass no visual 22:44 / Ppip / x 1 pass no visual **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Terrace property 4 (front)	29/09/2020	Sunset 18:52 18:35 / 20:00	Calm / No rain 100% / 15°C / 57%	19:15 / Ppip / x 1 pass commute towards Flintshire Depot 19:23 / Ppip / no visual 19:29 / Ppip / x 1 pass commute towards Flintshire Depot 19:31 / Ppip / x 1 pass commute toward tree line to the rear of the properties 19:32 / MbraMmys / no visual multiple passes 19:38 / Ppip / no visual 19:52 / MbraMmys / no visual **No bats were seen to emerge**
Flintshire Depot 1 and 2	05/08/2020	Sunset 21:00 20:45 / 22:02	Slight breeze / No rain 80% / 18.5°C / 63%	21:24 / Ppip / commute due north in front of depot 21:27 / Nnoc / no visual 21:42 / Ppip / no visual 21:45 / Myotis / no visual 21:45 / Ppip / commute in front of buildings due north 21:49 / Ppip / commute in front of buildings due north 21:52 / Ppip / commute in front of buildings due north 21:59 / Ppip / no visual **No bats were seen to emerge**

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity	Species Recorded Time / Species / Location and/or Activity
Electricity sub-station at Queensferry Drain pumping station compound	22/07/2020	Sunset 21:22 20:58 / 22:32	Slight breeze / No rain 50% / 14°C / 50%	21:29 / Ppip / from east to west towards A494 21:39 / Ppip and Ppyg / x 3 bats foraging in courtyard **21:40 / Ppip / x 1 bat seen to emerge from gap under roof line located on the east aspect from missing mortar and foraged** 21:42 / Ppyg / x 2 bats foraging around vegetation 21:45 / Ppyg / x 1 bat foraging 21:49 / Ppip / x 1 bat foraging 21:50 / Ppip / x 1 pass no visual 21:54 / Ppyg / x 2 passes foraging 21:55 / Nnoc / x 1 pass no visual 21:57 / Ppip / few passes foraging 21:58 / Ppip / x 1 pass due southwest towards WTW 22:00 / Ppip / x 1 pass due north foraging overhead 22:05 / Ppip / x 1 pass no visual 22:07 / Ppip / x 1 pass faint 22:20 / Ppyg / few passes foraging 22:29 / Ppip / no visual foraging 22:31 / Ppip / foraging

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station at Queensferry Drain pumping station compound	13/08/2020	Sunset 20:43 20:28 / 22:00	Calm / No rain 10% / 21°C / 62%	21:04 / Nnoc / no visual 21:16 / Ppip / commute due north 21:24 / Ppyg / foraging 21:31 / Ppyg / no visual x 1 pass 21:39 / Ppip / x 1 pass no visual 21:40 / Ppyg / no visual 21:41 / Ppyg / x 1 pass no visual 21:42 / Ppyg / as above 21:56 / Ppip / x 1 pass faint 21:59 / Nnoc / x 1 pass no visual **No bats were seen to emerge**
Electricity sub-station at Queensferry Drain pumping station compound	15/09/2020	Sunrise 06:47 05:14 / 06:45	Calm / No rain 10% / 14°C / 71%	05:29 / Myotis / no visual 05:55 / Ppip / no visual x 1 pass 06:06 / Ppyg / as above 06:08 / Ppip / as above **No bats were seen to return to roost**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Tree TR1	09/06/2020	Sunset 21:57 21:43 / 23:00	Light breeze / No rain 100% / 14°C / 51%	21:55 / Ppip / no visual faint 22:05 / Ppip / as above 22:18 – 22:24 / Ppip / x 1 bat constant foraging activity over tall ruderal vegetation and scrub 22:26 / Ppyg and Ppip / foraging 22:30 – 23:00 / Ppip and Ppyg / constant foraging activity x 2 bats, and social calls **No bats were seen to emerge**
Tree TR1	08/09/2020	Sunrise 06:30 04:53 / 06:25	Calm / No rain 100% / 18°C / 66%	04:53 / Ppip / no visual, few passes 05:05 / Ppip / x 1 pass no visual 05:08 / Ppip / as above 05:16 / Ppip / as above 05:20 / Ppip / as above 05:39 / Ppip / x 2 passes no visual 05:43 / Ppip / x 1 pass no visual 05:52 / Ppip / few passes no visual 05:56 / Ppip / x 1 pass no visual **No bats were seen to return to roost**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Avg Relative Humidity**	**Species Recorded Time / Species / Location and/or Activity**
Tree TR2	09/06/2020	Sunset 21:57 21:43 / 23:00	Light breeze / No rain 100% / 14°C / 51%	22:18 / Ppip / x 1 pass no visual 22:19 / Ppip / as above 22:26 / Ppyg / no visual 22:27 / Ppip / no visual 22:40 / Ppip / no visual x 2 passes 22:45 / Ppip / no visual 22:56 / Ppip / no visual **No bats were seen to emerge**
Tree TR2	08/09/2020	Sunrise 06:30 04:53 / 06:25	Calm / No rain 100% / 18°C / 66%	04:54 / Myotis / no visual 05:19 / Ppip / no visual 05:56 / Ppip / no visual 06:02 / Ppyg / no visual **No bats were seen to emerge**

Key

Ppip = Common pipistrelle (*P. pipistrellus*)

Ppyg = Soprano pipistrelle (*P. pygmaeus*)

MbraMmys = Whiskered / Brandts (*M. mystacinus / M.brandtii agg*)

Myotis = *Myotis* species

Nnoc = Noctule (*N. noctula*)

Table 8-9 Transect survey results 2020

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity
04/06/2020	Sunset: 21:33 21:30 / 00:07	Route 1 / 1 of 3	Light breeze / Light rain towards end 90% / 11.5°C / 58%	**South of the River Dee (Queensferry)** 22:03 / Ppip / x 1 pass Queensferry drain 22:09 – 22:19 / Ppip / constant passes along footpath adjacent to railway line 22:29 / Ppyg / x 2 passes foraging up and down poplar tree line on footpath adjacent to WTW 22:31 / Ppip / x 2 bats foraging poplar tree line 22:34 - 22:38 / Ppip / SP4 several passes foraging along tree and hedge line, footpath from Chemistry Lane to river Dee 22:40 – 22:43 / Ppip / foraging along tree and hedge line as above 22:54 / Ppip / SP6 no visual 23:07 - 23:13 / Ppip / SP8 several passes foraging no visual 23:22 - 23:24 / Ppip / SP4 few passes foraging along tree and hedge line, footpath from Chemistry Lane to river Dee 23:28 / Ppip / SP1 foraging around streetlight **North of the River Dee (Sealand)** 23:48 - 23:51 / Ppip / few passes foraging along vegetation adjacent to cycle path 00:02 - 00:05 / Ppip / as above couple of passes

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity
04/08/2020	Sunset: 21:00 20:56 / 23:10	Route 1 / 2 of 3	Moderate breeze / No rain 70% / 19°C / 62%	**North of the River Dee (Sealand)** No bats recorded **South of the River Dee (Queensferry)** 21:44 /Ppip / SP8 no visual, faint 21:47 - 21:55 / Ppyg and Ppip / SP7 and near to bridge many passes foraging along the River Dee 22:03 / Ppip / x 2 passes track near to Riverside Caravan Park 22:04 / Nnoc / x 1 pass no visual 22:05 / Ppip / x 3 passes track near to Riverside Caravan Park 22:12 / Ppip / x 1 pass along vegetated track adjacent to Riverside Caravan Park 22:25 / Nnoc / SP1 x 1 pass no visual 22:44 – 22:47 / Ppip / few passes foraging along Queensferry Drain 22:54 / Ppyg / x 1 pass foraging along Queensferry Drain 22:55 / Nnoc / x 1 pass no visual Queensferry Drain 22:54 – 22:56 / Ppip and Ppyg / few passes foraging Queensferry Drain 23:03 - 23:08 / Ppyg, MbraMmys, Myotis, Ppip / few passes along tree lined footpath adjacent to railway line

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity
22/09/2020	Sunset: 19:09 19:15 / 21:25	Route 1 / 3 of 3	Calm / No rain 90% / 16.5°C / 58%	**South of the River Dee (Queensferry)** 19:28 - 19:33 / Ppip / SP7 few passes with activity directly under the bridge 19:33 - 19:36 / Ppip / SP6 few foraging 19:42 - 19:47 / Ppyg and Ppip / Sp5 few passes 19:49 / Nnoc / x 1 pass footpath from Dee to Chemistry Lane adjacent to DCWW treatment works 20:00 / Ppip / SP1 x 1 pass no visual 20:24 / Ppip / x 1 faint pass no visual Queensferry Drain 20:33 / Ppip / few faint passes along track next to railway line 20:37 - 20:39 Ppip / SP1 / few passes foraging 20:45 / Ppip / track near to Riverside Caravan Park, no visual 20:51 / Ppip / SP7 x 1 pass 20:52 – 21:00 / Ppip and Ppyg / few passes along tree lined footpath from the River Dee adjacent to the Toyota Garage **North of the River Dee (Sealand)** 21:05 / Ppip / SP10 x 1 pass 21:10 / Ppip / x 1 pass foraging over swale and grassland adjacent to cycle path 21:24 / Ppip / SP10 x 1 pass near to house on Fox Lane

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity

Key

Ppip = Common pipistrelle *(P. pipistrellus)*

Ppyg = Soprano pipistrelle *(P. pygmaeus)*

Nnoc = Noctule *(N. noctula)*

MbraMmys = Whiskered / Brandts *(M. mystacinus / M. brandtii agg)*

Myotis sp.

SP# = Stopping point number

8.1.5 Table 10 details the results obtained from the static bat detectors including species and total number of passes recorded throughout the duration of the evening (dusk until dawn) for surveys conducted in 2020.

Table 8-10 Static detector results 2020

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[1]	Species recorded / number of passes per minute	Time of recordings First / Last
ST1 Plantation behind Flintshire Depot	04/06/2020 to 08/06/2020	21:32 / 04:49 21:36 / 04:46	10.7 to 15.2	Ppip / 67 passes	21:55 / 05:05
ST2 DCWW treatment works north-west	21/07/2020 to 26/07/2020	21:23 / 05:12 21:16 / 05:18	12.5 to 18.7	Ppip / 599 passes Ppyg / 53 passes MbraMmys / 1 pass	21:19 / 05:14 21:54 / 04:42 01:33 / 01:34

[1] Recorded over deployment period

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[1]	Species recorded / number of passes per minute	Time of recordings First / Last
ST3 Pentre Poplars tree line in DCWW treatment works	13/08/2020 to 17/08/2020	20:42 / 05:49 20:34 / 05:56	15.6 to 21.5	Ppip / 464 passes Ppyg / 371 passes Mdau / 5 passes Nnoc / 3 passes	20:59 / 05:29 21:25 / 05:39 22:11 / 02:41 22:37 / 01:32
ST4 DCWW treatment works north	23/09/2020 to 28/09/2020	19:07 / 07:00 18:55 / 07:09	6.8 to 14.4	Ppip / 17 passes Ppyg / 17 passes MbraMmys / 1 pass Mdau / 1 pass	20:31 / 03:13 19:52 / 03/13 20:25 / 20:26 20:25 / 20:26

Key

Ppip = Common pipistrelle (P. pipistrellus)

Ppyg = Soprano pipistrelle (P. pygmaeus)

MbraMmys = Whiskered / Brandts (M. mystacinus / M.brandtii agg)

Mdau = Daubentons (M. daubentonii)

Nnoc = Noctule (N. noctula)

Bat Survey Results Tables 2022

8.1.6 Tables 11 to 13 detail the results of the bat surveys conducted in 2022. Survey locations, static locations and bat activity are present in Figures 8.5G – 8.5I, Volume 2 of the ES.

Table 8-11 Emergence / Return to roost survey results – structures 2022

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity
Electricity sub-station within Queensferry Drain pumping station compound	29/06/2022	Sunset 21:42 21:29 / 22:14	**Start** Calm / No rain 80% / 21°C / 52% rH / 5.8 lx **Finish** Calm / Raining 100% / 16.7°C	21:49 / Ppip / from west, foraging several passes. 21:53 / Ppip / from west few foraging passes. 21:53 / Ppip / circling overhead foraging. 22:01 / Ppip / heard not seen 22:07 / Ppip / heard not seen 22:08 / Ppip / flew east to west from treeline behind building. 22:08 / Ppip / along the tree line and foraging around tree canopy. 22:15 – Ppip x2 foraging along tree canopy **Survey abandoned early due to rain** **No bats were seen to emerge**

Electricity sub-station within Queensferry Drain pumping station compound	06/07/2022	Sunset 21:40 21:28 / 23:10	**Start** Light breeze / No rain 100% / 17°C **Finish** Gentle breeze / No rain 100% / 17°C	22:00 / Ppip / foraging along treeline 22:06 / Ppip / x2 foraging 22:06 / Ppip / commuting over pumping station into vegetation 22:07 / Ppip / foraging over vegetation to the east 22:09 / Ppip foraging and circling around yard in between buildings 22:10 / Ppip / x2 foraging 22:10 / Ppip foraging overhead 22:12 / Ppip / x2 foraging overhead and commuting south 22:12 / Ppip / foraging overhead 22:15 / Ppip /foraging 22:18 / Ppip / x2 foraging 22:19 / Ppip / x2 foraging overhead and commuting east 22:20 / Ppip / foraging along tree line 22:20 / Ppip / x2 Foraging overhead 22:22 / Ppip / foraging overhead 22:32 / Ppip / x3 foraging overhead 22:34 / Ppip / foraging overhead 22:40 / Ppip / foraging along tree line east to west 22:44 / Ppip / foraging overhead 22:50 / Ppip / heard not seen 22:54 / Ppip / x2 foraging overhead 22:55 / Ppyg / foraging over yard 22:56 / Ppip / x2 foraging overhead **No bats were seen to emerge**
Electricity sub-station within	11/08/2022	Sunset 20:49 20:49 / 22:20	**Start** Calm / No rain	21:14 / Ppyg / commuting along fence line west to east 22:27 / Ppyg / commuting east to west

Queensferry Drain pumping station compound			0% / 21°C / 39% rH / 96.7 lx **Finish** Calm / No rain 0% / 38% rH / 0.02 lx	21:31 / Ppyg / heard not seen 21:32 / Ppyg / heard not seen 21:37 / Ppyg / commuting overhead from west to east 21:39 / Ppyg / heard not seen 21:41 / Ppip / commuting from west to east beneath the tree line 21:41 / Ppip / heard not seen 21:44 / Ppip / heard not seen 21:44 / Ppip / commuting from north around building then into the treeline to the east 21:45 / Ppip / heard not seen 21:47 / Ppip / commuting around north side of pumping station 21:47 / Ppip / heard not seen 21:49 / Ppyg / heard not seen 21:53 / Ppip / commuting east to west 21:54 / Ppip / heard not seen 21:56 / Ppip / heard not seen 21:57 / Ppip / heard not seen 21:58 / Ppip / heard not seen 21:59 / Ppip / foraging over water course 21:59 / Ppyg / commuting north to south over building 22:00 / Ppip / heard not seen 22:00 / Ppip and Ppyg / heard not seen 22:05 / Ppyg / heard not seen 22:10 / Ppyg / heard not seen 22:11 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station within Queensferry Drain pumping station compound	28/09/2022	Sunset 18:49 18:39 / 20:20	**Start** Calm / No rain 10% / 11°C / 51% rH / 63.6 lx **Finish** Calm / No rain 70% / 11°C / 52% rH / 0.02 lx	19:27 / Ppyg / heard not seen 19:31 / Ppyg / heard not seen, multiple passes above the height of the pump house 19:32 / Ppyg / foraging over head in yard 19:34 / Ppyg / commuting east to west above treeline 19:35 / Ppyg / x3 social calls in the yard 19:36 / Ppip / commuting east to west across the yard 19:38 / Ppip / commuting from south circled the yard then headed back south 19:40 / Ppip / x2 commuting south to north 19:40 / Ppip / heard not seen 19:41 / Ppip / commuting north-west direction x2 passes 19:43 / Ppip / commuting north-west direction x2 passes 19:46 / Ppip / commuting south to north 19:48 – 20:12 / Ppip and Ppyg / multiple passes from north-west, probably flying around pumping house 19:58 / Ppyg / foraging above the treeline 19:53 / Ppyg / heard not seen 19:55 / Myotis / heard not seen 19:59 / Ppip and Ppyg / foraging along the treeline 20:02 - 20:14 / Ppip and Ppyg / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Garage 1 and electricity sub-station south of Chester Road East	26/07/2022	Sunset 21:16 21:06 / 22:32	**Start** Calm / No rain 10% / 16°C / 2.37 lx **Finish** Calm / No rain 50% / 12°C / <0.01 lx	21:39 / Ppip / foraging along tree line up and down x3 passes 21:40 / Ppip / heard not seen 21:41 / Ppip / 1 pass from southwest to northeast towards terrace house 21:50 / Ppip / heard not seen 21:53 / Ppip / 1 pass northeast towards Flintshire Depot 21:54 / Ppip / continued foraging in tree line 21:55 / Ppip / foraging along treeline northeast towards terrace houses 22:03 / Ppip / foraging around trees 22:09 / Ppip / commuting across yard 22:10 / Ppip / commuting south to north across yard 22:12 / Ppip / heard not seen 22:16 / Ppyg / heard not seen 22:17 / Ppyg / 1 pass along tree line northeast towards the terrace houses 22:21 / Ppip / heard not seen 22:22 / Ppip / fainter call foraging in treeline 22:23 / Ppyg / commuting west to east across yard 22:24 / Ppip / heard not seen 22:27 / Ppip / heard not seen 22:28 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Flintshire Depot 1 and 2	27/0//2022	Sunset 21:16 21:06 / 22:29	**Start** Calm / Light rain 90% / 20.5°C / 44% rH / 26.4 lx **Finish** Calm / Drizzle 100% / 16.5°C / 49% rH	21:40 / Ppip / x 1 pass from east to west 21:41 / Ppip / heard not seen 21:53 / Ppyg / heard not seen 21:56 / Ppyg / heard not seen 22:21 / Ppyg / heard not seen 22:22 / Ppip / heard not seen 22:26 / Ppip / heard not seen **No bats heard or seen along the side nearest the A494 (northeast). This area is illuminated by streetlights** **No bats were seen to emerge**
Terrace Property 1 (front)	10/08/2022	Sunset 20:49 20:40 / 22:15	**Start** Calm / No rain 0% / 22°C / 51% rH / 237 lx **Finish** Calm / No rain 0% / 19°C / 50% rH / 6.1 lx	21:17 / Ppip / faint 1 pass, heard not seen 21:22 / Ppip / faint 1 pass, heard not seen 21:22 /Ppip / 1 pass commuting towards Flintshire Depot in front of the properties 21:27 / Ppip / faint, heard not seen 21:43 / Ppip / 1 pass heard not seen 21:55 / Ppip / 1 pass heard not seen 21:57 / Ppip /1 pass heard not seen 22:10 / Ppip / 1 pass heard not seen 22:10 / Ppip / 1 pass heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terrace Property 1 (front)	23/08/2022	Sunset 20:23 20:20 / 21:46	**Start** Calm / No rain 100% / 21°C / 56% rH / 33.9 lx **Finish** Calm / No rain 30% / 18°C / 53% rH / 2.54 lx	20:43 / heard not seen 20:45 / heard not seen 20:48 / foraging east to west 20:49 / heard not seen 20:50 / heard not seen 20:56 / Ppyg / heard not seen 21:04 / heard not seen 21:10 / heard not seen **No bats were seen to emerge**
Terrace Property 1 (front)	03/10/2022	Sunset 18:45 18:40 / 20:00	**Start** Calm / No rain 40% / 18°C / 55% rH / 13.8 lx **Finish** Calm / No rain 20% / 14°C / 48% rH / 0.01 lx	19:19 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terrace Property 2 (rear)	10/08/2022	Sunset 20:49 20:40 / 22:15	**Start** Calm / No rain 0% / 22°C / 51% rH / 237 lx **Finish** Calm / No rain 0% / 19°C / 50% rH / 6.1 lx	21:05 / Ppip / commuting from the north between properties 2 and 3 into the garden 21:15 / Ppip / x2 foraging in the garden 21:18 / Ppip / x 3 foraging and social calls in the garden 21:24 / Ppip / x 2 foraging and social calls in the garden 21:27 / Ppip / commuting from the north between properties 2 and 3 21:30 / Ppip / commuting over the roof north from the garden 21:34 / Ppip / heard not seen 21:40 / Ppyg / heard not seen. 21:43 / Ppip / commuting from treeline west to north between the properties 21:46 / Ppyg / commuting from treeline to the south heading north to property 2 21:57 / Ppip / commuting from south treeline north between property 2 and 3 20:00 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terrace Property 2 (front), in-between property 2 and 3	23/08/2022	Sunset 20:23 20:20 / 21:46	**Start** Calm / No rain 100% / 21°C / 56% rH / 33.9 lx **Finish** Calm / No rain 30% / 18°C / 53% rH / 2.54 lx	20:32 / Ppip / commuting from northwest to southeast of the properties between number 2 and 3 20:42 / Ppyg x2 / commuting from northwest to southeast 20:43 / Ppip commuting from southeast to northwest between properties 2 and 3 20:47 / Ppyg / commuting from southeast to northwest between properties 2 and 3 20:48 / Ppip / commuting from southeast in between properties then west towards Flintshire Depot 20:49 / Ppip / commuting from southeast in between properties then west towards Flintshire Depot 21:05 / Nnoc / heard not seen 21:11 / Ppip / heard not seen 21:15 / Ppip / heard not seen 21:34 / Ppip / heard not seen 21:35 / Ppip / heard not seen. 21:36 / Ppip / heard not seen. 21:43 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terrace Property 2 (front), in-between 2 and 3	03/10/2022	Sunset 18:45 18:40 / 20:00	**Start** Calm / No rain 40% / 18°C / 55% rH / 13.8 lx **Finish** Calm / No rain 20% / 14°C / 48% rH / 0.01 lx	19:06 / Ppip / flew around the garden and then south into the treeline 19:07 / Ppip / foraging around garden 19:13 / Ppip / commuting from the north between properties 2 and 3 19:15 / Ppyg / commuting west to east towards Bromborough plastics 19:29 / Ppyg / heard not seen. 19:34 / Ppyg / heard not seen. 19:41 / Ppip / heard not seen. 19:49 / Ppip / heard not seen. 19:51 / Ppip / heard not seen. 20:00 / Ppip / heard not seen. **No bats were seen to emerge**

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity
Terrace Property 3 (rear of 3 and 4)	10/08/2022	Sunset 20:49 20:40 / 22:15	**Start** Calm / No rain 0% / 22°C / 51% rH / 237 lx **Finish** Calm / No rain 0% / 19°C / 50% rH / 6.1 lx	21:10 / Ppip / possible emerge from eaves at gable end of number 3 21:14 / Ppip / possible emerge from eaves at gable end of number 3 21:15 / Ppip / x2 foraging in garden of 1 and 2 21:15 / Ppip / commuting to Flintshire Depot 21:19 / Ppip / foraging in garden of number 2 and 3 21:21 / Ppip / foraging in the garden 21:21 / Ppip / commuting to Flintshire Depot 21:23 / Ppip / commuting along hedgerow towards Flintshire Depo 21:25 / Ppip / activity between 2 and 3 and front gardens 21:33 / Ppip / heard not seen 21:38 / Ppip / heard not seen 21:39 / Ppip / commuting though garden west 21:42 / Ppip / possible emergence from gable of number 3 or flying between number 2 and 3 21:45 / Ppip / heard not seen 21:49 / Ppip / commuting to Flintshire Depot 21:51 / Ppip / heard not seen 21:56 / Ppip / overhead southward to hedge-line. **Potential emergence**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terrace Property 3 (rear of 3 and 4)	23/08/2022	Sunset 20:23 20:20 / 21:46	**Start** Calm / No rain 100% / 21°C / 56% rH / 33.9 lx **Finish** Calm / No rain 30% / 18°C / 53% rH / 2.54 lx	20:34 / Ppip / foraging around treeline behind properties 1 and 2. It is possible that it emerged from one of the houses 20:37 / Ppip / x2 bats from above properties 1 and 2 20:52 / Ppyg and Ppip / continued foraging around the garden area 21:10 / Ppip / head not seen 21:19 / Ppip / head not seen 21:30 / Ppip / head not seen 21:37 / Myotis / head not seen **No bats were seen to emerge**
Terrace Property 3 (rear of 3 and 4)	03/10/2022	Sunset 18:45 18:40 / 20:00	**Start** Calm / No rain 40% / 18°C / 55% rH / 13.8 lx **Finish** Calm / No rain 20% / 14°C / 48% rH / 0.01 lx	19:06 / Ppip / from direction of the Depot 19:14 / Ppyg / heard not seen, couple of passes 19:27 / Ppip / heard not seen, 1 pass 19:29 / Ppip / heard not seen, couple of passes 19:32 / Ppip / heard not seen, 1 pass 19:41 / Ppip / heard not seen, 1 pass 19:49 / Ppip / heard not seen, 1 pass 19:51 / Ppip / heard not seen, 2 pass 20:00 / Ppip heard not seen, 1 pass **Bat seen to emerge from boarding placed over a window**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terrace Property 4 (front)	10/08/2022	Sunset 20:49 20:40 / 22:15	**Start** Calm / No rain 0% / 22°C / 51% rH / 237 lx **Finish** Calm / No rain 0% / 19°C / 50% rH / 6.1 lx	21:06 / streetlight came on, 31.7 lx 21:26 / Nnoc / heard not seen 21:42 / Ppip / heard not seen 21:57 / Ppip / heard not seen 22:06 / Nnoc / heard not seen **No bats were seen to emerge**
Terrace Property 4 (front)	23/08/2022	Sunset 20:23 20:20 / 21:46	**Start** Calm / No rain 100% / 21°C / 56% rH / 33.9 lx **Finish** Calm / No rain 30% / 18°C / 53% rH / 2.54 lx	20:30 / streetlight came on 20:56 / Ppyg / heard not seen 21:04 / Nnoc / heard not seen **No bats were seen to emerge**
Terrace Property 4 (front)	03/10/2022	Sunset 18:45 18:40 / 20:00	**Start** Calm / No rain 40% / 18°C / 55% rH / 13.8 lx **Finish** Calm / No rain 20% / 14°C / 48% rH / 0.01 lx	No bats recorded **No bats were seen to emerge**

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Cloud Cover / Avg Temp / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity

Key

Ppip = Common pipistrelle (*P. pipistrellus*)

Ppyg = Soprano pipistrelle (*P. pygmaeus*)

Myotis = *Myotis* species

Nnoc = Noctule (*N. noctula*)

Table 8-12 Transect survey results 2022

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity
12/07/2022	Sunset 21:35 21:26 / 23:45	1 / 1 of 3	**Start** Calm / No rain 60% / 23°C / 46% rH **Finish** Calm / No rain 60% / 22°C	**South of the River Dee (Queensferry)** 22:30 / Nnoc / commuting along footpath near river at SP7 22:31 / Ppip / commuting along footpath near river at SP7 22:32 / Ppip / commuting along footpath near river at SP7 22:34 / Ppip / foraging along footpath adjacent to the river 22:39 / Ppip / SP8, heard not seen 22:41 / Ppyg / SP8, heard not seen 22:42 / Ppyg / SP8, heard not seen **North site of River Dee (Sealand)** 22:54 / Ppip / commuting along edge of footpath at SP1 22:54 / Ppip / heard not seen SP1 22:54 / Ppip / heard not seen SP1 22:55 / Ppip / heard not seen SP1 22:57 / Ppip / heard not seen SP1 22:59 / Ppip and Ppyg / heard not seen SP1 23:00 / Ppip / heard not seen along the footpath SP1

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity
24/08/2022	Sunset 20:20 20:24 / 22:23	1 / 2 of 3	**Start** Light breeze / No rain 90% / 21.7°C	**North side of the river Dee (Sealand)** 20:24 / Ppyg / commuting from field south and foraging along footpath 20:43 / Ppyg / foraging along field edge 20:49 / Ppyg / foraging along field edge **South side of River Dee (Queensferry)** 21:01 / Ppip / heard not seen at SP3 at the back of Toyota garage 21:06 / Ppip and Ppyg / heard not seen 21:09 / Ppip and Ppyg / almost constant passes from both species under the bridge 21:11 / Myotis / heard not seen under the bridge 21:12 / Ppip / heard not seen 21:12 / Ppip / heard not seen 21:20 / Ppyg and Nnoc / heard not seen. several passes heard. SP5 near the river 21:23 / Ppip / foraging along footpath 21:26 / Ppip and Ppyg / social calls, several passes heard not seen 21:37 / Ppip / several passes and social calls. SP6 along footpath 21:49 / Ppip and Ppyg / several passes 21:50 / Ppip / heard not seen 22:08 / Ppip / heard not seen. SP9 Queensferry drain 22:18 / Ppyg and Ppip / heard not seen, several passes

Survey Date	**Sunset / Sunrise Survey Start / Finish**	**Transect Route / Survey Number**	**Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity**	**Species Recorded Time / Species / Location and/or Activity**
04/10/2022	Sunset 18:38 18:35 / 20:26	1 / 3 of 3	**Start** Strong breeze / No rain 20% / 16°C / 57% rH **Finish** Moderate breeze / Drizzle 50% / 15°C / 61% rH	**South side of River Dee (Queensferry)** 19:18 / Ppip / x 2 foraging and social calls in canopy of poplar trees along footpath between SPs 4 and 5 19:23 / Ppip / foraging in canopy of poplar trees near to SP5 19:27 / Ppip / x3 commuting westward along the Poplar trees, near SP6 19:29 / Ppyg / commuting along the poplar trees and hedgerow, near SP6 19:39 / Ppip / heard not seen at SP7near dense scrub 19:44 / Ppyg / heard not seen near SP7 **North side of River Dee (Sealand)** No bats recorded
Key Ppip = Common pipistrelle *(P. pipistrellus)* Ppyg = Soprano pipistrelle *(P. pygmaeus)* Nnoc = Noctule *(N. noctula)* SP# = Stopping point number				

8.1.7 Table 13 details the results obtained from the static bat detectors including species and total number of passes recorded throughout the duration of the evening (dusk until dawn) for surveys conducted in 2022.

Table 8-13 Static detector results 2022

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[2]	Species recorded / number of passes per minute	Time of recordings First / Last
ST3 Pentre Poplars tree line in DCWW treatment works	03/08/2022 to 08/08/2022	21:04 / 05:34 20:55 / 05:42	12.7 to 19.7	Ppip / 8832 passes Ppyg / 4078 passes MbraMmys / 3 passes Mdau / 1 pass Myotis / 10 passes	21:22 / 05:15 21:32 / 05:14 00:07 / 04:08 22:52 23:20 / 04:47
ST3 Pentre Poplars tree line in DCWW treatment works	09/09/2022 to 13/09/2022	19:43 / 06:37 19:34 / 06:43	12.9 to 20	Ppip / 5419 passes Ppyg / 531 passes MbraMmys /10 passes Myotis / 8 passes Rhip / 2 passes Paur / 1 pass Mdau / 1 pass	20:06 / 07:07 20:12 / 06:06 21:53 / 05:41 22:41 / 05:00 23:31 / 23:59 04:28 02:05
ST4 DCWW treatment works north	03/08/2022 to 08/08/2022	21:04 / 05:34 20:55 / 05:42	12.7 to 18.7	Ppip / 1406 passes Ppyg / 305 passes MbraMmys / 2 passes Nnoc / 3 passes	20:11 / 05:31 20:08 / 05:06 03:23 22:42
ST4 DCWW treatment works north	09/09/2022 to 13/09/2022	19:43 / 06:37 19:34 / 06:43	11.3 to 24.9	Ppip / 85 passes Ppyg / 59 passes MbraMmys / 1 pass Myotis / 1 pass	20:11 / 05:31 20:08 / 05:06 03:23 22:42

[2] Recorded over deployment period

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[2]	Species recorded / number of passes per minute	Time of recordings First / Last
ST2 Rear garden of 2 Bridge Houses, Chester Road East	10/08/2022 to 16/08/2022	20:33 / 05:38 20:21 / 05:47	13.5 to 26.2	Ppip / 2004 passes Ppyg / 360 passes Nnoc / 3 passes MbraMmys / 19 passes Myotis / 5 passes Paur / 10 passes	20:54 / 05:47 21:08 / 05:25 20:59 / 23:29 22:23 / 0405 21:47 / 07.09 00.12 / 03.41
ST2 Rear garden of 2 Bridge Houses, Chester Road East	03/10/2022 to 10/10/2022	18:46 / 07:18 18:27 / 07:32	9 to 16	Ppip / 687 passes Ppyg / 372 passes Nnoc / 2 passes Myotis / 6 passes MbraMmys / 22 passes Paur / 5 passes	18:27 / 06:52 18:57 / 06:52 19:33 / 05:38 18:59 / 03:20 18:59 / 22:52 21:41

Key

Ppip = Common pipistrelle (P. pipistrellus)

Ppyg = Soprano pipistrelle (P. pygmaeus)

MbraMmys = Whiskered / Brandts (M. mystacinus / M.brandtii agg)

Mdau = Daubentons (M. daubentonii)

Myotis = Myotis species

Nnoc = Noctule (N. noctula)

Paur = Brown long eared *(P. auritus)*

Rhip = Lesser horseshoe *(R. hipposideros)*

Bat Survey Results Tables 2023

8.1.8 Tables 14 and 15 detail the results of the bat surveys conducted in 2023. Survey locations, static locations and bat activity are present in Figures 8.5J – 8.5L, Volume 2 of the ES.

Table 8-14 Transect survey results 2023 – Spring season only

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity
16/05/2023	Sunset 21:06 21:20 / 23:43	1 / 1 of 1	**Start** Calm / No rain 60% / 12°C / 49% rH **Finish** Calm / No rain 60% / 12°C / 55% rH	**South of the River Dee (Queensferry)** 21:44 / Nnoc / 1 pass no visual 22:09 / Ppyg / 1 pass no visual 22:10 / Ppip / 1 pass no visual 22:11 / Ppip / 1 pass no visual 22:12 / Ppip / 1 pass no visual 22:15 / Ppip / 1 pass no visual 22:15 / Ppyg / 1 pass no visual 22:16 / Ppyg / 1 pass no visual 22:17 / Ppip / 1 pass no visual 22:20 / Ppip / 2 passes no visual 22:20 / Ppyg / 1 pass no visual 22:21 / Ppip / 1 pass no visual 22:22 / Ppip / 1 pass no visual 22:23 / Ppip / 4 passes x 2 bats foraging along tree line adjacent to DCWW treatment works 22:24 / Ppip / 1 pass along tree line 22:24 / Ppyg / 2 passes along tree line adj to DCWW treatment works 22:29 / Ppip / 1 pass SP7 tree line adj to DCWW treatment works 22:30 / Ppip / 2 passes along tree line adj to DCWW treatment works 22:31 / Ppip / 1 pass no visual 22:40 / Ppip / 1 pass no visual 22:41 / Ppip / 1 pass no visual

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Cloud Cover / Temperature / Humidity	Species Recorded Time / Species / Location and/or Activity
				North site of River Dee (Sealand) 23:02 / Ppip /1 pass along PRoW adj to fields 23:03 / Ppip / 4 passes as above 23:04 / Ppip / 1 pass as above 23:06 / Ppip / 2 passes as above 23:07 / Ppip / 3 passes SP3 under bridge 23:13 / Ppip / 1 pass as above
Key Ppip = Common pipistrelle *(P. pipistrellus)* Ppyg = Soprano pipistrelle *(P. pygmaeus)* Nnoc = Noctule *(N. noctula)* SP# = Stopping point number				

8.1.9 Table 15 details the results obtained from the static bat detectors including species and total number of passes recorded throughout the duration of the evening (dusk until dawn).

Table 8-15 Static detector results 2023 – Spring season only

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[3]	Species recorded / number of passes per minute	Time of recordings First / Last
ST3 Pentre Poplars tree line in DCWW treatment works	16/05/2023 to 22/05/2023	21:06 / 05:13 21:15 / 05:04	10.2 to 21.1	Ppip / 9240 passes Ppyg / 3284 passes Mdau / 4 passes Myotis / 13 passes Nnoc / 6 passes	21:34 / 04:29 21:54 / 04:30 00:49 / 3:12 21:59 / 03:44 21:46 / 01:23
ST4 DCWW treatment works north	16/05/2023 to 22/05/2023	21:06 / 05:13 21:15 / 05:04	12.7 to 18.7	Ppip / 726 passes Ppyg / 58 passes MbraMmys / 2 passes Nnoc / 3 passes Myotis / 1`pass Mdau / 3 passes	21:46 / 04:20 21:44 / 04:15 22:50 / 22:43 22:24 / 00:00 22:40 / 22:41 23:40 / 02:41

Key
Ppip = Common pipistrelle (P. pipistrellus)
Ppyg = Soprano pipistrelle (P. pygmaeus)
MbraMmys = Whiskered / Brandts (M. mystacinus / M.brandtii agg)
Mdau = Daubentons (M. daubentonii)
Myotis = Myotis species
Nnoc = Noctule (N. noctula)

[3] Recorded over deployment period

Bat Survey Results Tables 2024

8.1.10 Tables 16 to 18 detail the results of the bat surveys conducted in 2024. Survey locations, static locations and bat activity are present in Figures 8.5M – 8.5O, Volume 2 of the ES.

Table 8-16 Emergence / Return to roost survey results – structures 2024

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity
Garage 1 south of Chester Road East	14/08/2024	Sunset 20:48 20:30 / 22:18	**Start** Light air / No rain 5 / 17°C / 71% rH / 21.3 lx **Finish** Light air / No rain 6 / 14°C / 74% rH / 0.02 lx	21:09 / Ppyg / heard not seen 21:32 / Ppyg / heard not seen 21:38 / Ppyg / heard not seen 21:43 / Ppyg / heard not seen 21:52 / Ppip / heard not seen 21:59 / Ppip / heard not seen 22:05 / Ppip / heard not seen 22:07 / Nnoc / heard not seen 22:10 / Ppip / heard not seen 22:13 / Ppyg / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station adjacent to Garage 1 south of Chester Road East (west aspect)	14/08/2024	Sunset 20:48 20:30 / 22:18	**Start** Light air / No rain 5 / 17°C / 71% rH / 21.3 lx **Finish** Light air / No rain 6 / 14°C / 74% rH / 0.02 lx	21:06 / Ppip / heard not seen 21:18 / Ppip and Ppyg / heard not seen 21:24 / Ppyg / commuting from W to E, lost sight when it flew to trees along road 21:27 / Ppyg / heard not seen 21:32 / Ppyg / heard not seen, heard surveyor to the west detector first 21:34 / Ppyg / heard not seen 21:39 / Ppyg heard not seen, heard surveyor to the west detector first 21:42 / Ppip / heard not seen, heard surveyor to the west detector first 21:46 / Ppip / heard not seen 21:48 / Ppip / heard not seen 21:51 / Ppyg / commuting from E to W, couple of passes 21:52 / Ppip / heard not seen 21:55 / Ppip / heard not seen 22:07 / Ppip and Nnoc / heard not seen 22:14 / Ppip / heard not seen **No bats were seen to emerge**

Electricity sub-station adjacent to Garage 1 south of Chester Road East (east aspect)	14/08/2024	Sunset 20:48 20:30 / 22:18	**Start** Light air / No rain 5 / 17°C / 71% rH / 21.3 lx **Finish** Light air / No rain 6 / 14°C / 74% rH / 0.02 lx	21:06 / Ppip / heard not seen 21:12 / Ppip / commuting N to S over surveyor's head 21:18 / Ppip / commuting N to S 2 passes 21:20 / Ppip / foraging, circling around to the W of the substation 21:24 / Ppyg / heard not seen 21:26 / Ppyg / heard not seen 21:30 / Ppyg / heard not seen 21:32 / Ppyg / heard not seen, 2 passes 21:34 / Ppyg / heard not seen 21:37 / Ppip / heard not seen 21:38 / Ppip and Ppyg / heard not seen, feeding buzz heard 21:42 / Ppip / heard not seen 21:47 / Ppip / heard not seen 21:50 / Ppyg / heard not seen 21:51 /Ppip / heard not seen, several passes including a feeding buzz 21:55 / Ppyg / heard not seen 22:05 / Ppip / heard not seen 22:07 / Ppip / heard not seen 22:07 / Nnoc and Ppip / heard not seen 22:08 / Ppip / heard not seen. several passes. 22:12 / Ppip / heard not seen 22:17 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity
Terraced property 1 (rear – south-east aspect)	04/07/2024	Sunset 21:41 21:35 / 23:10	**Start** Light breeze / No rain 5 / 14°C / 51% rH / 159 lx **Finish** Light breeze / No rain 5 / 13°C / 52% rH / 0.02 Lux	22:11 / Ppip / heard not seen 22:12 / Ppip / heard not seen 22:19 / Ppip / heard not seen 22:57 / Nnoc / heard not seen 22:58 / Ppip / heard not seen 23:01 / Ppip / heard not seen 23:03 / Ppip / heard not seen 23:04 / Ppip / heard not seen **No bats were seen to emerge**
Terraced property 1 (rear – south-east aspect)	25/07/2025	Sunset 21:25 21:15 / 22:45	**Start** Light breeze / No rain 2 / 16°C / 77% rH / 3.27 lx **Finish** Light breeze / No rain 7 / 15°C / 81% rH / 0.01 lx	21:45 / Ppip / heard not seen 21:53 / Ppip / flying between buildings 1 and 2 21:58 / Ppip / heard not seen 21:59 / Ppip / heard not seen 22:00 / Ppip / heard not seen 2x passes. 22:04 / Ppip / commuting W to E in front of buildings 1 and2 22:06 / Ppip / heard not seen 22:07 / Ppip / heard not seen 22:15 / Ppip / commuting W to E in front of building 1 and 2. 22:16 / Ppip / heard not seen 22:24 / Ppip / heard not seen with social calls. 22:34 / Ppip / heard not seen 22:40 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terraced property 1 (rear – south-east aspect)	18/09/2024	Sunset 19:19 19:00 / 20:45	**Start** Calm / No rain 0 / 16°C / 79% rH **Finish** Calm / No rain 1 / 15°C / 82% rH	19:42 / Nnoc / heard not seen 19:56 / Ppyg / heard not seen 19:57 / Ppyg / heard not seen 20:00-20:01 / Ppip / heard not seen 20:04 / Nnoc / heard not seen 20:08-20:09 / Ppyg / heard not seen 20:15 / Ppyg / heard not seen 20:20 / Ppyg / heard not seen 20:22 / Ppyg / heard not seen 20;24 / Ppip / heard not seen 20:29 / Ppip / heard not seen 20:33 / Nnoc / heard not seen 20:38 / Ppyg / heard not seen **No bats were seen to emerge**
Terraced property 2 and 3 (rear – south aspect)	04/07/2024	Sunset 21:41 21:35 / 23:10	**Start** Light breeze / No rain 5 / 14°C / 51% rH / 159 lx **Finish** Light breeze / No rain 5 / 13°C / 52% rH / 0.02 lx	22.12 / Ppip / heard not seen 22:13 / Ppip / foraging around the garden, several passes 22:19 / Ppyg / heard not seen 22:57 / Nnoc / heard not seen 22:58 / Ppip / heard not seen 23:03 / Ppip / heard not seen 23:07 / Ppyg / heard not seen **No bats were seen to emerge**

Terraced property 2 and 3 (rear – south aspect)	25/07/2025	Sunset 21:25 21:15 / 22:45	**Start** Light breeze / No rain 2 / 16°C / 77% rH / 3.27 lx **Finish** Light breeze / No rain 7 / 15°C / 81% rH / 0.01 lx	21:40 / Ppip / several passes along treeline at back of garden 21:44 / Ppip / flying around the garden of No. 2 21:45 / Ppip / several passes along treeline 21:47 / Ppip / several passes, flying around tree in gardens of Nos 2 and 3 21:49 / Ppip / from the direction of No. 3 21:53 / Ppip / flew across the garden W to E 1 pass 21:57 / Ppip / flew across gardens W to E and into Depot 21:58 / Ppip / flying around garden and feeding buzz 22:00 - 22:05 / Ppip / constant circling, foraging around the garden by two bats 22:05 / Ppyg / foraging feeding buzz heard 22:06 / Ppip / W to E along treeline 1 pass 22:07 / Ppip / heard not seen 22:11 / Ppip /commuting across garden W to E. 22:15 / Ppyg /commuting W to E along treeline 2x passes. 22:23 / Ppip / heard not seen 22:25 / Ppip / 2 bats commuting W to E along treeline. 22:29 / Ppip / heard not seen several passes with feeding buzzes. 22:31 / Ppyg / heard not seen 22:34 / Ppip / heard not seen several passes. 22:37 / Ppip / heard not seen 22:39 / Ppip / heard not seen 22:43 / Ppip / heard not seen 22:44 / Ppyg / heard not seen several passes. **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terraced property 2 and 3 (rear – south aspect)	18/09/2024	Sunset 19:19 19:00 / 20:45	**Start** Calm / No rain 0 / 16°C / 79% rH **Finish** Calm / No rain 1 / 15°C / 82% rH	19:42 / Nnoc / heard not seen 19:54 / Ppyg and Ppip / commuting across garden W to E 19:56 / Ppyg / heard not seen 19:58 / Ppip / heard not seen 20:00 / Ppyg / heard not seen 20:01 / Ppyg / several passes heard not seen 20:01 / Ppip / commuting across garden W to E 20:08 / Ppyg / heard not seen 20:10 / Ppip / commuting across garden W to E 20:15 / Ppip / heard not seen 20:21 / Ppyg and Ppip 20:22 / Ppyg / heard not seen 20:24 / Ppip / heard not seen 20:26 / Ppip / heard not seen 20:28 / Nnoc / heard not seen 20:29 / Ppip + Nnoc 20:29 / Ppip / heard not seen 20:33 / Ppyg / recording seen during analysis 20:38 / Ppyg / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terraced properties 4 (rear – south-east corner)	04/07/2024	Sunset 21:41 21:35 / 23:10	**Start** Light breeze / No rain 5 / 14°C / 51% rH / 159 lx **Finish** Light breeze / No rain 5 / 13°C / 52% rH / 0.02 lx	22:12 / Ppip / heard not seen 22:13 / Ppip Foraging in the rear garden, low, height 2 m. 22:19 / Ppyg / heard not seen, foraging. 22:29 / Ppyg / heard not seen 22:53 / Ppip / heard not seen, foraging 22:57 / Nnoc / heard not seen 22:59 / Ppyg / heard not seen 23:02 / Ppyg / flew over No. 4 roof, around garden then towards the depot 23:03 / Ppyg / heard not seen 23:05 / Ppyg / heard not seen 23:08 / Ppip / heard not seen 23:09 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terraced properties 4 (rear – south-east corner)	25/07/2025	Sunset 21:25 21:15 / 22:45	**Start** Light breeze / No rain 2 / 16°C / 77% rH / 3.27 lx **Finish** Light breeze / No rain 7 / 15°C / 81% rH / 0.01 lx	21:45 / Ppip / heard not seen foraging along hedgerow to south of gardens 21:49 / Ppip commuting between Nos. 2 and 3 to hedgerow on S side 21:52 / Ppip / W to E across garden into depot site 21:56 / Ppip / W to E and into depot yard 22:01 / Ppip / foraging in rear gardens and boundary, several passes, deeding buzzes. 22:04 / Ppyg / W to E into depot yard 22:05 / Ppyg / heard not seen 22:06 / Ppip / E to W from depot site into garden 22:11 / Ppip / N to S within garden, exited over the hedgerow 22:15 / Ppyg / W to E across garden 22:22 / Ppip / heard not seen 22:29 / Ppip / heard not seen 22:34 / Ppip / heard not seen 22:43 / Ppip / heard not seen 22:45 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terraced properties 4 (rear – south-east corner)	18/09/2024	Sunset 19:19 19:00 / 20:45	**Start** Calm / No rain 0 / 16°C / 79% rH **Finish** Calm / No rain 1 / 15°C / 82% rH	19:54 / Ppip / commuting along boundary to S (Makro) 19:56 / Ppip / commuting 1-4 side of garden and foraging 19:58 / Ppip / foraging through garden and over fence to the E 20:00 / Ppyg / commuting across gardens 20:08 / Ppyg / commuting to rear of gardens, several passes 20:15 / Ppyg / commuting across garden 20:20 / Ppip / foraging 20:22 / Ppyg / foraging 20:24 / Ppip / heard not seen several passes 20:29 / Ppip / heard not seen several passes 20:38 / Ppyg / heard not seen **No bats were seen to emerge**
Terraced properties 1 and 2 (front – north-east aspect)	04/07/2024	Sunset 21:41 21:35 / 23:10	**Start** Light breeze / No rain 5 / 14°C / 51% rH / 159 lx **Finish** Light breeze / No rain 5 / 13°C / 52% rH / 0.02 lx	22:57 / Nnoc / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terraced properties 1 and 2 (front – north-east aspect)	25/07/2025	Sunset 21:25 21:15 / 22:45	**Start** Light breeze / No rain 2 / 16°C / 77% rH / 220 lx **Finish** Light breeze / No rain 7 / 15°C / 81% rH / 4.87 lx	22:05 / Nnoc / heard not seen **No bats were seen to emerge**
Terraced properties 1 and 2 (front – north-east aspect)	18/09/2024	Sunset 19:19 19:00 / 20:45	**Start** Calm / No rain 0 / 16°C / 70% rH / 239 lx **Finish** Calm / No rain 1 / 15°C / 82% rH / 0.01 lx	19:42 / Nnoc / heard not seen **No bats were seen to emerge**
Terraced properties 3 and 4 (front – north aspect)	04/07/2024	Sunset 21:41 21:35 / 23:10	**Start** Light breeze / No rain 5 / 14°C / 51% rH / 159 lx **Finish** Light breeze / No rain 5 / 13°C / 52% rH / 4.87 lx	22:11 / Ppip / heard not seen 22:12 / Ppip / heard not seen 22:57 / Nnoc / heard not seen 22:59 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Terraced properties 3 and 4 (front – north aspect)	25/07/2025	Sunset 21:25 21:15 / 22:45	**Start** Light breeze / No rain 2 / 16°C / 77% rH / 220 lx **Finish** Light breeze / No rain 7 / 15°C / 81% rH / 4.87 lx	21:39 / heard not seen 21:45 / heard not seen, 2 passes 21:49 / commuting in front and between Nos. 2 and 3 W to E 21:53 / quick fly past in front of 1 and 2 W to E. 21:58 / in front and over roof E to W 22:00 / In front and over roof E to W, maybe the same bat doing loops. 22:04 / heard not seen 22:11 / heard not seen 22:28 / heard not seen 22:34 / heard not seen 22:43 / heard not seen **No bats were seen to emerge**
Terraced properties 3 and 4 (front – north aspect)	18/09/2024	Sunset 19:19 19:00 / 20:45	**Start** Calm / No rain 0 / 16°C / 79% rH / 239 lx **Finish** Calm / No rain 1 / 15°C / 82% rH / 0.01 lx	19:54 / Ppyg and Ppip / 1 pass from path towards scrub near to building 20:00 / Ppyg / 1 pass, heard not seen 20:08 / Ppyg / 1 Pass faint, heard not seen, feeding buzz seen during analysis 20:10 / Ppyg / 1 pass, heard not seen 20:33 / Nnoc / 1 pass, heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Flintshire Depot 1 and 2 (surveyor 1 – front – north aspect)	10/07/2024	Sunset 21:35 21:20 / 23:00	**Start** Light breeze / No rain 9 / 15°C / 84% rH / 153 lx **Finish** Light breeze / No rain 9 / 14°C / 86% rH / 3.2 lx	22.03 / Nnoc / heard not seen **No bats were seen to emerge**
Flintshire Depot 1 and 2 (surveyor 2 – front – north aspect)	10/07/2024	Sunset 21:35 21:20 / 23:00	**Start** Light breeze / No rain 9 / 15°C / 84% rH / 153 lux **Finish** Light breeze / No rain 9 / 14°C / 86% rH / 3.2 lx	22.03 / Nnoc / heard not seen **No bats were seen to emerge**
Flintshire Depot 1 and 2 (surveyor 3 – front – north aspect)	10/07/2024	Sunset 21:35 21:20 / 23:00	**Start** Light breeze / No rain 9 / 15°C / 84% rH / 153 lx **Finish** Light breeze / No rain 9 / 14°C / 86% rH / 3.2 lx	21:54 / Nnoc / recorded on the detector 22:03 / Nnoc / heard not seen 22:07 / Ppyg / communing about building height 22:21 / Ppip / heard not seen 22:36 / Ppip / heard not seen 22:44 / Ppip / heard not seen x 2 passes **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Flintshire Depot 1 and 2 (surveyor 4 – side – east aspect)	10/07/2024	Sunset 21:35 21:20 / 23:00	**Start** Light breeze / No rain 9 / 15°C / 84% rH / 153 lx **Finish** Light breeze / No rain 9 / 14°C / 86% rH / 3.2 lx	21:54 / Nnoc / not heard or seen, recorded on detector 22:21 / Ppip / heard not seen 22:36 / Ppip / heard not seen 22:44 / Ppip / heard not seen 22:45 / Ppip / heard not seen, likely foraging along treeline 22:47 / Ppip / heard not seen x 2 passes. 22:51 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Flintshire Depot 1 and 2 (surveyor 5 – central courtyard)	10/07/2024	Sunset 21:35 21:20 / 23:00	**Start** Light breeze / No rain 9 / 15°C / 84% rH / 11.3 lx **Finish** Light breeze / No rain 9 / 14°C / 86% rH / 1.2 lx	21:42 / Ppip / commuting and foraging around courtyard 22:03 / Nnoc / recorded on the detector 22:07 / Ppip / commuting over yard 22:14 / Ppip / commuting over yard 22:20 / Ppip / heard not seen 22:22 / Ppip / foraging along treeline 22:26 / Ppip / heard not seen 22:33 / Ppip / heard not seen 22:35 / Ppip / commuting across yard 22:36 / Ppip / heard not seen 22:40 / Ppip / heard not seen 22:44 / Ppip / commuting across yard 22:46 / Ppip / foraging, heard not seen, probably at treeline to south 22:50 / Ppip / commuting across yard 22:52 / Ppip / heard not seen 22:57 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station within Queensferry Drain pumping station compound (surveyor 1 – west aspect)	16/07/2024	Sunset 21:30 21:22 / 23:00	**Start** Calm / No rain 9 / 16°C / 81% rH / 20.8 lx **Finish** Light breeze / No rain 0 / 16°C	21:57 / Ppip / heard not seen 22:00 / Ppip / heard not seen 22:04 / Ppip / heard not seen x2 passes 22:07 / Ppip / heard not seen 22:11 / Nnoc / heard not seen 22:13 / Ppyg / heard not seen 22:14 / Ppyg / heard not seen 22:31 / Ppip / heard not seen 22:33 / Ppyg / heard not seen 22:46 / Ppip / heard not seen multiple passes 22:48 / Ppip / heard not seen 22:56 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station within Queensferry Drain pumping station compound (surveyor 2 – south-west aspect)	16/07/2024	Sunset 21:30 21:22 / 23:00	**Start** Calm / No rain 9 / 16°C / 81% rH / 20.8 lx **Finish** Light breeze / No rain 0 / 16°C	22:00 / Ppip / heard not seen 22:04 / Ppip / heard not seen several passes 22:07 / Ppip / heard not seen 22:14 / Ppyg / heard not seen several passes 22:27 / Ppyg / heard not seen 22:28 / Ppip / heard not seen 22:31 / Ppip / above trees to east of small building 22:46 / Ppip / heard not seen several passes 22:49 / Ppip / heard not seen several passes 22:56 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station within Queensferry Drain pumping station compound (surveyor 1 – west aspect)	22/08/2024	Sunset 20:25 20:25 / 21:55	**Start** Strong breeze / No rain 9 / 17°C **Finish** Moderate breeze / No rain 9 / 17°C	20:54 / Ppip / heard not seen 21:14 / Ppyg / heard not seen 21:26 / Ppip / foraging in tree canopy above substation and yard to N of the pump station. 21:30 / Ppip / heard not seen 21:32 / Ppyg / foraging to N of the pump station building 21:33 / Ppyg and Ppip / heard not seen 21:34 Ppyg / foraging 21:38 / Ppyg / foraging in the tree canopy overhead 21:40 / Ppyg and Nnoc / heard not seen 21:41 / Ppyg / foraging across yard to N of pump station 21:44 / Ppyg / heard not seen 21:50 / Myotis / heard not seen 21:50 / Ppip / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station within Queensferry Drain pumping station compound (surveyor 2 – south-west aspect)	22/08/2024	Sunset 20:25 20:25 / 21:55	**Start** Strong breeze / No rain 9 / 17°C **Finish** Moderate breeze / No rain 9 / 17°C	20:54 / Ppip / heard not seen 21:14 / Ppyg / heard not seen x2 passes 21:24 / Ppip / heard not seen 21:26 / Ppip / heard not seen several passes 21:29 / Ppip / heard not seen several passes 21:31 / Ppyg and Ppip / heard not seen several passes, social calls heard 21:33 / Ppip and Ppyg / heard not seen several passes, social calls heard 21:34 / Ppip and Ppyg / heard not seen 21:37 / Ppyg / heard not seen several passes. 21:44 / Ppyg / heard not seen 21:50 / Myotis / heard not seen **No bats were seen to emerge**

Electricity sub-station within Queensferry Drain pumping station compound (surveyor 1 – west aspect)	12/09/2024	Sunset 19:34 19:27 / 21:00	**Start** Light breeze / No rain 9 / 12°C / 46% rH / 76.5 lx **Finish** Light breeze / Light rain shower 7 / 9°C / 54% rH / 0.01 lx	20:06 / Ppip / east along tree line 20:23 / Ppyg / heard not seen, likely along treeline 20:24 / Ppip / heard not seen 20:25 / Ppyg / few passes heard not seen, along treeline. 20:26 / Ppip / few passes heard not seen, along treeline. 20:27 / Ppip / few passes heard not seen, along treeline. 20:28 / Ppip / seen around trees, through thermal to the east of the building along path to river Dee. 20:29 / Ppyg / few passes heard not seen, bats seen on review of the thermal cameras. 20:34 / Ppip and Ppyg / few passes heard not seen 20:37 / Myotis / one pass heard not seen 20:38 / Ppip / few passes foraging along treeline briefly, come into view on the thermal in front of pumping station, foraging 20:42 / Ppyg / few passes heard not seen 20:43 / Ppip / heard not seen 20:44 / Ppyg / few passes heard not seen 20:45 / Ppyg / few passes heard not seen 20:46 / Ppip / heard not seen 20:49 / Ppyg / heard not seen 20:53 / Ppip / few passes heard not seen 20:55 / Ppip / few passes heard not seen 20:56 / Ppip / few passes heard not seen 20:58 / Ppip / few passes heard not seen 20:59 / Ppyg / heard not seen **No bats were seen to emerge**

Structure Reference or Name	**Survey Date**	**Sunset / Sunrise Survey Start / Finish**	**Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level**	**Species Recorded Time / Species / Location and/or Activity**
Electricity sub-station within Queensferry Drain pumping station compound (surveyor 2 – south-west aspect)	12/09/2024	Sunset 19:34 19:27 / 21:00	**Start** Light breeze / No rain 9 / 12°C / 46% rH / 76.5 lx **Finish** Light breeze / Light rain shower 7 / 9°C / 54% rH / 0.01 lx	20:06 / Ppip / heard not seen 20:14 / Ppip / commuting S to N 20:23 / Nnoc and Ppyg / heard not seen 20:23 / Ppyg / heard not seen 20:24 / Ppip / heard not seen several passes 20:24 / Ppyg / heard not seen several passes 20:26 / Ppip foraging above yard in between the two buildings. Several passes 20:28 / Ppip / heard not seen several passes 20:28 / Ppip / heard not seen 20:29 / Ppyg / heard not seen several passes 20:31 / Ppyg / heard not seen 20:34 / Ppip and Ppyg 20:37 / Myotis / heard not seen 20:41 / Ppyg / heard not seen 20:43 / Ppip / heard not seen 20:45 / Ppyg / heard not seen several passes 20:52 / Ppip / heard not seen several passes 20:54 / Ppip / heard not seen several passes 21:58 / Ppip / heard not seen several passes **No bats were seen to emerge**

Structure Reference or Name	Survey Date	Sunset / Sunrise Survey Start / Finish	Weather Conditions Wind / Precipitation Oktas / Avg Temp / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity

Key

Ppip = Common pipistrelle (*P. pipistrellus*)

Ppyg = Soprano pipistrelle (*P. pygmaeus*)

Myotis = *Myotis* species

Nnoc = Noctule (*N. noctula*)

Table 8-17 Transect survey results 2024

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Oktas / Temperature / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity
07/05/2024	Sunset 20:52 20:55 / 23:09	1 / 1 of 3	**Start** Light breeze / No rain 9 / 11.5°C / 45% rH / 142 lx	**South of the River Dee (Queensferry)** 21:24 / SP3 seen not detected, crossing the track from the pumping station 21:50 / Ppip / SP6 several passes foraging with feeding buzzes heard 21:53 / Ppip / SP6 several passes foraging with feeding buzzes heard **North of River Dee (Sealand)** 22:42 / Ppip / SP1 few passes foraging low, just above the grass vegetation adjacent to footpath 22:58 / Ppip / SP1 heard not seen several passes. foraging 23:02 / Ppip / heard not seen several passes, foraging along footpath. 23:06 / Ppip / SP2 heard not seen one pass under the bridge

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Oktas / Temperature / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity
18/06/2024	Sunset 21:46 21:46 / 23:56	1 / 3 of 3	**Start** Calm / No rain 13°C / 44% rH / 8.53 lx **Finish** 12°C / 54% rH	**South of the River Dee (Queensferry)** 22:10 / Ppip / flying eastward from drain to plantation approx. 5 m high 22:37 / Ppip / at the entrance to sewage works 22:41 / Ppyg / at the entrance to sewage works 22:43 / Ppyg / foraging low in the tree canopy along the public footpath 22:45 / Ppip / foraging low in the tree canopy along the public footpath 22:47 / Ppip / commuting westward along footpath above tall herbs 22:49 / Ppip / foraging above tall herbs (hemlock) adjacent to footpath 23:00 / Ppyg / foraging along footpath above the hedgerow, several passes 23:11 / Ppip / foraging in the tree canopy, several passes **North of River Dee (Sealand)** 23:25 / Ppip / foraging around scattered trees, several passes 23:27 / Ppip / foraging adjacent to footpath, heard not seen 23:34 / Ppip / foraging above the trees and amongst the streetlights Barn owl seen flying along the tree line and swale next to the A494, towards the river 23:39 / Ppip / near bridge along the river side, heard not seen

24/09/20024	Sunset 19:04 19:04 / 20:50	1 / 3 of 3	**Start** Calm / No rain 4 / 13°C / 45% rH / 88.7 lx **Finish** 4 / 13°C / 48% rH / 0.02 lx	**South of the River Dee (Queensferry)** 19:40 / Ppyg / SP5 near to the Queensferry Drain, commuting north to south 19:47 / badger seen walking down the footpath between the water treatment works and the railway embankment 19:53 / Ppip / SP6 heard not seen 19:57 / Ppip / commuting and foraging in the line of poplar trees next to footpath, heard not seen, several passes 19:59 / Ppip / SP3 foraging along the line of poplar trees next to footpath, several passes 20:01 / Ppip / SP6 foraging along line of trees, social calls seen on the walkabout – several passes 20:04 / Ppip / SP6 foraging along line of trees, social calls seen on the walkabout – several passes 20:08 / Ppyg / foraging and commuting along the hedgerow next to the footpath, heard not seen, several passes 20:09 / Ppyg / foraging and commuting along the hedgerow next to the footpath, heard not seen, several passes 20:10 / Ppyg / SP7 / foraging and commuting along the hedgerow next to the footpath, heard not seen, several passes. Bat seen commuting from caravan park over the hedge and flying towards the river **North of River Dee (Sealand)** 20:32 / Ppip / within the area of trees/scrub edge habitat, heard not seen, several passes 20:36 / Ppip / within the area of trees/scrub edge habitat, heard not seen, several passes

Survey Date	Sunset / Sunrise Survey Start / Finish	Transect Route / Survey Number	Weather Conditions Wind / Precipitation Oktas / Temperature / Humidity / Lux level	Species Recorded Time / Species / Location and/or Activity
Key Ppip = Common pipistrelle *(P. pipistrellus)* Ppyg = Soprano pipistrelle *(P. pygmaeus)* SP# = Stopping point number				

8.1.11 Table 18 details the results obtained from the static bat detectors including species and total number of passes recorded throughout the duration of the evening (dusk until dawn).

Table 8-18 Static detector results 2024

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[4]	Species recorded / number of passes per minute	Time of recordings First / Last
ST3 Pentre Poplars tree line in DCWW treatment works	21/06/2024 to 26/06.2024	21:43 / 04:45 21:43 / 04:47		Ppip / 6248 passes Ppyg / 3723 passes Myotis / 7 passes Nnoc / 7 passes	22:12 / 04:59 22:22 / 04:21 23:02 / 02:43 22:05 / 04:59
ST3 Pentre Poplars tree line in DCWW treatment works	11/09/2024 to 16/09/2024	19:41 / 06:38 19:27 / 06:48	7.7 16.7	Ppip / 1631 passes Ppyg / 1418 passes Myotis / 45 passes Nnoc / 7 passes Rhip / 2 passes	20:03 / 07:08 19:53 / 06:36 20:12 / 05:54 06:11 / 01:59 20:54 / 2:15

[4] Recorded over deployment period

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[4]	Species recorded / number of passes per minute	Time of recordings First / Last
ST4 DCWW treatment works north	21/06/2024 to 26/06.2024	21:43 / 04:45 21:43 / 04:47		Ppip / 235 passes Ppyg / 107 passes Myotis / 1 pass Nnoc / 7 passes	22:15 / 04:12 22:17 / 04:07 00:44 21:17 / 01:57
ST4 DCWW treatment works north	11/09/2024 to 16/09/2024	19:41 / 06:38 19:27 / 06:48	7.7 16.7	Ppip / 411 passes Ppyg / 140 passes Myotis / 3 passes Nnoc / 4 passes Paur / 1 pass	20:08 / 06:57 20:01 / 06:11 21:54 / 23:49 19:56 / 04:16 21:08
ST2 Rear garden of 2 Bridge Houses, Chester Road East				Ppip / 1094 passes Ppyg / 258 passes Myotis / 11 passes Nnoc / 40 passes Rhip / 2 passes	21:51/ 04:36 21:25 / 04:17 22:36/ 02:30 21:25 / 04:24 22:34 / 02:05
ST2 Rear garden of 2 Bridge Houses, Chester Road East	11/09/2024 to 16/09/2024	19:41 / 06:38 19:27 / 06:48	7.7 16.7	Ppip / 369 passes Ppyg / 173 passes Myotis / 8 passes Nnoc / 13 passes Rhip / 2 passes	19:53 / 06:14 19:59 / 06:23 21:10 / 01:34 19:40 / 04:34 01:02 / 01:18

Location	Dates set	Sunset / Sunrise	Min / Max temperature (°C)[4]	Species recorded / number of passes per minute	Time of recordings First / Last
Key Ppip = Common pipistrelle (P. pipistrellus) Ppyg = Soprano pipistrelle (P. pygmaeus) Myotis = Myotis species Nnoc = Noctule (N. noctula) Paur = Brown long eared *(P. auritus)* Rhip = Lesser horseshoe *(R. hipposideros)*					

This title page to be deleted before formal publication to external parties.

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix E

Green Infrastructure Statement

Document reference: 395318 | RML-00-XX-RP-Y-8015 | P01

First Issue | Revision P01 | September 2025

Issue and Revision Record

Revision	Date	Originator	Checker	Co-ordination check	Description
Rev A	21/07/2025	Rh. Edwards	J. Stoddard	J. Stoddard	First Draft

This document is issued for the party which commissioned it and for specific purposes connected with the above captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, ore being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It shouldnot be shown to other parties without consent from us and from the party which commissioned it.

Mott MacDonald Limited
First Floor, Bryn Eirias,
Abergele Road, Colwyn Bay, LL29 8BY

Richards, Moorehead & Laing Ltd
Office 1, Llys Clwyd, Cwrt Y Dderwen
Ffprdd Celyn, Ruthin, LL15 1NJ

Llywodraeth Cymru / Welsh Government

A494 RIVER DEE BRIDGE REPLACEMENT SCHEME

Environmental Statement

Volume 3: Appendices

Chapter 8: Appendix E

Green Infrastructure Statement

395318 | RML-00-XX-RP-Y-8015

First Issue | Revision P01 | September 2025



Contents

8. E. Green Infrastructure Statement 1

8.1 Introduction 1
8.2 Backdrop 1
8.3 Green Infrastructure 2
8.4 Planning Policy Wales and The Step-Wise Approach 2
8.5 Limitations of the A494 River Dee Bridge Replacement Scheme 8
8.6 Description of the Scheme 9
8.7 Scheme Response to DECCA 12
8.8 Applying the Step-Wise Approach 12
8.9 Summary and Conclusions 14

Tables

Table 8-1 The DECCA framework 4
Table 8-2 Change in land use 11
Table 8-3 Scheme response to DECCA 12
Table 8-4 How the Step-Wise approach has been applied to the A494 River Dee Bridge Replacement 13

Figures

Figure 8-1 Summary of the Step-Wise Approach (PPW Figure 12) 3

8. E. Green Infrastructure Statement

8.1 Introduction

8.1.1 This is a Green Infrastructure Statement (GrIS) prepared in accordance with the requirements of Planning Policy Wales (PPW – Edition 12 – February 2023) for the A494 River Dee Bridge Replacement scheme.

8.1.2 The GrIS outlines how green spaces, natural features, and sustainable drainage systems are integrated into the project to enhance biodiversity, ecosystem resilience, and overall environmental quality. It demonstrates how the scheme adheres to the "step-wise approach" of avoiding, minimizing, mitigating, and compensating for environmental impacts while aiming for a net biodiversity gain. The GrIS provides additional explanation of the measures undertaken in the design development stages of the scheme and how the stages of the stepwise approach advocated in PPW have been applied within the limits and parameters of the project.

8.2 Backdrop

8.2.1 Welsh Government have a duty under Section 6 of the Environment (Wales) Act 2016, to maintain and enhance biodiversity and promote the resilience of ecosystems through the delivery of its functions. This duty is carried through into transport and Strategic Road Network (SRN) policy in the form as the Wales Transport Strategy, Roads Review Recommendations and *Llwybr Newydd i Natur*: the nature recovery action plan for the SRN in Wales. These documents provide a high-level commitment to deliver the Section 6 duty, but there is no detailed guidance on how to evidence compliance for infrastructure delivery schemes which fall outside the planning system that is subject to Planning Policy Wales (PPW) guidance.

8.2.2 In Wales, the policy framework "Net Benefit for Biodiversity" (NBB) aims to ensure that all new developments enhance biodiversity and ecosystem resilience. Unlike England's Biodiversity Net Gain (BNG) which uses a metric-based approach, NBB focuses on qualitative, site-specific improvements to local ecosystems.

Developers must demonstrate how their projects will contribute to biodiversity enhancement, either on-site or through off-site measures, leaving the environment in a better state than before the development.

8.2.3 The requirements of Green Infrastructure Statements are set out in Chapter 6 Distinctive and Natural Places of Planning Policy Wales (PPW) that covers environmental and cultural components of placemaking. Places that are distinctive and natural are seen as contributing to the seven goals of the Well-being of Future Generations (Wales) Act 2015.

8.3 Green Infrastructure

8.3.1 PPW defines Green Infrastructure as:

"…the network of natural and semi natural features, green spaces, rivers and lakes that intersperse and connect places" and "at the landscape scale green infrastructure can comprise entire ecosystems such as wetlands, waterways, peatlands and mountain ranges or be connected networks of mosaic habitats, including grasslands."[1]

8.3.2 PPW also refers to the Environment (Wales) Act 2016 and how the Act provides a context for the delivery of multi-functional green infrastructure that can make a significant contribution to the sustainable management of natural resources by protecting, maintaining and enhancing biodiversity and promoting the resilience of ecosystems.

8.3.3 Green infrastructure statements should be submitted with all planning applications and be proportionate to the scale and nature of the proposed development and describe how green infrastructure has been incorporated into the scheme.

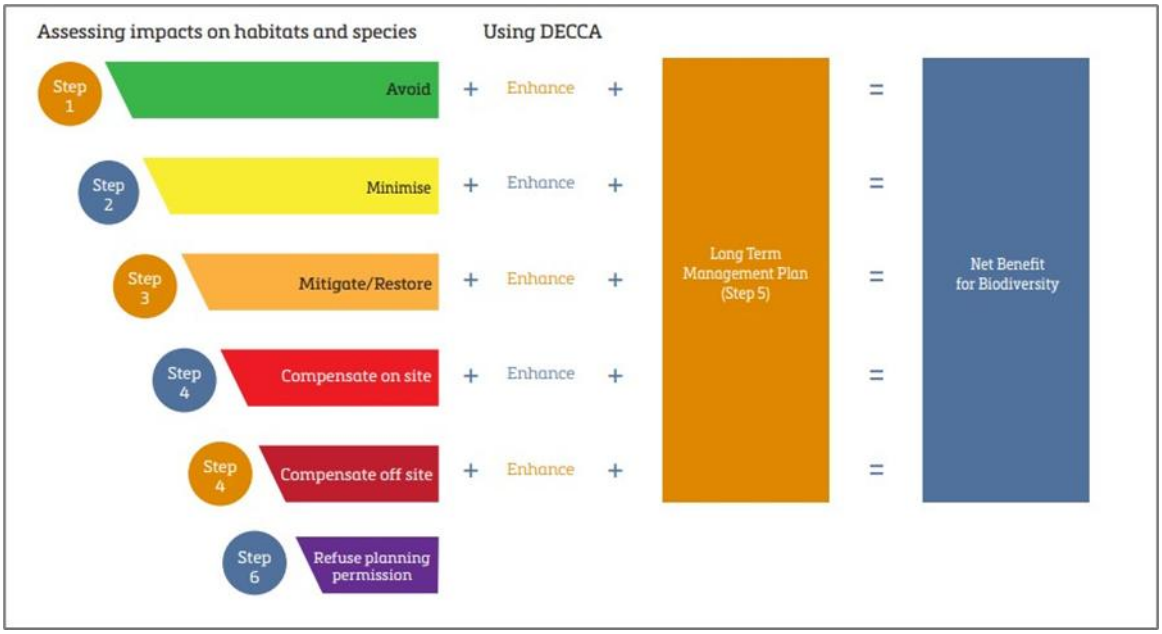
8.4 Planning Policy Wales and The Step-Wise Approach

8.4.1 A Green Infrastructure Statement is an effective way of demonstrating positive multi-functional outcomes which are appropriate to the site in question and should be used for demonstrating how the 'Step-Wise Approach' (Paragraph 6.4.21) has

[1] PPW 12 – para 6.2.1

been applied. PPW states that the first priorities for planning authorities to consider, is if the proposed development avoids damage to biodiversity (in its widest sense). If there are any potential harmful environmental effects, then planning authorities must be satisfied that all reasonable alternatives have been considered. Sites that contain protected species and habitats which are irreplaceable should be safeguarded.

Figure 8-1 Summary of the Step-Wise Approach (PPW Figure 12)



PPW and DECCA

8.4.2 PPW has developed a framework for evaluating ecosystem resilience based on five attributes and properties specified in the Environment (Wales) Act 2016. This is referred to as **DECCA**: Diversity, Extent, Condition, Connectivity and Aspects of ecosystem resilience.[2]

[2] Garrett HM, and Ayling SC. 2021.Terrestrial and freshwater Resilient Ecological Networks: a guide for practitioners in Wales. 43 pp. NRW Report No. 483 Natural Resources Wales. Dolgellau

Table 8-1 The DECCA framework

D	**Diversity:** to ensure mechanisms are in place to minimise further loss and where circumstances allow for species' populations to expand and recolonise their natural range (former range) or adapt to future change. More diverse ecosystems are more resilient to external influences (this includes biological, geological and physical diversity on a site). This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity
E	**Extent:** to ensure mechanisms allow for the identification of potential habitat, the maintenance of existing assets and networks and promote the restoration of damaged, modified or potential habitat and the creation of new habitat. This means that planning decisions should incorporate measures which seek the creation, restoration and appropriate management of green networks and linkages between habitats and maintaining and enhancing other green infrastructure features and networks.
C	**Condition:** Ecosystems need to be in a healthy condition to function effectively, to deliver a range of important ecosystem services. Planning decisions should not compromise the condition of ecosystems. By taking an integrated approach to development, for example, which considers both direct and wider impacts and benefits it should be possible to make a positive contribution. Planning for the long-term management of retained habitats is key to maintaining condition through for example, the use of planning obligations.
C	**Connectivity**: to take opportunities to develop functional habitat and ecological networks within and between ecosystems and across landscapes, building on existing connectivity and quality and encouraging habitat creation, restoration and appropriate management. The opportunities could include enlarging habitat areas, developing buffers around designated sites or other biodiversity assets or corridors, including transport and river corridors, and the creation of 'stepping stones' which will strengthen the ability of habitats and ecological networks to adapt to change, including climate change
A	**Adaptability to change:** primarily in the form of climate change, for both species (diversity) and ecosystems requires action to protect the extent, condition and connectivity of habitats, features and ecological networks. Development plans, planning proposals and applications which build on protecting designated sites and securing and enhancing green infrastructure will be key ways of addressing the attributes of ecosystems resilience identified in the Environment (Wales) Act as well as facilitating social and economic resilience aspirations of the Well-being of Future Generations Act

(extracted and adapted from PPW: Implementing the Section 6 Duty)

Future Wales: The National Plan[3]

8.4.3 Future Wales: The National Plan 2040 provides a framework that sets the direction for development in Wales to 2040. The plan is concerned with infrastructure and development in Wales and aims to ensure that the planning system is consistent at all levels. The National Plan introduced specific policies that safeguard areas for the purposes of improving the resilience of ecological networks and ecosystems services, to identify areas for the provision of green infrastructure, and to secure biodiversity enhancement, the plan introduced a requirement for development to deliver a net benefit for biodiversity (NBB). Policy 9 is particularly relevant and is extracted below:-

Policy 9 – Resilient Ecological Networks and Green Infrastructure

To ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure, the Welsh Government will work with key partners to:

a) identify areas which should be safeguarded and created as ecological networks for their importance for adaptation to climate change, for habitat protection, restoration or creation, to protect species, or which provide key ecosystems services, to ensure they are not unduly compromised by future development; and

b) identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well being.

Llwybr Newydd i Natur – The Welsh Strategic Road Network Nature Recovery Action Plan (October 2023)

8.4.4 The nature recovery action plan sets out high level ambitions and commitments that the Welsh Government should take in managing the Strategic Road Network (SRN) in Wales.

[3] Available at Future Wales: The National Plan 2040.

8.4.5 Llwybr Newydd i Natur (LlNiN) commits Welsh Government to:

"…maintain and enhance biodiversity, and increase ecosystem resilience through transport operations and infrastructure projects."

Biodiversity Policy and Net Benefits for Biodiversity

8.4.6 Wales Biodiversity Partnership (WDP)[4] have produced biodiversity checklists for local authority and public authority staff in Wales. The checklists will assist public and local authorities to take account of biodiversity in their operational activities and will help organisations to remain legal under the Environment (Wales) Act (2016) Biodiversity Duty and other biodiversity related legislation. In addition, the implementation of the checklists and guidance will help build towards the biodiversity outcomes contained in the Environment Strategy for Wales.

8.4.7 The net-benefits for biodiversity approach by Welsh Government has the intention to deliver an overall improvement in biodiversity by putting an emphasis on proactive consideration of biodiversity and wider ecosystem benefits within a placemaking context to be considered early in the design process. The aim is to design schemes that positively impact ecosystem resilience.

Flintshire Deposit Local Development Plan 2015 – 2030 – Background Paper 2 – Green Infrastructure Assessment (GIA) September 2019

8.4.8 The background paper provides an assessment of the green infrastructure (GI) across Flintshire and encourages GI to be considered across all scales of development from individual householders and volume housebuilders to large scale regeneration projects.

8.4.9 The River Dee and Estuary is identified as a green corridor that runs from Llangollen to Queensferry and along with the Clwydian Area of Outstanding Natural Beauty (AONB) and Halkyn Mountain and Holywell Common are considered as key strategic interests within Flintshire.

[4] Available at https://www.biodiversitywales.org.uk/ [Accessed:09/10/24]

8.4.10 As recommended by PPW it is paramount that GI is considered at the beginning of the development process so that it can be effectively designed and implemented within a scheme, adding it on at the end of the design process can limit the potential benefits and its overall success within the development. Policy STR13 sets out the LDP's strategic priority to protect and enhance Flintshire's natural and built environment. Item iii of the policy places emphasis on the need to:

"Conserve, protect and enhance the quality and diversity of Flintshire's natural environment including landscape, biodiversity, the Dee Estuary and the Clwydian Range and Dee Valley AONB."

8.4.11 The A494 road corridor is a protected route (TR111) in the Flintshire LDP including the crossing of the river.

The Lower River Dee Green Infrastructure Action Plan

8.4.12 The action plan for the natural environment (or green infrastructure) of the Lower River Dee. It covers the area downstream of Chester; as far as Queensferry in Wales and Neston in England. It includes actions to enhance the quality of the river, its settlements and the countryside. The action plan recognises that the River Dee has significant ecological importance as it is designated as a Site of Special Scientific Interest and a Special Area of Conservation.

8.4.13 The plan highlights areas and locations prone to flood risk and states that there could be opportunities for GI intervention in the flood zones to improve flood risk management and to create biodiversity benefits.

8.4.14 The action plan identifies areas of landscape character from the Flintshire Landscape Strategy namely:

a) LCA 3 - Dee Floodplain.
b) LCA 6 - Dee Coastal Slopes.
c) LCA 7 - Coastal and Estuarine Flats (following the River Dee).

8.4.15 The landscape strategy identifies priorities for each landscape character area as follows:

LCA3 Dee Floodplain	LCA6 Dee Coastal Slopes	LCA 7 Coastal and Estuarine Flats
i) Enhance the hedgerow tree character, by new planting and natural regeneration. ii) Conserve and manage the few existing small woods. iii) Encourage new small scale mainly broadleaved planting of small-scale copses and woods.	i) Maintain and restore the hedgerow tree character by new planting and natural regeneration and planting of field corners. ii) Identify opportunities to enhance the fringe areas by community woodland planting and management of semi-natural features. iii) Maintain and restore key hedgerows and landscape features.	i) Maintain and restore key hedgerows as landscape features, particularly alongside roads and paths ii) Maintain ditches as open water features, manage marginal vegetation and improve overall diversity. iii) Enhance stream sides and ditches by planting individual trees of willow and alder.

8.5 Limitations of the A494 River Dee Bridge Replacement Scheme

8.5.1 The Scheme is classified as a Major Asset Renewal (MAR) and will replace the existing River Dee Bridge. The extent and location of the Scheme is limited by the need to join the A494 road corridor on either side of the river and other land use constraints. There is no real alternative. The footprint of the Scheme that needs to allow for site compounds to construct the replacement bridge is also limited to that required for the Scheme and mitigation measures alone. Wider connections to other green infrastructure assets within Flintshire cannot be considered as part of the Scheme proposals due to the constraints of the Highways Act and limitations of the Orders and EIA process.

8.6 Description of the Scheme

8.6.1 The Scheme and land use changes can be divided into three areas described below:

a) Chester Road East to Chester and Holyhead Railway Line.
b) Chester and Holyhead Railway Line to River Dee.
c) River Dee to Foxes Lane.

Chester Road East to Chester and Holyhead Railway Line

8.6.2 The existing land uses are comprised of roadside soft estate, disused buildings and hard standing with garden areas to the rear of Bridge Houses. Queensferry Drain is culverted beneath Chester Road East from Drybridge Farm to the railway bridge. The A494 and Chester Road East soft estate is predominantly neutral grassland, with some self-sown and introduced trees and shrubs.

8.6.3 Proposed changes would include the removal of disused buildings at Bridge Houses, Queensferry Autos and the former Flintshire Council depot. The garage site is being considered for use as a construction site compound, which after completion of the works would be available for redevelopment as an employment site. The houses and depot site would be changed to a shared use path connecting Chester Road East to the River Dee and an open channel for the Queensferry Drain. There would be access in-between the shared-use path and Queensferry Drain for NRW to maintain the watercourse and for Network Rail to reach the railway embankment and bridge. Land in between the watercourse and the retail park would become a dark linear corridor shadowed by hedgerows to connect plantations at Queensferry Roundabout, Chester Road East and Pentre Trade Park to the semi-natural woodland on the Chester and Holyhead railway embankment.

Chester and Holyhead Railway Line to River Dee

8.6.4 The existing ground is comprised of dualled A494 highway and soft estate, Queensferry Drain runs in an open channel to the west of Riverside Way with the

pumping station and ancillary buildings on the eastern side. Riverside Way serves a haulage depot, light industry units, a residential caravan park and a site formerly used as a scrap yard but now disused. The outfall from the pumping station discharges into the Aston Quay inlet. There is unused land within the sewage works compound that has been allowed to develop into ruderal tall herb and scrub habitat.

8.6.5 Proposed changes would include the realignment of the dualled A494 and reconfiguration of Riverside Way junction and layout. This would displace the Queensferry Drain channel, pumping station and electricity sub-station, and cover the Aston Quay inlet. The replacement channel for the Queensferry drain would be next to the sewage works compound, and the pumping station and outlet would displace the haulage depot. The former scrap yard site is being considered for use as a construction site compound, which after completion of the works would be available for its designated land use as a gypsy/traveler site. The abandoned road surface would be removed and land cover changed to highway soft estate with SuDS. The shared use path connecting Chester Road East to the River Dee would continue in parallel to the realigned A494 and replacement watercourse with branches connecting to Station Road and Factory Road. There would be access in between the shared-use path and Queensferry Drain for NRW to maintain the watercourse and around the pumping station. Land in between the watercourse and the sewage treatment plant would become a dark corridor to connect the semi-natural woodland on the Chester and Holyhead railway embankment and vegetation surrounding the sewage works to the vegetation around Riverside Way and the River Dee.

River Dee to Foxes Lane

8.6.6 The existing ground is comprised of dualled A494 highway and soft estate, and arable land. The Wales Coast Path follows the northern embankment and there are connections to Claremont Avenue and Foxes Lane.

8.6.7 Proposed changes would include the realignment of the dualled A494 and introduction of a connection between the shared use path and the existing cycle/pedestrian network. This would displace part of the SuDS swale, which

would be reprofiled. A portion of arable land is being considered for use as a construction site compound, which after completion of the works the majority of which would be restored to its original condition ensuring ground compaction has been removed. The abandoned road surface would be removed and land cover changed to highway soft estate. Land next to the shared-use path would become a dark corridor to connect the River Dee and vegetation surrounding Ferrybank Farm and Foxes Lane.

Land Use / Habitat

8.6.8 The overall change in land uses is presented in the table below that illustrates the change in land use from the baseline conditions as they currently stand to that on the completion of the Scheme:

Table 8-2 Change in land use

Land Use/Habitat	Existing Baseline (m^2)	Scheme proposals (m^2)
Buildings and Structures	3,070	3,555
Roads and Footpaths	53,425	39,170
Hardstanding	21,215	24,980
Woodland and plantation	5,045	8,750
Amenity Planting & Grassland	3,155	6,660
Hedgerows	10	3,080
Amenity Grassland	23,355	35,495
Scrub and Ruderal Vegetation	25,395	15,275
Agricultural Land	37,285	34,475
Marshland/Wetland	0	750
Intertidal Habitat	810	810
Saltmarsh	750	630
Running Water	635	520
Total Area	**174,150**	**174,150**

8.7 Scheme Response to DECCA

8.7.1 The environmental objectives (EOs) for the Scheme have been carefully aligned with Llywbr Newydd i Natur and PPW and agreed with key stakeholders through the Environmental Liaison Group (ELG) forum. The Scheme's response to DECCA is summarised in the table below.

Table 8-3 Scheme response to DECCA

D	**Diversity:** The Scheme does not cause significant loss of habitat or have adverse effects to the marine environment of the protected River Dee. Mitigation measures to avoid construction impacts and safeguard qualifying features of the river such as migratory fish would be a requirement and environmental commitment of the Scheme. Land take for the Scheme would include areas for habitat creation and linear habitat in the form of open channels and hedgerows to encourage opportunities to create a net benefit for biodiversity.
E	**Extent:** The Scheme extents have been maximised to enable habitat creation and linkages to adjacent habitats and linear wildlife corridors such as the Chester Holyhead Railway Lands and corridor of the River Dee. The provision of green infrastructure within the extent of the Scheme includes provision for active travel, extended open channels and areas of soft estate.
C	**Condition:** The soft estate would be managed and maintained to ensure long term benefits for biodiversity are achieved. Planning for the long-term management of retained habitats is key to maintaining condition through implementation of an Environmental Management Plan with regular inspections and monitoring measures and cyclical management practices to be undertaken by NMWTRA on behalf of the Welsh Government.
C	**Connectivity**: The safeguarding of the River Dee during construction protection and creation of a wider soft estate provides opportunities to develop functional habitat and ecological networks building on existing connectivity and quality and encouraging habitat creation.
A	**Adaptability to change:** The provision of soft estate provides opportunities for creating resilient habitats that can adapt to climate change through careful selection of plants and grasslands and implementation of a responsive management regime.

8.8 Applying the Step-Wise Approach

8.8.1 The Scheme is classified as a Schedule 2 project under the EIA Regulations and as such has been subject to the EIA process and in accordance with the Highways Act. The EIA process is a similar in effect to the Step-Wise approach that would apply to a similar scheme if taken through the planning process that is advocated in PPW.

8.8.2 In developing options for the Scheme, the avoidance of any adverse effects on environmental designations is paramount in the scheme selection process. Any options or alternatives that would likely to have a significant adverse effect are avoided and discounted. The EIA process is very similar in principle to the step-wise approach and is summarised below in Table 8-3:-

Table 8-4 How the Step-Wise approach has been applied to the A494 River Dee Bridge Replacement

Applying the Step-Wise approach to the A494 River Dee Bridge Replacement Scheme	
Avoid	The River Dee Bridge Replacement Scheme is highly constrained in that the safe crossing of the Dee is the primary purpose of the scheme and one of overriding public interest. The crossing of the Dee cannot be avoided but can be safeguarded by minimising any potential adverse effects. The existing bridge would be demolished but the existing river piers would remain thus avoiding potential disturbance and environmental risks to the River Dee.
Minimise	The minimisation of any adverse effects has been addressed through the EIA process in assessing adverse effects and introducing mitigation measures to minimise adverse effects. These include the identification of construction techniques and placing limitations and restrictions on the timing of some of the works such as piling works needed in the River Dee for construction of the replacement bridge. No piling works will be permitted in the River Dee during nighttime to minimise potential disturbance to migratory fish. The type of piling will also be restricted to non-percussive piling such as rotary drilling in order to minimise noise within the marine environment during construction. Lighting required for the scheme has also been carefully developed and assessed to ensure minimal impact on human and ecological receptors. Through a combination of best practice design, adherence to national standards, and proactive mitigation measures, the project delivers a low-risk lighting environment for residents, road users, and other stakeholders. The loss of existing soft estate would be minimised, particularly along the northern perimeter of the scheme where woodland plantations have developed and matured to provide visual amenity and screening of the existing road corridor from nearby residential properties.

Applying the Step-Wise approach to the A494 River Dee Bridge Replacement Scheme	
Mitigate/Restore	Mitigation measures have been identified through the EIA process and incorporated into the scheme proposals. These include measures such as providing: • Circa 3 kilometres of native species hedgerows to create linear habitat and dark corridors. The restoration of hedgerows as part of the scheme would contribute to the landscape character of the area and compensate for hedgerows lost due to modern agricultural practices • Open ditches and swales for improved SuDs will mitigate for the loss of the existing ditch of Queensferry Drain. Additional sections of open channel would be restored, maintained and managed as part of the scheme. • Areas of land and derelict building would be restored to circa 1.3 hectares of amenity and species rich grassland • An additional 3,750 square metres of broadleaved woodland plantation would be part of the scheme proposals
Compensate on Site	A bat house would be provided on site to compensate for the demolition of a roost in an existing sub-station building that needs to be removed to re-build the connecting road corridor. Existing concrete revetment on the eastern bank beneath the existing bridge would be modified to encourage accretion of growing medium to encourage re-colonisation of saltmarsh species.
Compensate off Site	Loss of saltmarsh habitat on the eastern bank of the river beneath the replacement bridge will be compensated for off-site on an area of foreshore site located at Greenfield. The area of saltmarsh affected is small (circa 150 square metres) and likely to be affected during the construction period and in the long term by the shadowing effect of the new bridge. The mitigation measures for saltmarsh restoration at Greenfield are considered to be proportionate to the area affected.

8.9 Summary and Conclusions

8.9.1 The purpose of the Scheme is to replace the existing bridge that is deteriorating and causing an increasing risk to the operation of the A494 and the strategic road network. The existing bridge crosses the highly protected River Dee and therefore the replacement of the bridge would not only safeguard the future of the strategic road network but also reduce the environmental risks to the River Dee.

8.9.2 The extent of the Scheme is highly restricted by having to re-connect to the existing alignment of the A494 on either side of the river. The construction of the replacement bridge has an unavoidable effect on the banks of the River Dee and

the protected saltmarsh habitat and intertidal areas on both banks. However, the removal of the existing bridge provides opportunity for the saltmarsh to naturally recolonise on both banks of the river, previously shaded by the bridge. In addition, an area on the south bank of the River Dee further downstream has been identified where enhancements to the existing saltmarsh habitat can be improved as part of the Scheme proposals.

8.9.3 The Scheme incorporates sufficient land take to deliver net biodiversity benefits in the form of increased terrestrial habitat by providing species rich grassland and native species hedgerows that would be managed in the long term as soft estate and as part of the strategic road network. The Scheme also delivers an increased length of open channel watercourses and bankside habitat along the south-eastern side of the A494 road corridor.

8.9.4 The Scheme would leave the existing environment in a better state than currently exists by safeguarding the protected River Dee and replacing areas of derelict buildings and land with terrestrial habitat that would be maintained and managed in the long term as soft estate and part of the wider strategic road network.