J2: TfL Arboricultural Survey

Environmental Statement

Volume II

Northern Line Extension
Arboricultural Impact Assessment

April 5th 2013

Prepared by John Parker, TfL Arboriculture & Landscape Manager (Central).

Report Reference: NLE-050413-JP-ARB

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1. Introduction

1.1 The purpose of this report is to record basic data and assess the condition of trees which lie within or adjacent to the site boundaries of the proposed Northern Line Extension (NLE) in the London Borough of Lambeth (LBL), and to identify those trees which may require removal as part of this development. The report has been written in accordance with British Standard 5837 :2012 *Trees in relation to design, demolition and construction – Recommendations* (BS 5837).

1.2 Four sites were inspected in all. For the purposes of this report only these will be referred to as Kennington Green, Kennington Park, Nine Elms station and Radcot Street. The construction activities at the proposed Battersea station and Harmsworth Street sites will not affect any trees.

1.3 This report contains a schedule of trees on each of the four sites, including measurement data and a condition assessment, and an appraisal of the likely impact of the proposal on these trees.

1.4 This report does not contain a post-construction planting programme, which is to be dealt with elsewhere.

2. Methodology

2.1 Tree inspections were undertaken by John Parker, Transport for London (TfL) Arboriculture & Landscape Manager for Surface Transport (ST) in the Central area, working on behalf of London Underground (LU). Inspections were undertaken between the 12th and the 17th of July, 2012.

2.2 All inspections were made from ground level, and no invasive methods were used. In some situations a complete assessment was not possible due to either the location of the tree (on private land) or as a result of a part of the tree being obscured.

2.3 Measurements relating to tree height and spread are based on estimations unless otherwise stated.

2.4 All trees have been allocated a category of either A, B, C or U in accordance with British Standard 5837 :2012 *Trees in relation to design, demolition and construction - Recommendations* (BS 5837). The definitions of the categories are as follows:

- **Category U.** Those in such a condition that they cannot realistically be retained as living trees in the 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.

2.5 All tree identification numbers supplied in this report are for the purposes of this report only, and will not reflect identification numbers stated elsewhere (for example, in the databases held by the LA or TfL).

2.6 The Root Protection Area (RPA) of any trees to be retained on or adjacent to any of the sites must be taken into consideration during the detailed design and construction phases. For single stem trees the RPA should be calculated as an area equivalent to a circle with a radius 12 times the stem diameter (DBH).

3. Additional Considerations

3.1 The trees inspected in this survey are maintained by either the LBL, TfL or private stakeholders. Before any work is undertaken to any trees, the relevant Arboricultural professional responsible for the maintenance of the tree (or the owner, in the case of private trees) must be consulted.

3.2 Any tree work which is undertaken must be carried out in accordance with industry best practice as specified in British Standard 3998:2010 *Tree work – recommendations* (BS 3998), after all necessary consultation has been completed.

3.3 All maps used in this report have been adapted and reproduced from documents GRNLEB-BHD-00-XX-REP-CON-00023 - REV 02-01 and GRNLEB-HGL-TU-XX-REP-CON-00002 - 02-01.

3.4 Initial consultation with Lambeth Tree Officers was conducted on January 25th and February 13th 2013. Proposals were discussed and the response of the Lambeth Tree Officers to the proposal was positive, subject to a suitable replanting scheme.

3.5 A Tree Preservation Order (TPO) check has not been made. TfL are a Statutory Undertaker and therefore exempt from TPO legislation when executing their statutory duty. A copy of this report will be sent to the LB Lambeth Planning Tree Officer as part of the planning application and he will review any existing TPOs on LB Lambeth trees accordingly. As mentioned in 3.4 (above), a positive response has already been given with regard to the proposed tree removals.

4. Kennington Green, Lambeth

4.1 The site is located adjacent to the junction of Kennington Park Road and Montford Place, Lambeth.

4.2 Eleven trees were surveyed in total. TfL are responsible for maintaining four (T1, T2, T10 and T11), and the LBL for the other seven.

4.3 The proposal requires the removal of eight trees from this site. These are T1, T2, T3, T5, T6, T7, T8 and T9.

4.4 Four of the trees (T3, T6, T7 and T9) are in poor condition and have been classified as Category U trees. Removal would be recommended independently of the NLE proposal.

4.5 T5 has been classified as a British Standard 5837 Category C tree. Please see the Appendices of this report for details relating to BS 5837 Categorisation.

4.6 T8 has been classified as a Category B tree.

4.7 T1 and T2 have been classified as Category A trees.

4.8 T4, T10 and T11 must all be adequately protected during the construction phase. Suitable methods of tree protection are to be found in BS 5837, extracts of which are contained within the Appendices of this report.

4.9 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

4.10 Figure J6-1 illustrates construction worksite requirements at Kennington Green, including trees to be removed and retained.

Kennington Green, Lambeth Surveyed 10/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Notes	Work Recommendations
1	Opp 344, on Kennington Road	Plane	Platanus	13	390	5,5,4,5	SM	G	G	A	No visible defects. TfL tree.	Remove
2	On Kennington Rd, opp black entrance gates	Plane	Platanus	12	300	5,5,5,5	SM	G	G	A	No visible defects. TfL tree.	Remove
3	Opp 350, on grass	Cherry	Prunus	7	330	3,4,5,2	M	P	P	U	Canopy decline, lean, dog damage, old pruning wounds	Remove
4	Opp 352, on pavement	Tree of Heaven	Ailanthus	14	680	5,4,5,6	M	F	F	B	Minor deadwood	No work required
5	Opp 354, on pavement	Ash	Fraxinus	12	390	5,4,5,5	SM	F	F	C	Basal damage, vehicle strikes, sparse foliage at top of crown	Remove
6	Opp Montford Place, adjacent central paving	Cherry	Prunus	7	420	6,1,4,3	M	P	P	U	Deadwood, tree generally in decline, old pruning wounds, black exudations from stem	Remove
7	Opp Montford Pl, adjacent pavement	Cherry	Prunus	6	330	2,3,4,3	M	P	P	U	Cavities, deadwood, unbalanced crown, dieback	Remove
8	Opp 362, on pavement	Tree of Heaven	Ailanthus	15	740	6,7,6,5	M	F	F	B	Minor deadwood, extensive suckering and epicormic growth	Remove
9	Opp 362, on grass	Cherry	Prunus	5	290	3,2,4,1	M	P	P	U	Canopy is 50% dead, fungal fruiting bodies all over stem, lean, overshadowed by adjacent Ailanthus, stem decay, dog damage	Remove
10	Opp 366, on pavement	Maidenhair Tree	Gingko	11	210	4,4,4,4	SM	F	G	B	Sparse foliage towards top of crown, several crossing branches throughout. TfL tree.	No work required
11	On Kennington Rd, adjacent to Clayton Street	Plane	Platanus	14	540	8,6,7,8	M	G	G	A	No visible defects. TfL tree.	Remove

Key
***Ht**: Estimated height in metres. **DBH**: Diameter at breast height in millimetres. **N,S,E,W**: Estimated spread of branches at cardinal points in metres.*
***Age:** Young(less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).*
***Phys/Stru Con**: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.*
***5837 Cat:** U, A, B or C in accordance with BS 5837. **Notes**: Relevant comments about the tree. **Work Recommendations**: Required works in the context of the proposal.*

5. Radcot Street, Lambeth

5.1 The site is the length of Radcot Street, as well as the eastern sections of Methley Street and Ravensdon Street.

5.2 Twelve trees were surveyed in total, all of which are the responsibility of LB Lambeth. Only four of these trees (T3, T4, T5 and T6) are to be affected by the proposal.

5.3 Two trees (T4 and T5) require removal. They have been classified as Category U and B respectively.

5.4 Two trees (T3 and T6) require crown lifting to facilitate the installation of hoarding. Works are to be agreed with the LB Lambeth Tree Officer. They must be adequately protected during the construction phase. Suitable methods of tree protection are to be found in BS 5837, extracts of which are contained within the Appendices of this report.

5.5 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

5.6 Figure J6-2 illustrates construction worksite requirements at Radcot Street, including trees to be removed and retained.

Radcot Street, Lambeth Surveyed 12/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Defects	Work Recommendations
1	Os 6/8 Ravensdon	Photinia	Photinia	4	60	1,1,1,1	Y	G	G	C	No visible defects	No work required
2	Os 2 Ravensdon	Ash	Fraxinus	6	120	2,2,2,2	Y	G	F	C	Apparent weakness at graft point at 2m, weak branch unions	No work required
3	Os 2 Radcot	Birch	Betula	10	170	3,3,2,3	SM	G	F	B	Co-dominant stem from 3m	Crown lift to facilitate hoarding
4	Opp 2 Radcot	Pear	Pyrus	9	260	3,1,1,3	SM	P	P	U	Lean, dieback, conflicting with overhead cables, vehicle damage, significant torn-out limbs	Remove
5	Opp 5 Radcot	Honey Locust	Gleditsia	12	370	4,4,5,5	SM	G	F	B	Low crown, touching buildings, roots causing damage to pavements	Remove
6	Os 6 Radcot	Pear	Pyrus	10	300	3,2,3,3	SM	F	F	C	Conflicting with overhead cables	Crown lift to facilitate hoarding
7	Os 9/10 Radcot	Whitebeam	Sorbus	10	380	4,2,3,3	SM	F	F	C	Black exudations at base	No work required
8	Os 2 Methley	Pear	Pyrus	8	180	3,4,2,2	SM	F	F	C	Minor vehicle damage on limb	No work required
9	Os 1 Methley	Pear	Pyrus	10	150	2,2,2,2	SM	G	G	B	No visible defects	No work required
10	Os 8/10 Methley	Pear	Pyrus	5	60	1,1,1,1	Y	G	G	C	No visible defects	No work required
11	Os 12 Methley	Golden Rain Tree	Koelreuteria	6	90	2,2,2,2	Y	G	G	C	No visible defects	No work required
12	Os 11 Methley	Hawthorn	Crataegus	7	270	4,2,2,1	M	P	P	U	Sparse crown, lean, cavity at base, substantial old pruning wounds, growing into overhead cables	No work required

Key

***Ht**: Estimated height in metres. **DBH**: Diameter at breast height in millimetres. **N,S,E,W**: Estimated spread of branches at cardinal points in metres.*

***Age:** Young(less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).*

***Phys/Stru Con**: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.*

***5837 Cat:** U, A, B or C in accordance with BS 5837. **Notes**: Relevant comments about the tree. **Work Recommendations**: Required works in the context of the proposal.*

6. Kennington Park, Lambeth

6.1 The site is located at the junction of Kennington Park Road and St Agnes Place.

6.2 Twenty nine trees were surveyed in total, all of which are the responsibility of LB Lambeth.

6.3 T1, T2, T3, T4, T5, T6 and T21 are to be protected during construction. Suitable methods of tree protection are to be found in BS 5837, extracts of which are contained within the Appendices of this report. Very minor pruning may be required in order to facilitate the installation of the hoarding, to be agreed with the LB Lambeth Tree Officer.

6.4 T21 is to be retained during construction in order to provide an element of screening. However, it is proposed that it be removed once construction is complete in order to allow the planting of an extensive new avenue along this boundary.

6.5 Twenty two trees require removal in order to accommodate this proposal. These are T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T22, T23, T24, T25, T26, T27, T28 and T29.

6.6 None of the twenty two trees are of sufficient quality individually to warrant retention at the expense of this development.

6.7 Fourteen trees are located behind a fence within the allocated dog area. These are T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19 and T20.

6.8 Four trees in the dog area (T14, T16, T18 and T20) have been classified as BS 5837 Category U; T14 and T18 are dead. The other ten trees in the dog area have been classified as Category C.

6.9 T22, T23, T24, T25, T26, T27, T28 and T29 are within the garden of Kennington Lodge.

6.10 T24, T26 and T28 are very large overgrown shrubs rather than trees. In addition to these three there are several more specimens which could reasonably be defined as either a large shrub or a small tree, which have not been included in this survey.

6.11 There are a number of fruit trees in the garden which have not been surveyed individually as they are rather small, less than 5cm DBH. There are other items of arboricultural and landscape interest such as the Kiwi Fruit Vine alongside the cottage.

6.12 The garden around Kennington Lodge has a reasonable level of biodiversity value, described in the Ecology Chapter of the Environmental Statement.

6.13 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

6.14 Figure J6-3 illustrates construction worksite requirements at Kennington Park, including trees to be removed and retained.

Kennington Park, Lambeth Surveyed 11/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Notes	Work Recommendations
1	South of memorial	Plane	Platanus	23	1300	13,11, 10,10	M	G	G	A	Minor deadwood, risk of compaction from adjacent path	No work required
2	South of dog area, in avenue	Oak	Quercus	12	710	6,6,6,6	M	G	G	A	Minor deadwood	No work required
3	South of dog area, in avenue	Oak	Quercus	12	800	6,8,6,6	M	G	G	A	Black exudations from lowest scaffold limb, which has developed a large rib	No work required
4	South of dog area, in avenue	Oak	Quercus	12	670	6,8,5,6	M	G	G	A	No visible defects	No work required
5	South of dog area, in avenue	Oak	Quercus	12	740	6,7,6,6	M	G	G	A	No visible defects	No work required
6	South of dog area, in avenue	Oak	Quercus	12	730	7,6,8,6	M	G	G	A	No visible defects	No work required
7	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
8	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
9	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
10	North east corner of dog area	Birch	Betula	7	110	3,3,3,3	SM	F	F	C	No visible defects	Remove
11	Northern boundary of dog area	Tree of Heaven	Ailanthus	10	280	4,4,4,4	SM	F	F	C	Minor snapped limbs	Remove
12	Northern boundary of dog area	False Acacia	Robinia	8	190	2,2,2,2	SM	F	F	C	Sparse crown, very close to retaining wall	Remove
13	Northern boundary of dog area	Ash	Fraxinus	12	350	5,5,5,4	SM	F	F	C	Crossing branches, climbing plants up stem, very close to retaining wall	Remove
14	Northern boundary of dog area	DEAD	DEAD	9	150	3,3,3,3	D	D	D	U	Dead	Remove
15	Northern boundary of dog area	Ash	Fraxinus	12	460	4,7,5,5	SM	F	F	C	Sparse crown, slow recovery to previous pruning wounds	Remove
16	Northern boundary of dog area	False Acacia	Robinia	5	60	1,1,1,1	Y	P	P	U	Dead from 2m upwards	Remove
17	Opp De Cavne Street	Ash	Fraxinus	10	400	5,7,7,7	SM	F	F	C	Minor deadwood, sparse crown	Remove

18	Northern boundary of dog area	DEAD	DEAD	5	60	1,1,1,1	D	D	D	U	Dead	Remove
19	Northern boundary of dog area	Ash	Fraxinus	10	390	5,6,5,5	SM	F	F	C	Sparse crown	Remove
20	Northern boundary of dog area	Ash	Fraxinus	4	70	1,1,1,1	Y	P	P	U	Poor specimen, overshadowed by neighbours, no dominant leader	Remove
21	Northern boundary of dog area	Ash	Fraxinus	12	500	6,7,6,6	SM	F	F	C	Dog damage at base. Potentially to be removed once construction is complete	No work required
22	Kennington Lodge, south of cottage adjacent to fence	Tree of Heaven	Ailanthus	12	530	7,4,8,7	SM	F	P	C	Substantial stem damage from 0.5m to 3m, twin stemmed from 3m, poor historic pruning, cavities, torn branches, relatively sparse crown	Remove
23	Kennington Lodge, south of cottage adjacent to path	Holly	Ilex	10	530	3,3,3,3	SM	F	F	B	Twin stemmed from 1m, poor historic pruning, top of tree has been removed in the past	Remove
24	Kennington Lodge, south of cottage adjacent to door	Thorn	Crataegus	8	280	4,3,4,4	M	F	F	B	Deadwood and old pruning stubs throughout crown, canopy is touching the cottage roof	Remove
25	Kennington Lodge, west of cottage adjacent to gate	Cherry	Prunus	7	450	6,6,5,5	M	F	F	B	Twin stemmed from 2m, stem features numerous decay pockets	Remove
26	Kennington Lodge, north of cottage	Thorn	Crataegus	10	590	9,4,4,4	M	F	F	B	Twin stemmed from 1m, triple stemmed from 1.5, substantial historic pruning wounds at base	Remove
27	Kennington Lodge, northwest of cottage	Magnolia	Magnolia	8	180	2,3,2,2	SM	F	F	B	No visible defects	Remove
28	Kennington Lodge, northwest of cottage	Pyracantha	Pyracantha	6	230	4,3,3,3	M	F	P	C	Substantial historic pruning wounds at base	Remove
29	Kennington Lodge, northwest of cottage	Magnolia	Magnolia	7	160	0,5,3,6	SM	F	F	C	Stem leans towards west but tree is attempting to compensate by straightening out over the fence	Remove

Key

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***Age:** Young(less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).*

***Phys/Stru Con**: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.*

***5837 Cat:** U, A, B or C in accordance with BS 5837. **Notes**: Relevant comments about the tree. **Work Recommendations**: Required works in the context of the proposal.*

7. Nine Elms station (Wandsworth Road), Lambeth

7.1 The site is located at the junction of Pascal Street and Wandsworth Road, and includes the Sainsbury's car park.

7.2 Eight trees were surveyed in total, four of which are located within the car park and therefore likely to be the responsibility of Sainsbury's. The other four are the responsibility of the LBL.

7.3 Seven trees (T1, T2, T3, T5, T6, T7 and T8) require removal in order to facilitate the proposal.

7.4 This development does not require the removal of T4. However, it is a poor specimen in decline and should be considered for removal and replanting.

7.5 All tree removals are to be mitigated by an extensive post-construction replanting programme – to be agreed with the Local Authority/TfL Tree Officer – with the intention of restoring the landscape to a higher standard than that which currently exists.

7.6 Figure J6-4 illustrates construction worksite requirements at Nine Elms station, including trees to be removed and retained.

Nine Elms station, Lambeth Surveyed 17/07/12 by JP

T#	Location	Common name	Botanical name	Ht	DBH	N,S,E,W	Age	Phys Con	Stru Con	5837 Cat	Notes	Work Recommendations
1	South western corner of Sainsbury's car park	Maple	Acer	8	25	4,3,4,3	SM	F	F	C	No visible defects	Remove
2	Opp 55 Pascal St	Maple	Acer	8	20	3,2,3,3	SM	F	F	C	Sparse crown, minor limbs torn out	Remove
3	Opp Bramley Crescent	Rowan	Sorbus	6	14	2,2,2,2	SM	F	F	C	Minor vehicle damage	Remove
4	Os Lockyer House	Hawthorne	Crataegus	7	36	3,3,3,3	M	P	P	U	Sparse crown, cavities, decay pockets, snapped limbs	No work required
5	South eastern corner of car park	Maple	Acer	6	17	3,3,3,3	SM	F	F	C	Guying system needs adjusting	Remove
6	Opp Wilcox Road	Maple	Acer	7	19	3,3,3,3	SM	F	F	B	No visible defects	Remove
7	Centre of car park, adjacent to petrol station	Plane	Platanus	12	36	5,3,4,4	SM	G	F	B	No visible defects	Remove
8	Centre of car park, adjacent to petrol station	Plane	Platanus	12	38	3,4,4,4	SM	G	F	B	No visible defects	Remove

Key

***Ht**: Estimated height in metres. **DBH**: Diameter at breast height in millimetres. **Sd**: Estimated spread of branches at cardinal points in metres.*

***Age:** Young(less than ten years old), Semi-mature (within 1/5-2/5 of species-typical life expectancy), Mature (3/5-5/5 of life expectancy).*

***Phys/Stru Con**: General assessment of the physiological/structural condition of the tree, either Good, Fair, Poor or Dead.*

***5837 Cat:** U, A, B or C in accordance with BS 5837. **Notes**: Relevant comments about the tree. **Work Recommendations**: Required works in the context of the proposal.*

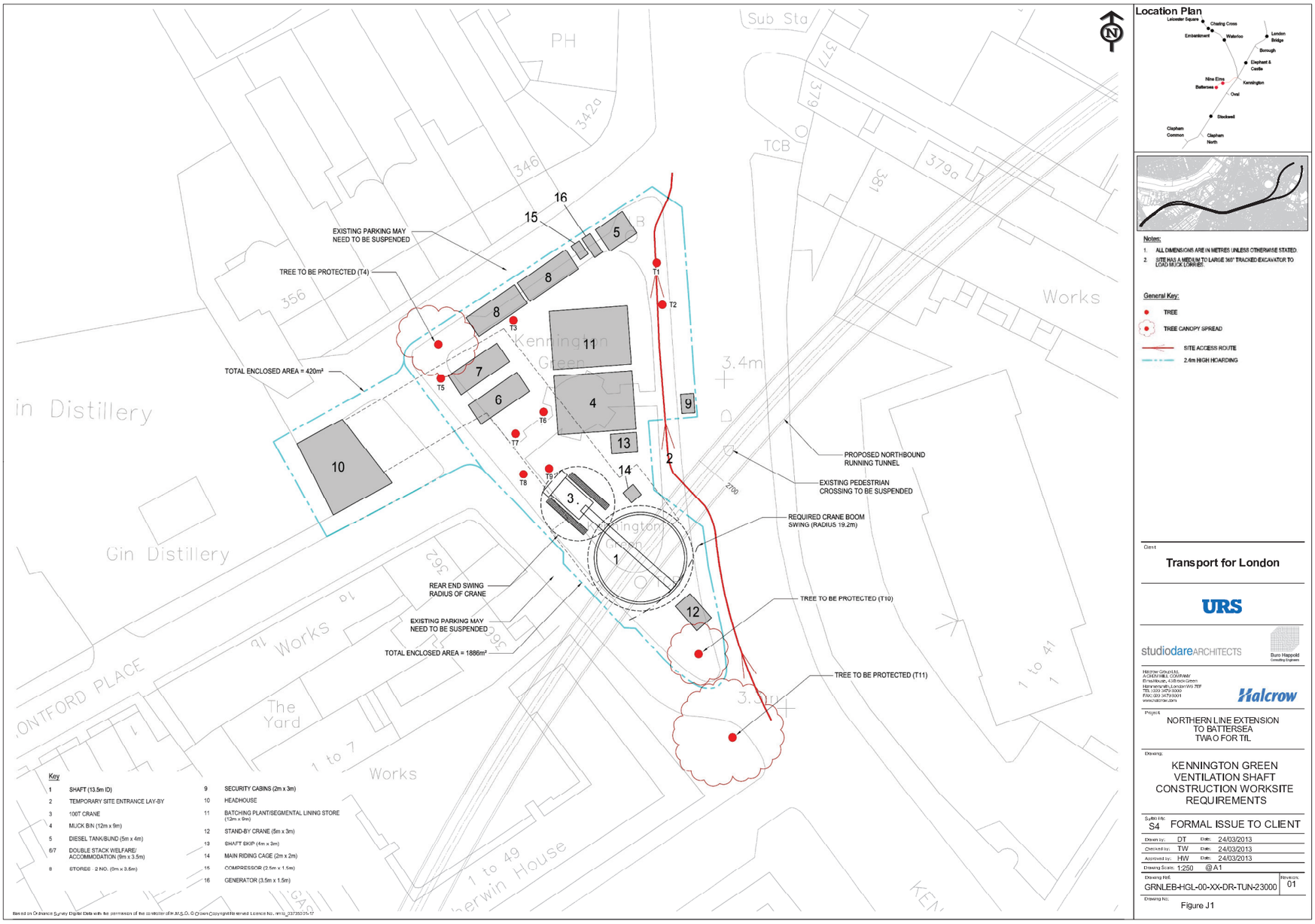
8. Figures

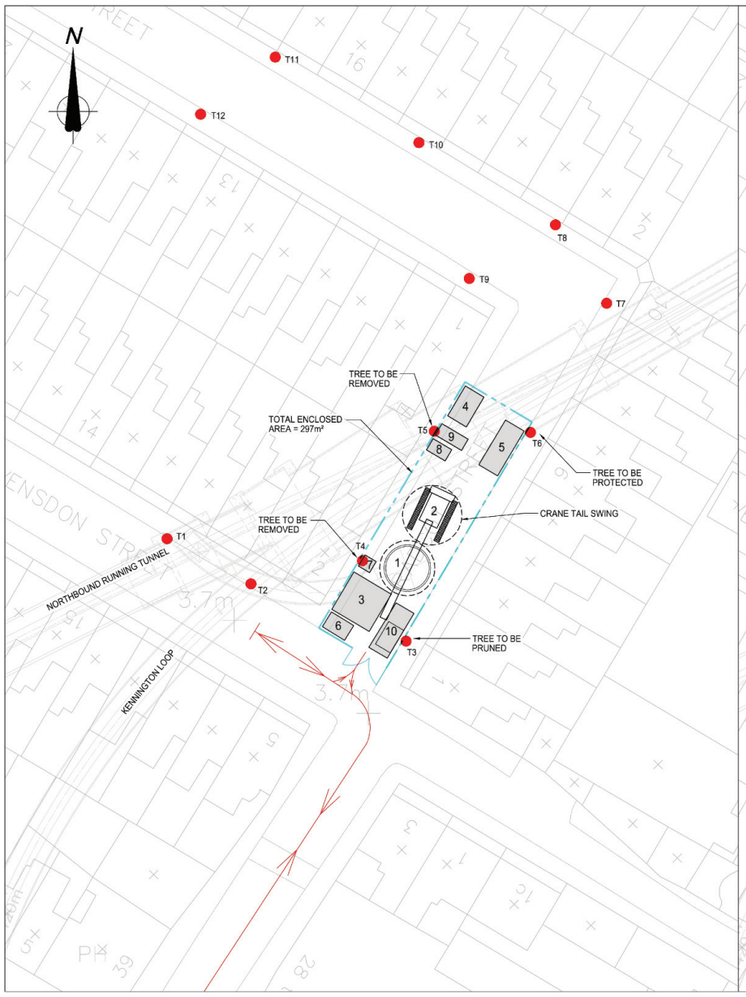
J1 – Kennington Green

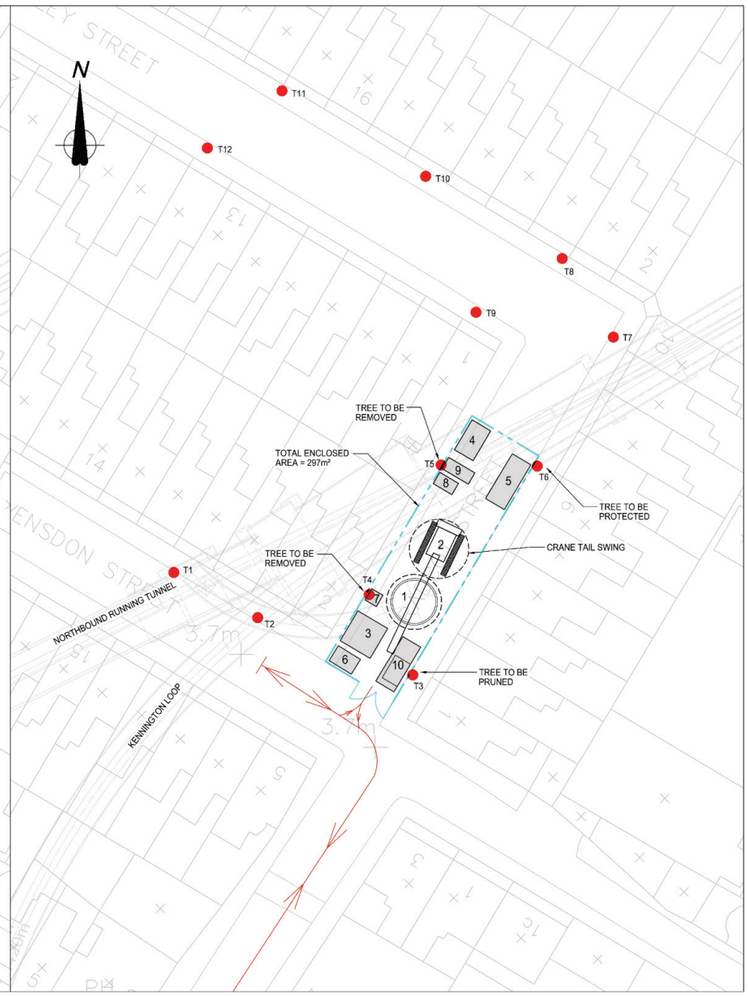
J2 – Radcot Street

J3 – Kennington Park

J4 – Nine Elms station







SITE REQUIREMENTS DURING SHAFT EXCAVATION

Key

1	SHAFT (5m ID)	5	SINGLE WELFARE/ ACCOMMODATION (6m x 2.5m)	9	GENERATOR (3.5m x 1.5m)
2	30T CRANE	6	SECURITY CABIN (2m x 3m)	10	TYPICAL LORRY (8m x 2.45m)
3	MUCK BIN (5m x 5m)	7	MAIN RIDING CAGE (1.5m x 1.5m)		
4	DIESEL TANK (2.5m x 4m)	8	COMPRESSOR (2.5m x 1.5m)		

SITE REQUIREMENTS DURING GROUTING WORKS

Key

1	SHAFT (5m ID)	5	SINGLE WELFARE/ ACCOMMODATION (6m x 2.5m)	9	GENERATOR (3.5m x 1.5m)
2	30T CRANE	6	SECURITY CABIN (2m x 3m)	10	TYPICAL LORRY (8m x 2.45m)
3	GROUTING WORKS PREPARATION AREA (4m x 4m)	7	MAIN RIDING CAGE (1.5m x 1.5m)		
4	DIESEL TANK (2.5m x 4m)	8	COMPRESSOR (2.5m x 1.5m)		

Location Plan

Notes:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. SITE HAS A MEDIUM 360° TRACKED EXCAVATOR TO LOAD MUCK LORRIES.

General Key

- TREE
- SITE ACCESS ROUTE
- 2.4m HIGH HOARDING

Client: Transport for London

URS

studiodareARCHITECTS

Buro Happold Consulting Engineers

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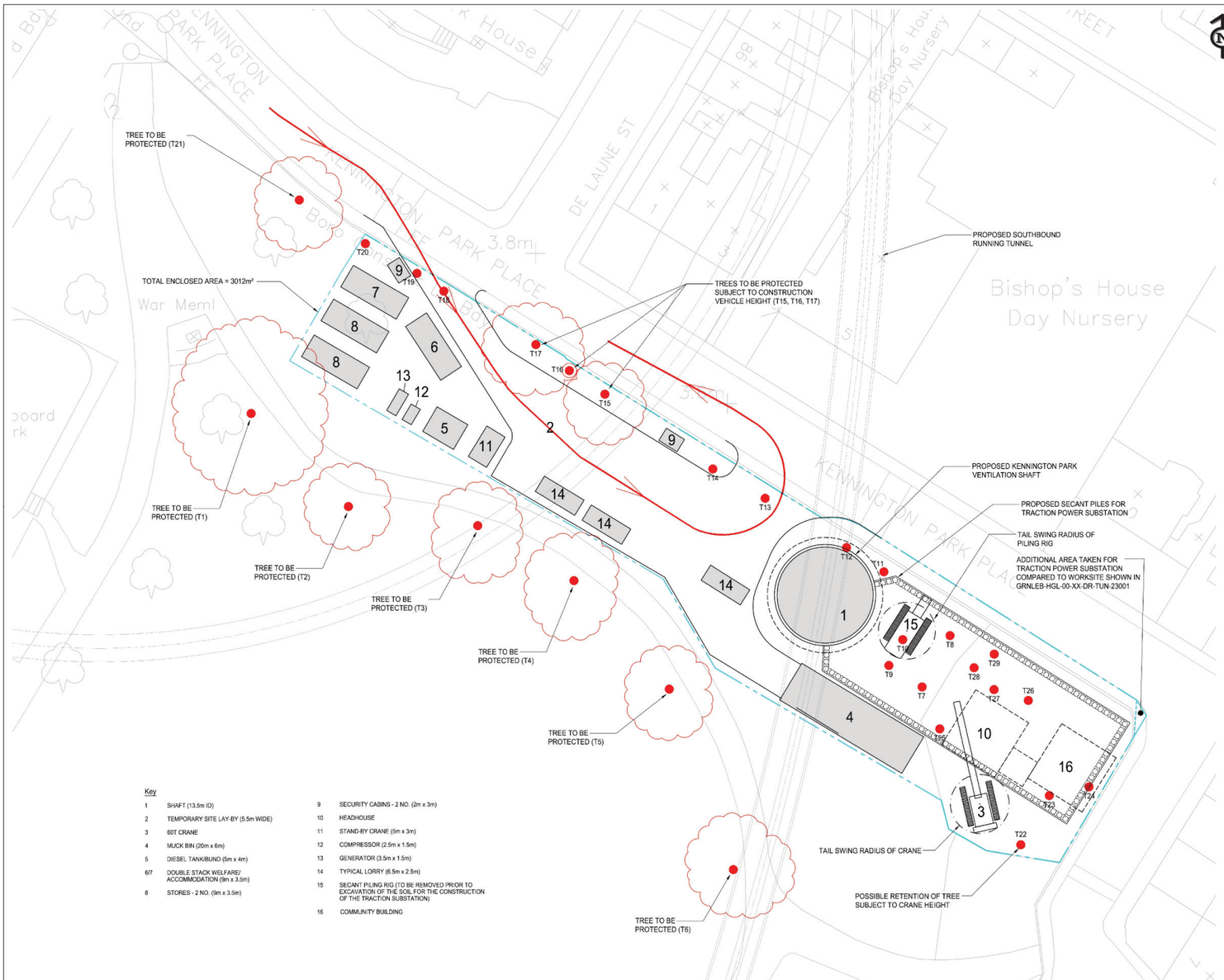
Project: NORTHERN LINE EXTENSION TO BATTERSEA TWAO FOR TfL

Drawing: RADCOT STREET TEMPORARY GROUTING SHAFT CONSTRUCTION WORKSITE NORTHBOUND

Suitability: S4	FORMAL ISSUE TO CLIENT		
Drawn by:	DT	Date:	24/03/2013
Checked by:	TW	Date:	24/03/2013
Approved by:	HW	Date:	24/03/2013
Drawing Scale: 1:250 @ A1			
Drawing Ref: GRNLEB-HGL-00-XX-DR-TUN-23030		Revision:	01
Drawing No: Figure J2			



Key

1	SHAFT (13.5m ID)	9	SECURITY CABINS - 2 NO. (2m x 3m)
2	TEMPORARY SITE LAY-BY (5.5m WIDE)	10	HEADHOUSE
3	60T CRANE	11	STAND-BY CRANE (5m x 3m)
4	MUCK BIN (20m x 6m)	12	COMPRESSOR (2.5m x 1.5m)
5	DIESEL TANK/BUND (5m x 4m)	13	GENERATOR (3.5m x 1.5m)
6/7	DOUBLE STACK WELFARE/ ACCOMMODATION (9m x 3.5m)	14	TYPICAL LORRY (6.5m x 2.5m)
8	STORES - 2 NO. (9m x 3.5m)	15	SECANT PILING RIG (TO BE REMOVED PRIOR TO EXCAVATION OF THE SOIL FOR THE CONSTRUCTION OF THE TRACTION SUBSTATION)
		16	COMMUNITY BUILDING

Location Plan

Notes:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
2. SITE HAS A MEDIUM TO LARGE 360° TRACKED EXCAVATOR TO LOAD MUCK LORRIES.

General Key:

- TREE
- TREE CANOPY SPREAD
- SITE ACCESS ROUTE
- 2.4m HIGH HOARDING

Client: Transport for London

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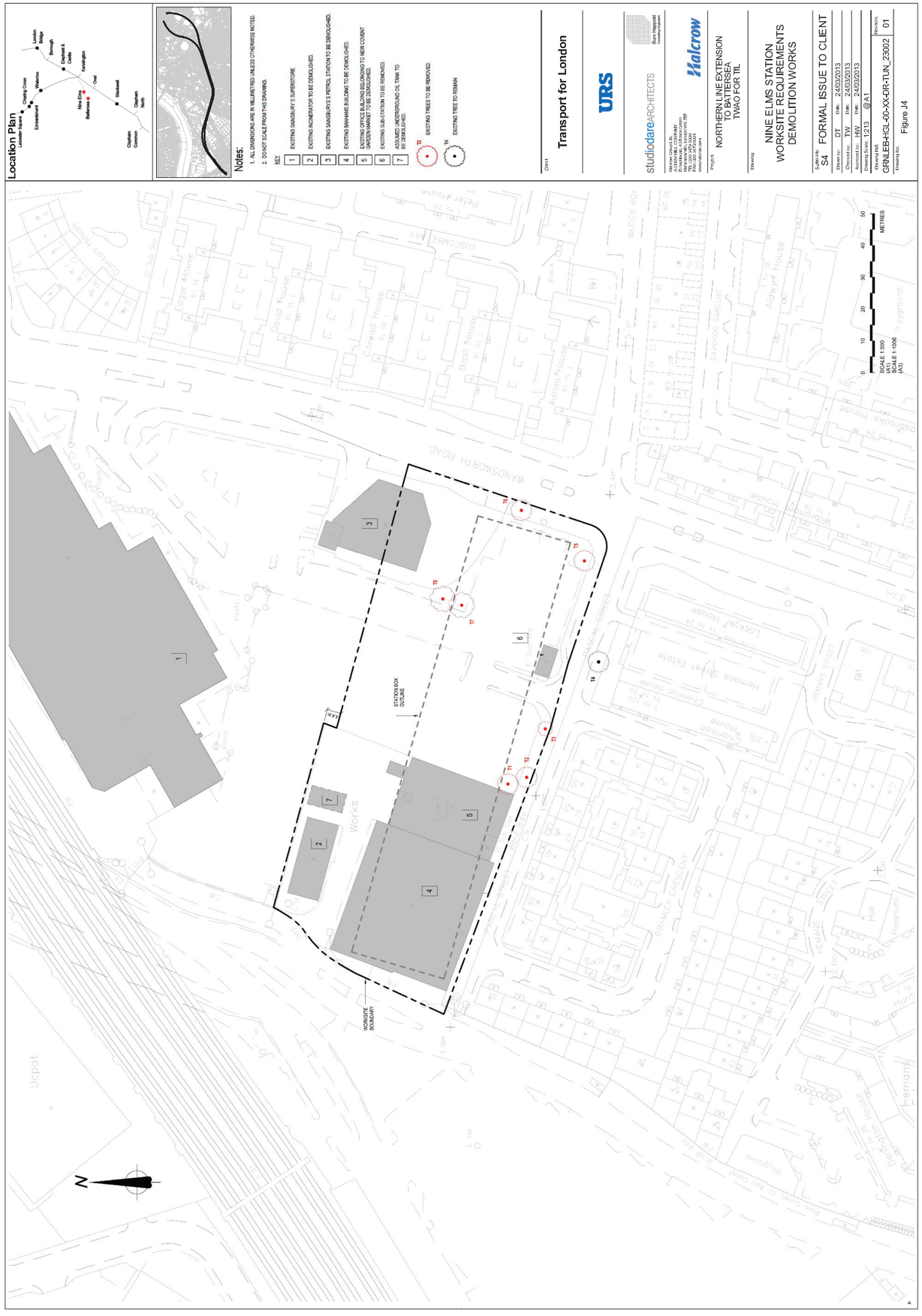
Project: NORTHERN LINE EXTENSION TO BATTERSEA TWAO FOR TfL

Drawing: KENNINGTON PARK TRACTION POWER SUBSTATION SHAFT CONSTRUCTION WORKSITE REQUIREMENTS

Suitability: S4	FORMAL ISSUE TO CLIENT		
Drawn by:	DT	Date:	24/03/2013
Checked by:	TW	Date:	24/03/2013
Approved by:	HW	Date:	24/03/2013
Drawing Scale: 1:250 @ A1			
Drawing Ref: GRNLEB-HGL-00-XX-DR-TUN_23002		Revision:	01
Drawing No: Figure J3			



9. APPENDICES

BS 5837:2012 Figure 1 *The design and construction process and tree care*

BS 5837:2012 Table 1 *cascade chart for tree quality assessment*

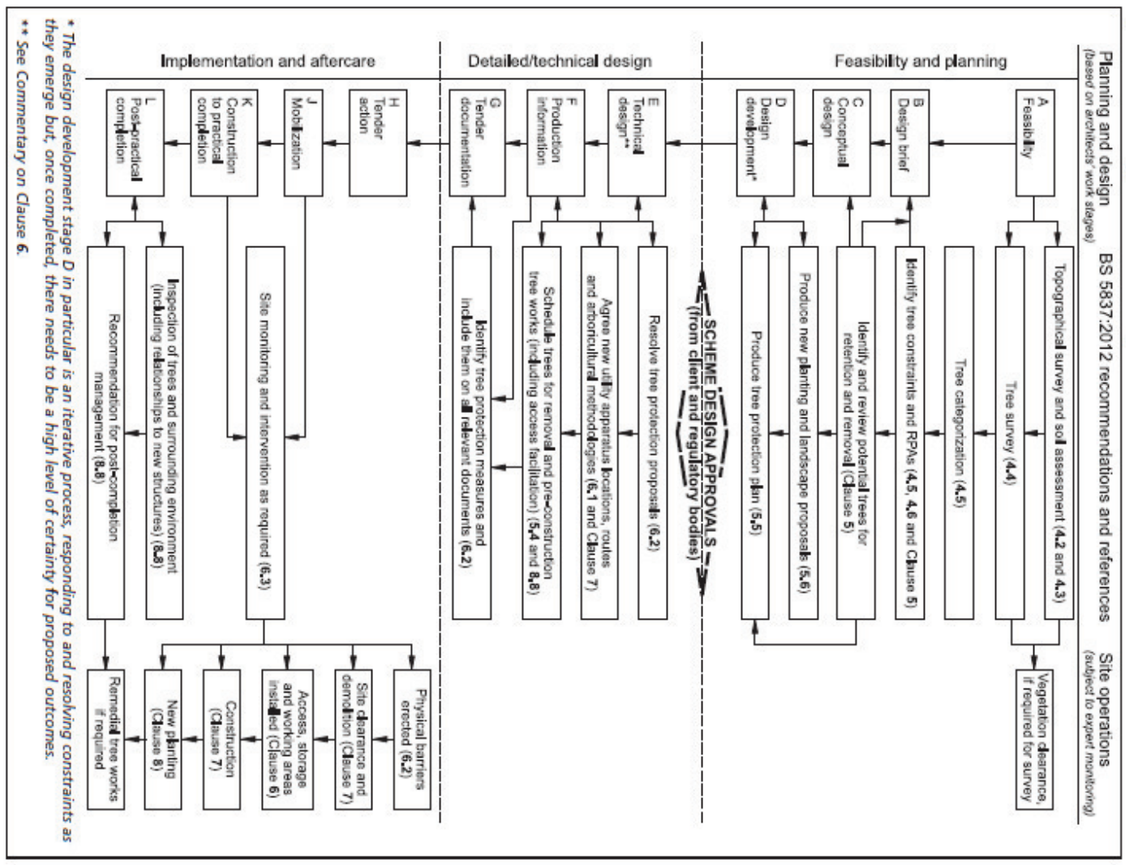
BS 5837:2012 Figure 2 *Default specification for protective barrier*

National Joint Utilities Guidelines 4 (NJUG4) *Summary sheet*

For all information relating to CAVAT, please visit the London Tree Officers Association website where methodology and the documents can be found:

http://www.ltoa.org.uk/resources/cavat

Figure 1 **The design and construction process and tree care**



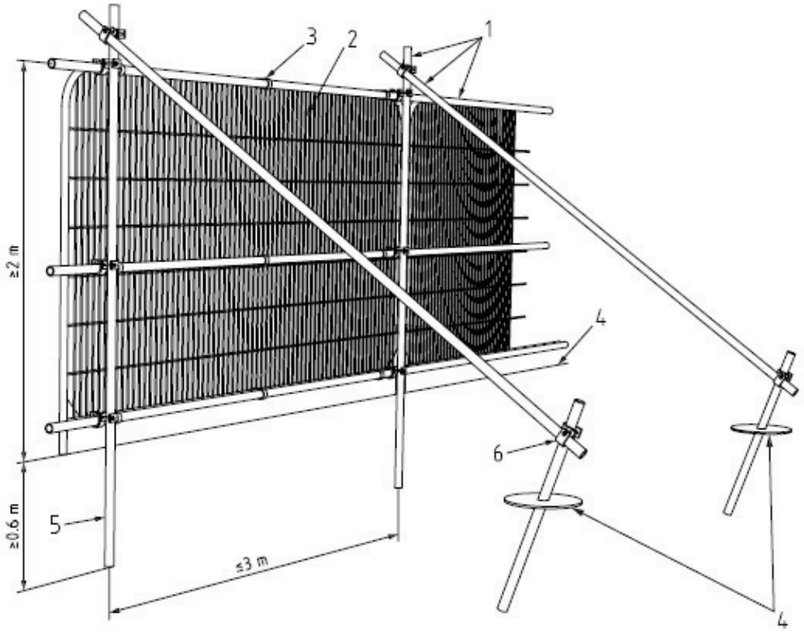
** The design development stage D in particular is an iterative process, responding to and resolving constraints as they emerge but, once completed, there needs to be a high level of certainty for proposed outcomes.*

*** See Commentary on Clause 6.*

Table 1 **Cascade chart for tree quality assessment**

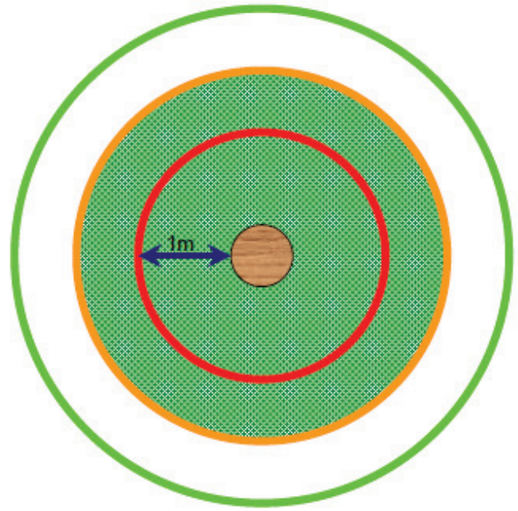
Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
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 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Figure 2 **Default specification for protective barrier**



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps



TREE PROTECTION ZONE

Key to Diagram

Trunk of Tree

Spread of canopy or branches

PROHIBITED ZONE – 1m from trunk. Excavations of any kind must not be undertaken within this zone unless full consultation with Local Authority Tree Officer is undertaken. Materials, plant and spoil must not be stored within this zone.

PRECAUTIONARY ZONE – 4 x tree circumference. Where excavations must be undertaken within this zone the use of mechanical excavation plant should be prohibited. Precautions should be undertaken to protect any exposed roots. Materials, plant and spoil should not be stored within this zone. Consult with Local Authority Tree Officer if in any doubt.

PERMITTED ZONE – outside of precautionary zone. Excavation works may be undertaken within this zone however caution must be applied and the use of mechanical plant limited. Any exposed roots should be protected.

DAMAGE TO TREES

Tree roots keep a tree healthy and upright. Most roots are found in the top 600mm of soil and often grow out further than the tree's height. The majority of these roots are very fine; even close to a tree few will be thicker than a pencil. Most street tree roots grow under the footway but may also extend under the carriageway. If roots are damaged the tree may suffer irreversible harm and eventually die.

PROTECTING ROOTS - DO'S and DON'TS

There are three designated zones around a tree each of which has its own criteria for working practices.

THE PROHIBITED ZONE

Don't excavate within this zone.

Don't use any form of mechanical plant within this zone

Don't store materials, plant or equipment within this zone.

Don't move plant or vehicles within this zone.

Don't lean materials against, or chain plant to, the trunk.

Do contact the local authority tree officer or owner of the tree if excavation within this zone is unavoidable.

Do protect any exposed roots uncovered within this zone with dry sacking.

Do backfill with a suitable inert granular and top soil material mix as soon as possible on completion of works.

Do notify the local authority tree officer or the tree's owner of any damage.

THE PRECAUTIONARY ZONE

Don't excavate with machinery. Where excavation is unavoidable within this zone excavate only by hand or use trenchless techniques.

Don't cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.

Don't repeatedly move / use heavy mechanical plant except on hard standing.

Don't store spoil or building material, including chemicals and fuels, within this zone.

Do prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.

Do backfill the trench with an inert granular material and top soil mix. Compact the backfill with care around the retained roots. On non highway sites backfill only with excavated soil.

Do protect any exposed roots with dry sacking ensuring this is removed before backfilling.

Do notify the local authority tree officer or the tree's owner of any damage.

THE PERMITTED ZONE

Don't cut roots over 25mm in diameter, unless advice has been sought from the local authority tree officer.

Do use caution if it is absolutely necessary to operate mechanical plant within this zone.

Do prune roots which have to be removed using a sharp tool (e.g. secateurs or handsaw). Make a clean cut and leave as small a wound as possible.

Do protect any exposed roots with dry sacking ensuring this is removed before backfilling.

Do notify the local authority tree officer or the tree's owner of any damage.

J3: Winter Bird Survey Report

Environmental Statement

Volume II

URS

Battersea Power Station Winter Bird Survey

Northern Line Extension

Prepared for:
Transport For London

UNITED KINGDOM & IRELAND

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1. INTRODUCTION

1.1 Brief and Scope

This Ecological Appraisal has been prepared by URS Infrastructure & Environment UK Limited (URS) on behalf of TfL (the Promoter) in support of a Transport and Works Act (TWA) application for the Northern Line Extension (NLE). This report describes the baseline ecological condition at Battersea station NLE site, hereafter referred to as the 'Site', in relation to wintering waterbirds. The Site is located in Battersea, London and centred on Ordnance Survey (OS) grid reference TQ 290 775.

The winter waterbird survey was carried out at low tide between November 2012 and March 2013 to assess the importance of the inter-tidal areas for wintering waterbirds.

1.2 Site Description

For the purposes of this report, the Site comprises a part of the Battersea station worksite (described in Chapter 4: Description of the NLE of ES Volume I). It includes brownfield land adjacent to the north of the Battersea Power Station (BPS) building. The Site also contains a length of river wall on the southern bank of the River Thames, an existing jetty and a small area of riverbed. As described in Chapter 14: Ecology of ES Volume I, the Site lies partly within the River Thames and Tidal Tributaries Sites of Metropolitan Importance for Nature Conservation (SMINC). The part of the River Thames that lies immediately adjacent to the Site includes small areas of mudflats which are exposed at low tide and may be used by foraging waterbirds.

1.3 Designated Sites

The survey area lies within the River Thames and Tidal Tributaries Sites of Metropolitan Importance for Nature Conservation (SMINC), which is valued as a wildlife corridor and for the variety of habitats it provides, including mudflats, shingle beach, inter-tidal vegetation and running water, which supports many valuable fish and bird species. The site is of particular importance to wildfowl and wading birds.

1.4 Conservation Status

1.4.1 *Schedule 1 Birds*

Wild birds are protected under *Section 1* of the *Wildlife and Countryside Act 1981* (as amended) (Ref. 1) and the *Countryside Rights of Way Act 2000* (Ref. 2) which make it an offence to;

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; and
- take or destroy an egg of any wild bird.

1.5 Birds of Conservation Concern

Leading governmental and non-governmental conservation organisations in the UK reviewed the population status of 247 bird species regularly found in Britain, and placed them onto one of three lists - red, amber or green. Although these listings offer no legal protection, they are meant to help guide conservation action for individual species.

Red List Species are species of high conservation concern. They are Globally Threatened according to International Union for the Conservation of Nature (IUCN) criteria, and include:

- those whose population or range has declined rapidly in recent years; and
- those that have declined historically and not shown a substantial recent recovery.

Amber List Species are species of medium conservation concern. They have an unfavourable conservation status in Europe, and include:

- those whose population or range has declined moderately in recent years;
- those whose population has declined historically but made a substantial recent recovery;
- rare breeders; and
- those with internationally important or localised populations.

Green List Species are the remaining species with stable or increasing populations and that are presently not of conservation concern.

1.6 United Kingdom Post-2010 Biodiversity Framework (2012)

In October 2010, 192 governments and the European Union agreed to take action to halt global declines of biodiversity. The resulting Strategic Plan for Biodiversity 2011-2020 (Ref. 3), with its five strategic goals and 20 new global 'Aichi' targets, sets a new global vision and direction.

The UK and Local Species Action Plans (SAPs) provide information and guidance for conservation for nearly 400 animal and plant species of conservation concern or priority status requiring national attention. At present there are UK SAPs for 59 species of birds.

2. METHODS

2.1 *Desk-Based Study*

A desk study was undertaken by URS in August 2008 to collect data on birds in this area. The desk study consisted of an ecological data search for information on statutory and non-statutory sites and species records held by the Geographic Information for Greater London (GIGL). The GIGL search area included the Site and land within a 2 kilometre (km) radius. Finally, the London Bird Report was referred to for information on the distribution of birds within London. The 2009 report was acquired (Ref. 4), which was the most recent available.

2.2 *Wintering Waterbird Survey*

2.2.1 *Equipment*

Surveys were conducted by experienced URS ornithologists using 20-60x magnification telescopes and 10 x 42 binoculars to identify birds.

2.2.2 *Field Survey Methodology*

Noise models predicted that noise generated by the works to dredge the river bed would attenuate to existing ambient levels (60dB L_{Aeq}) approximately 200m from the Site (Ref. 5). The area surveyed for waterbirds therefore focused on land within 200m

The wintering waterbird survey was conducted between November 2012 and March 2013. One visit to the Site was made each month within 1 hour of low tide. During each survey visit the surveyor recorded the species, number, and location of all waterbirds from the jetty at BPS. The survey area is presented on Figure 1 and included the mudflats on the north and south bank of the River Thames. All birds seen within the survey area were recorded. The weather conditions (including temperature) were also recorded during each survey (Table 1).

Figure 1: Wintering Waterbird Survey Area

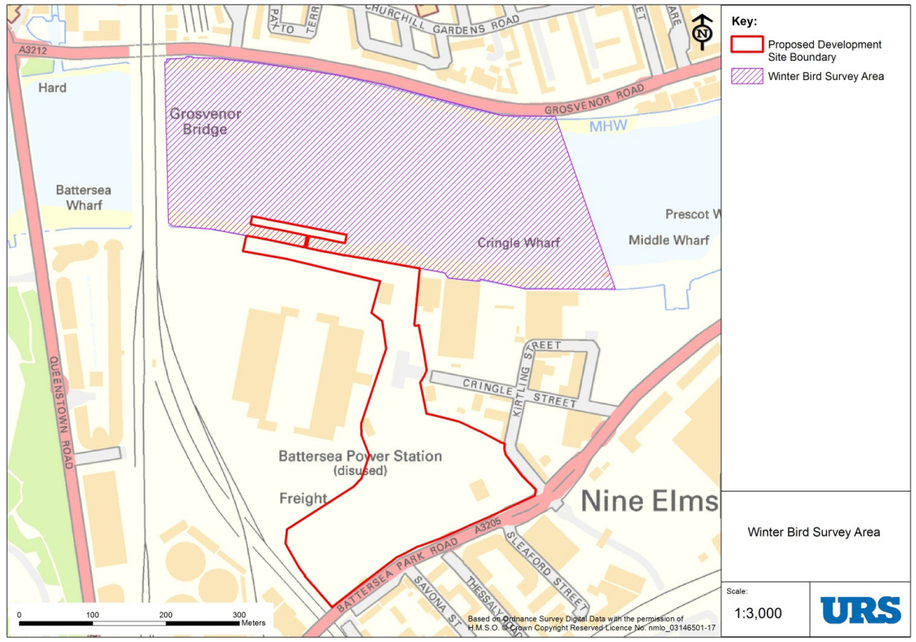

Table 1: Weather Conditions During Surveys

Date	Weather Conditions
22/11/12	80% cloud cover, dry, still, 12°C
13/12/12	100% cloud cover, light rain, still, 8°C
14/01/13	100% cloud cover, light rain, still, 3°C
20/02/13	20% cloud cover, dry, light breeze, 6°C

2.2.3 *Limitations*

It was not possible to survey birds to the west of Grosvenor Bridge as the bridge blocked the view from the site. However, the habitat that could be viewed is representative of this area and therefore the survey is considered sufficient to understand the baseline.

3. RESULTS

GIGL returned records of a large number of specially protected and notable bird species within 2km radius. These include a number of birds associated with the River Thames such as kingfisher *Alcedo atthis*, common tern *Sterna hirundo*, herring gull *Larus argentatus* and curlew *Numenius arquata*. Of these species only herring gull was recorded during the survey (Table 2).

Table 2: Monthly Counts of all Waterbirds

Species	Nov 12	Dec 12	Jan 13	Feb 13
Cormorant	1	3	2	24
Mallard		25	31	
Moorhen				3
Coot	1	2	6	2
Black-headed Gull	74	40	175	
Herring Gull				1
Lesser Black-backed Gull	1			

3.1 Accounts of Species Recorded in 2012/13 Waterbird Survey

The following species descriptions provide a summary of the URS WBS data along with the international, national and local context of the bird surveys. Thresholds of international and national importance, which have been taken from BTO figures (Ref. 6) state that a wetland is considered internationally important if it regularly holds at least 1% of the individuals in a population of one species or subspecies of waterbird, while Criterion 5 states that any site regularly supporting 20,000 or more waterbirds also qualifies. A wetland in Britain is considered nationally important if it regularly holds 1% or more of the estimated British population of one species or subspecies of waterbird. Any site regularly supporting at least this number of birds potentially qualifies for designation under national legislation, or the EC Birds Directive or Ramsar Convention. Where 1% of the national population is less than 50 birds, 50 is normally used as a minimum qualifying threshold for the designation of sites of national or international importance.

Information on the national status of birds has been collated from the RSPB website (Ref. 7). Information on the status of birds in London has been collated from the London Bird Report (Ref. 4).

3.1.1 *Cormorant Phalacrocorax carbo*

Conservation Status	Green
International Importance	1,200
National Importance	350
Peak Count at Site	24

Up to 24,200 cormorant winter in the UK and one site is considered of international importance for these birds; however, this does not lie within London. Cormorant are an increasing breeding resident and are common in winter in London and London supported a peak count of 1,050 individuals during the winter of 2009. The survey area is not a key site for cormorant in London. Cormorant were recorded during December, January, February and March during the winter 2012/13 with a peak count of 24 birds recorded in February.

3.1.2 *Moorhen Gallinula chloropus*

Conservation Status	Green
International Importance	20,000
National Importance	3,200
Peak Count at Site	3

Approximately 320,000 moorhen winter in the UK with no sites being considered of international importance. Moorhen are a very common resident in London. Moorhen were recorded on the site during February of the 2012/13 survey; three birds were recorded.

3.1.3 *Coot Fulica atra*

Conservation Status	Green
International Importance	17,500
National Importance	1,800
Peak Count at Site	5

Approximately 180,000 coot winter in the UK with no sites being considered of international importance. Coot is a very common winter visitor to London. Coot were recorded on the site during every month of the 2012/13 survey with a peak count of six birds recorded in January.

3.1.4 *Mallard Anas platyrhynchos*

Conservation Status	Amber
International Importance	20,000
National Importance	6,800
Peak Count at Site	31

Approximately 371,000 mallard winter in the UK with no sites being considered of international importance. Mallard is a very common resident bird in London with a maximum of 850 birds wintering in London in 2009. However, the survey area is not a key site for this species. Mallard were recorded on the sited during December, January, February and March of the 2012/13 survey with a peak count of thirty-one birds recorded in January.

3.1.5 *Black-headed Gull Chroicocephalus ridibundus*

Conservation Status	Amber
International Importance	20,000
National Importance	22,000
Peak Count at Site	40

Approximately 1,697,797 black-headed gull winter in the UK and there are several sites of international importance for this species in the UK; however none of these are within London. Black-headed gulls are a very common visitor and passage migrant in London; however, the survey area is not a key site within London. Black-headed gull were recorded every month between November and March during the 2012/13 survey. A peak count of 175 birds was recorded in January.

3.1.6 *Lesser Black-Backed Gull Larus fuscus*

Conservation Status	Amber, UKBAP, HBAP
International Importance	5,500
National Importance	1,200

Peak Count at Site	1

Approximately 120,000 lesser black-backed gulls winter in the UK and there are several sites of international importance for this species in the UK; however none of these sites are within London. Lesser black-backed gull are a common winter visitor in London. Lesser black-backed gull were recorded during November during the 2012/13 survey and only one bird was recorded.

3.1.7 *Herring Gull Larus argentatus*

Conservation Status	Red, UKBAP, HBAP
International Importance	5,900
National Importance	7,300
Peak Count at Site	1

Approximately 378,748 herring gull winter in the UK and there are several sites of international importance for this species in the UK; however none of these sites are within London. Herring gulls are a common winter visitor in London. Herring gulls were only recorded during February during the 2012/13 survey and only one bird was recorded.

4. SUMMARY AND CONCLUSIONS

Wintering waterbird data was collected for the winter bird core period of November 2012-February 2013. During this time all birds using the River Thames within 200m of the NLE works were recorded once a month at low tide.

The numbers and diversity of birds using the exposed mudflats was low. This is likely to be due largely to the very small areas of mudflats exposed at low tide. None of the birds recorded are considered wading birds, but rather the assemblage was dominated by mallard (dabbling duck), cormorant (diving bird) and black-headed gull (gull). More importantly, the survey area did not support any species that extract food from below the surface of the mud and this suggests that the mudflats here are not rich in the invertebrates that attract specialist wading birds. Furthermore, only moorhen was recorded foraging on the mudflats; the mallard, coot, gulls and cormorant were recorded swimming or roosting on the pontoons or jetty, and this reinforces the assertion that the mudflats do not provide an important food resource for wintering birds.

All of the birds recorded are widespread birds that are relatively common in the area. They are also generalist species that inhabit a range of habitats and, if displaced by the proposed development, are likely to find suitable habitat elsewhere. Furthermore, with the exception of moorhen, such birds are highly mobile in the winter and frequently move between sites to forage and roost. It is therefore unlikely that the works at the Site will have any impact on the fitness or populations of waterbirds.

The waterbirds using the Site are already habituated to high levels of disturbance in the form of human activity, noise and illumination generated by activities at the BPS. This is likely to reduce the impact of the scheme on waterbirds.

It is concluded that the NLE will have limited impacts on wintering waterbirds due to the low numbers of birds present, the types of birds and because the birds are somewhat habituated to the scheme. Whilst waterbirds are unlikely to use land adjacent to the Site during the construction phase, it is predicted that they will find alternative habitats nearby and return to the Site once disruptive works are complete.

See Chapter 15: Ecology of ES Volume I to view the impact assessment and recommendations.

5. REFERENCES

Ref. 1 Her Majesties Stationary Office (HMSO), (1981); 'Wildlife and Countryside Act 1981.'

Ref. 2 HMSO, (2000); 'Countryside and Rights of Way Act 2000.'

Ref. 3 Convention on Biological Diversity, (2010); 'Strategic Plan for Biodiversity 2011–2020.' Available at: http://www.cbd.int/decision/cop/?id=12268

Ref. 4 London Natural History Society (2012) 'London Bird Report: Number 74 for the Year 2009'

Ref. 5 URS (2013). 'Northern Line Extension Environmental Statement, Chapter 9 Noise'.

Ref. 6 www.bto.org/volunteer-surveys/webs/data/species-threshold-levels

Ref. 7 www.RSPB.org (accessed 05/03/12)

J4: LPWG Site Visit Report

Environmental Statement

Volume II

Date of Visit	Correspondence
24/03/08	As mentioned in earlier correspondence to Sarah and Brian all the signs point to the pair nesting on the East Wall centre nestbox having shown no interest in last years nest site on the tower. Obviously I cannot be 100% certain until I see a nest relief, which will show where they are nesting, over the last 7 years they have nested in 5 different locations. The Falcon (female) exited the centre nest box at dawn on Monday morning having roosted the night there so this is the likely nest site. They are very unpredictable and may be elsewhere, but I think this is unlikely going by behaviour, they were on the east wall and in and out of the nest box for near 2 hours. The only other place would be the nest box tower, as mentioned above I probably wont know for definite for a couple of weeks their exact position. Right now is a critical time and she may be incubating already, if not Friday or Saturday for the 1st egg. Any works on the east wall roof if she is in one of the nestboxes will create disturbance to them.
24/03/08	As it stands until I can locate them they could be in either of the 3 nest boxes, going by Bank Holiday Monday the middle is favourite, but until we know we are in the dark. There are no guarantees and Urban Peregrines are very unpredictable year by year in their choice of nest site and tend to move around quite a bit.
06/04/08	I managed to get an hour in before snow stopped play on Sunday and can confirm that she is in the Middle nest box. The Tiercel roosted the night in the southern nest box and exited at 6.04am with only light sleet coming down. He disappeared for an hour and the sleet had now became snow and eventually reappeared and flew straight to the centre nest box. Lots of chittering and the Falcon soon appeared beside him from inside the nest box and he then left and sat on the east wall. Couple of minutes went by and the Falcon then disappeared back inside the box so a safe bet that she is already incubating.
19/04/08	Saturdays visit - the male was roosting in the southern internal nestbox and showed at 6.22am, lots of calling before he alighted on the East Wall. The female appeared shortly after and flew to the inside of the Power Station, in all honesty I did not see where she came from but presumed it was the middle nestbox. The Tiercel (male) went up to the chimneys and started to hunt and it was very likely that the Falcon had a stashed kill inside. I walked round the perimeter and located a full adult Black Redstart on the west side, which promptly disappeared back inside the Power Station. Previous to this I had waited for the Falcon to return to the nestbox but went round the power station after 20-25 minutes, could not locate her inside looking through the windows so she must have gone back when I went for the walk. There was no calling from her inside to the Tiercel which she usually does if she is hungry so very likely had been feeding. 2 pair Linnet in grounds (Red List Species) and also 2 calling House Sparrows (London BAP species) near Dogs home, also Blackcap singing in corner.
26/04/08 and 05/05/08	On my last visit of April 26th I noticed that the Falcon did not seem to be incubating properly and was out of the nestbox for a long period. I was a bit concerned over this as in total she did not incubate for at least 2 hours 30 minutes. I visited again on Bank Holiday Monday and also found that she did not incubate at all for the duration of my visit, 3 hours. I find her

	behaviour very strange for a female at this time of year as all the other pairs I am watching have the Falcons sitting tight with the eggs about to hatch or have already done so. There may be a number of reasons why they may have failed or are laying very late. 1.The Falcon may have become too old to breed and is simply going through the motions despite multiple copulations (they were still copulating on April 26th.) 2.For some reason they are laying very late, weather etc. I find this very unlikely as all the other London birds have layed. 3.Is the clutch not complete and incubation proper has not started in full, again I find this very unlikely. 4.I have not seen birds off the eggs for this length of time before and also when she is out of the nestbox the Tiercel is not even attempting to try and incubate. Going by the behaviour of both birds it looks as if they are just going through the motions. He gave her a kill this morning and she spent the rest of the morning on all 3 nest boxes on the east wall just resting. As well as this, the Tiercel was in view most of the time and I know he did not incubate either as I was covering the nest boxes. I hope I am wrong on this and would like to visit again next weekend if ok to confirm one way or another whether or not they have failed. Also there are now 2 singing male Black Redstarts on site, again 1 singing on the east and 1 singing on the west side.
17/05/08/ 18/05/08	They may well have failed this year judging by their actions from last weekend. Although I did not see the Falcon, the Tiercel was on show and he was showing no territorial behaviour, which usually shows that they are breeding. I do not think she has laid late, she may be elsewhere but this is very unlikely, as I know she was incubating in the middle nestbox in early April. By this time they should have young that are around 2 to 3 weeks old with healthy appetites and should be constantly calling, there is always one adult guarding them, this does not seem to be happening at Battersea. I hope I am wrong and if ok I would like to visit once more this weekend to confirm this to make sure that they have failed. I know that you also had work planned for the east roof and that after the earlier meeting back in Spring you postponed the works, this was really appreciated by all. There is also the possibility if you agree to this that I could take an engineer up on to the east roof under licence (I have a Schedule 1 licence for Peregrines) to attach a laptop to the cables hanging down from the nest boxes to have a look inside the nest boxes with the internal CCTV. This will give us a definite answer, other than this, I will try and get a concrete answer this weekend if ok to visit. Now 2 male Black Redstarts on site, both males were fighting and a female was seen and it looks as if the immature male is already paired and breeding is about to commence. Very likely that there will be 2 pairs again.
31/05/08	I visited on Saturday and could see no sign of any young judging by the behaviour of the adults. By this time the young should be about 4 to 5 weeks old and ready to fledge in the next week or so. Despite the adults being in the vicinity of the East Wall, neither bird is now tied to it territorially, both birds were resting out of sight of the nest boxes. If there was young, 1 adult will always be on ' guard ' duty. Added to this a Crow flew quite close and was not attacked so very likely they have failed. Also seen was another female Peregrine soaring over the Power Station, hung around for about 30 minutes with resident pair going bananas but not driving her off. As well as this,

	there are a pair of Black Redstarts favouring the east side with another male singing Westside, have not seen a female over there as yet. Pair of Grey Wagtails seen taking food into the Power Station so probably feeding young and 2 pair of House Sparrows by the Dogs Home. It also looks as if there is a pair of Linnets, which may be breeding by the Dogs Home. 4 species of Butterfly on site.
N/A	I certainly have no objection to you commencing work. Thanks to everyone for postponing it even though they failed this year. The original idea of the nest boxes was to give options and to also contain them in one area, the danger may well be that if they are removed and the tower nestbox is ignored they may nest anywhere on the Power Station. The birds are tied to it and will not leave the site and will hold territory all year round. Urban Peregrines are very unpredictable and never seem to do anything straightforward.
06/07/08	Arrived on site on Sunday at 4.30am and located both birds roosting inside the Power Station viewing through the end windows. Both emerged at 5.40 so very likely had fed the day before. They like to pick the ferals off early as they leave the Power Station. Started to hunt in earnest at 6.00am. 1 feral was taken and stashed, also of interest over 200 ferals were seen to leave the site. Black Redstart singing on the East side but no sign of the west side bird seen earlier in the year. Red List species on site: Song Thrush - 1 House Sparrow - 6 in the corner by the Dogs Home Linnet 3 - feeding on the vegetated banks. Starling - a flock of around 50 feeding in the grass. Also seen as well were 2 small Bats as I arrived - most likely Pipistrelle.
27/09/08	Both Peregrines present as usual, could not see where they were roosting owing to thick fog, which did not clear until 10.00am. Heard them calling to each other at 9.00 and they both appeared around 9.40 ish. Tiercel flew straight to the nest box tower followed by the falcon that landed just below the box. The falcon stayed there for the duration of my visit whilst the male left to hunt. Very early days yet, pair bonding and house hunting will not start until Feb/March. If we intend to try and keep them on the nest box tower we will have to start thinking about closing up the 3 east wall nest boxes before Christmas if this is possible. There is no guarantee that they will go back to the tower in 2009 but it looks to be there first choice at the moment judging by behaviour patterns. A single Black Redstart was seen, an adult, juveniles look to have dispersed already, there is enough habitat and food to sustain them on site so the adult(s) may well winter. In the past they have wintered elsewhere and appeared on site around Feb/March. The fog had obviously interrupted migrant birds and forced some down into the grounds of the site, also recorded were - 14 Robins, 9 Dunnocks, 11 Meadow Pipits, 2 Chiffchaff, 3 Song Thrush, 15 Goldfinch's and 2 Yellow Wagtail to name but a few. The Robins were likely part of the national influx from the Continent, all were singing.

02/11/08	Dawn visit revealed male and female Peregrines roosting at either end of the Power Station with the female flying to the tower to feed on a stashed kill. The male commenced hunting from the chimney and was successful on his 4th hunt, which was a small Finch. No sign of any Black Redstarts so very likely moved or migrated to their winter habitat. Bob, I have collected the prey remains from Mike and have sifted through them and took out some prey and will send this off and we can see what there diet is. Most of the London birds diet is 90% Feral Pigeon, there's certainly enough of them on site.
23/12/08	Visited on the 23rd at dawn, both birds located at the north end roosting. The female was roosting on the girder work between the 2 chimney with the male emerging from the nestbox tower at 7.42. Female promptly disappeared inside and the male commenced to hunt. Going for Ferals leaving the Power Station and killed on his 4th sortie. Returned with feral which was then taken off him by the female who fed for the next 30 minutes before giving the kill over to the male again. This is usual as the females are dominant (frightening) After both birds had fed, both then flew to the nestbox tower where they remained until I left. They are showing an affinity to this quite early on so fingers crossed, also the fact that the male roosted inside it and drove off a Crow near it may show that he favours it at this early stage. Thanks for the info regarding the Black Redstart sighting, possibly a wintering bird, had a good look around but did not locate any.
01/02/09	A bitterly cold morning with both adult Peregrines roosting inside the Power Station at 7.20am and located looking through the windows. Both birds were on the girders tucked up against the brickwork. There was no attempt at hunting, so likely well fed from the afternoon before. Very quiet until 8.30am when another adult female Peregrine turned up and both birds went for the intruder. A good sign was that the resident female immediately flew to the nestbox tower as if in defence of a nest site before attacking the new female. This went on for about 2 minutes with all 3 birds drifting off south with the resident female driving off her opposite number more aggressively with lots of talon locking. This is normal in the Peregrine world as new birds will come in and see how strong the pairing and bond is as they pair for life. By this show it is a strong partnership and eventually both birds returned to the Power Station and landed inside again on the girders to rest, excitement over. Scoped them to make sure it was the same female and all the identifying marks were still there. With new partnerships it can take them up to 2 to 3 years before they get there act together and breed. Had a walk round the site and was pleased to locate a female/1st winter Black Redstart in the habitat of the north/west corner, hopefully this remaining habitat will be retained for the breeding season? Also of note was 94 Starlings seen to leave the roost inside the Jetty Cranes.
22/02/09	Can confirm after Sundays visit that the Peregrines are going to breed with copulation noted several times during the morning. Also that both birds are showing an affinity to the nestbox tower, in particular the female inspected it twice and remained perched on the lip for a good hour. The fact that she is showing an interest this early is good news, no other ledge or niche around the Power Station was looked at so looking good for the nestbox tower.

	Both birds pair hunting the ferals leaving the Power Station and eventually after 4 hunts a feral was taken by the male. Black Redstart again seen on the west side corner, looked like a 1st year male again, also 2 House Sparrows in the corner by the dogs home. All being well 1st eggs by the Peregrines should be around March 28th.
22/03/2009	A very productive visit with the Peregrines not even showing an interest in any other ledges, holes or niches on the Power Station. During my stay they were frequently in and out of the nestbox so I am more or less certain by their behaviour that this will be the nest site. All being well the 1st egg should be laid this Saturday or Sunday, if ok I would like to visit again this Sunday. Anything that the Tiercel sees as a threat is being attacked with Herring and Lesser Black Backed Gulls all being pursued and driven off and out of the Peregrines territory. Crows in particular were chased with 1 Crow being hit by the male and taking refuge on the jetty cranes. No male Black Redstarts singing as yet but did have a female on the vegetated bank on the west side along with 6 Linnets. Good job on the north facing ledges with the plywood, in doing this it has cut down there options along with the closed east side nestboxes.
29/03/2009	Am pleased to confirm that they are breeding again in the nestbox tower, probably have not laid the full clutch as yet. I arrived at dawn to see if there was a nest relief and was lucky enough to catch one at 6.38am. Tiercel flew straight to the nestbox with prey and the Falcon came out of the box to meet him and then flew off to the Power Station with the prey to feed. He incubated whilst she fed and she then returned to the nestbox at 6.55am and turfed him out to hunt. Eventually he killed again for himself after 4 hunts (feral pigeon), stashed this and then spent the rest of the morning seeing off Crows. No Black Redstarts seen and no males singing as yet but they should start singing any day now as I had a male singing last year on March 30th. It is also likely that a pair of Grey Wagtails (Amber List) are going to breed inside the Power Station with both birds seen entering and leaving throughout the morning. Starlings still using the Jetty Cranes to roost in with 34 seen to leave at dawn.
05/04/2009	It seems as if we have a new female Peregrine that has disrupted the pairs' breeding after noticing and photographing the new female on April 5th. Previous to this they had been settled and I observed a nest relief at dawn the weekend before when they had just begun to lay. At this time another female came in and seemed very determined before being seen off, in subsequent conversations with the security chaps they had noticed the same with 3 birds fighting above the Power Station during the week, so it seems as if this was a very determined female who was not going to give up.
12/04/2009	Last Sunday when I arrived at dawn, the Tiercel did not go anywhere near the nestbox, which was a surprise as they do like to incubate. Further to this, the Falcon (female) appeared from the inside of the Power Station and landed on the nestbox tower. I had an idea what had occurred and after taking lots of photo's compared them to previous and found that we have a new female Falcon. This is normal in the Peregrine world and seems to be happening a lot in London with birds trying to take over prime territories as the species continues to colonise London. They also showed their intention to breed straight away with copulation noted, so will hopefully be able to confirm soon if this is the case. Also seen and heard was a male Black Redstart, a 1st year male singing mainly at the

	southern end, it will be interesting to see if any full adults arrive and he is displaced which seems to happen quite often. 3 Linnets, pair of Grey Wagtails on site as well as 19 Starlings roosting in the jetty Cranes.
19/04/2009	The new female, it seems, has completely disrupted the nesting on the tower by seeing off the old female. Everything was going to plan with a nest relief observed on March 30th in the tower nestbox, having probably only laid one or 2 eggs by then. The new female is showing not the slightest interest in the tower and during the time I was there she stayed inside the Power Station. I observed copulation twice so they definitely intend to breed, although it will be late fledging if successful. Owing to the fact that she was inside and I know how it complicates matters if they decide to breed in the shell, I entered the Power Station and watched from the middle, hopefully this was ok due to the situation. Consequently I heard her calling from the southern end - west side wash tower and very soon the male flew inside and joined her also. It is a bit dark inside but I could hear them chirruping away but could not see them, presently both birds exited the wash tower and flew to the north end. Being a totally new bird she will have her own ideas about where she will nest and the wash tower may possibly be a nest site and she may have already found a ledge or niche. Alternatively it could be a prey stash site but I think this is unlikely, as they do not fear Crows, which will scavenge kills, therefore there is no reason for them to hide kills inside the wash tower. Hopefully I am wrong and they will use the nestbox tower, what ever happens it will be a late breeding. Going by the behaviour of both birds, it seems as if they favour the shell inside, she did not appear outside from dawn and she was still there when I left, an hour and a half later. For a new pairing I would have expected the male to be flying round looking at holes, etc. to try and encourage her, to get approval. The fact that they are not looking and emerged from the wash tower may signal that she may have already decided. I have attached a photo showing the wash tower where they entered, hopefully there is no work scheduled for that end? I will try and locate them as soon as possible by observing a nest relief or if the male takes a kill to her, that is the only way off locating them at this stage. Male Black Redstart singing on west side early a.m.
03/05/2009	Further to my last e- mails saying that we have a new female, I can confirm that the new pairing have laid eggs and are incubating on a ledge inside the Power Station at the southern end. I suspected that they were inside and at the southern end from last visits and this also means that to complete the breeding cycle they will go well into July due to the takeover. I know that the positioning of this is going to cause problems especially if the inside hoist cradles to both wash towers are needed, this will without doubt cause massive disturbance to them and likely cause desertion at this, the egg stage. Further to this, the passenger hoist on the exterior, if anyone goes up and walks round to the east facing side they will be likely looking down on the birds, this again will likely cause disturbance, they do not like people above them. Hopefully there is no scheduled works for these areas? I had no response from my last 2 updates indicating the new female and that they may be at the southern end so presumably they are ok at that end? Full adult male Black Redstart singing high up on eastern side with brief views of a female low down at dawn.

	Grey Wagtail breeding inside Power Station.
09/05/2009	All going well, with the birds with the female observed incubating after seeing a nest relief when she took over from the male. They seem to be exclusively hunting feral pigeons from the Power Station and he took one at his 2nd attempt. Over 250 ferals noted leaving the site and flying south. All being well fledging is likely to be around the 1st or 2nd week in July, they are roughly around a month late because of the takeover by the new female. Black Redstart male seen inside near the northern wash tower and a fledged family of Grey Wagtails seen also inside.
N/A	I have taken the 2nd week in July as an outside date, it is likely they could be much earlier not having known the dates the eggs were laid. If successful, as soon as I can see the young and age them, I can give you a much more accurate date for fledging. In regard to any works around the SW wash tower, it depends on whether they are internal or external, if it is to be internal I would say that it is just too close to the incubating bird. It is not only the incubating birds line of site to what they would see as a threat, it is the bird sitting on the girders inside on 'guard duty'. If they get stressed and nervous, this will be picked up by the incubating bird and may cause them too come off the eggs. Egg stage is always more delicate than young stage and the bond with eggs is never as strong as it is with young. Fledged young in London at the most will stay 3 months especially males who lose out to the bigger females in the pecking order, they are usually gone within 6 to 8 weeks of fledging.
23/05/2009	Having watched the Peregrines from dawn on Saturday till 7.30am it appears that they may have failed judging by both birds' behaviour. The Tiercel did not visit the nest ledge once for a nest relief or to call off the female with prey. During the course of the morning both birds were on show and perched on the north facing chimneys for over an hour, I would have expected 1 adult to be nearer. In the morning the Falcon appeared from the inside shell and I did not record where she came from; it could have been off the eggs or from a roost position. Prior to this I had watched the ledge through the scope and I did not detect any movement or the profile of an incubating bird. I think it is very likely that they have failed and to confirm this, if ok, on the morning of the meeting (Wednesday) I would like to visit at dawn again. Hopefully this will be convenient. Black Redstarts - whilst inside the shell I recorded no activity from either male or female but outside did have sightings on the east side, which the male seems to favour. In particular there is a window, which he enters and leaves by, in total it was 4 sightings through the same stretch of windows. It is possible that this might be an entrance to his nest site; I did not see the female so presume she is incubating. I am not sure what is beyond it, a room?
14/06/2009	Arrived at 5.45 and it appears that both birds were either roosting or resting on the nestbox tower with the Tiercel in the nest box. By their actions, no breeding behaviour was noted over a 2-hour period with the Tiercel spending most of the morning inside the Power Station and the Falcon sun bathing on the Tower. No hunting took place so they had either fed before arrival or the previous evening although the Falcon repeatedly called for food from the male, who promptly went into hiding inside. Can also confirm that the Black Redstarts have bred and have fledged a minimum of 3 young, which are well spread out inside and at the northern end by the Helipad. I have attached some rather poor photos of one of the juveniles; will hopefully get better ones in the future.

	I believe that the male may try to breed again as he has started to sing again fully so there may be the possibility of a 2nd brood. If this is the case it will most likely be in the old nest site again on the East side. The Peregrines have failed 2 years running, hopefully next year we can reverse this and I have a few ideas that may help in successful breeding. This year could not be foreseen with a new female taking over at the start of breeding. It was all going to plan then. New pairings rarely get it right first time and it can take up to 2 -3 breeding seasons before successful fledging. Good numbers of House Sparrows in the corner by the Dogs Home.
12/07/09	A very enjoyable visit with both male and female Peregrines hunting from the north chimneys as soon as I arrived at 5.30. In total there were 7 hunts with 2 ferals eventually taken but not before losing 2 others. On 2 of the hunts ferals were hit above Battersea Park Road by the Tiercel but he did not get a good enough purchase and both came down. One hit the roof of the new flats and the other narrowly missed the pub opposite. I also noticed that a couple of the residents in the new flats came out onto there balconies and were watching the birds hunt, must be quite a spectacle for them. On the feral front, 316 were seen to leave the Power Station from 5.30 to 6.45am. Both male and female Black Redstarts were seen with the male very briefly observed. The female was in the Dogs Home corner with a mixed species flock, ground feeding, very likely the largest I have had on site. No juvenile Black Redstarts seen, may well have dispersed already. House Sparrows - the largest flock so far, 21 Goldfinch - 12 including 4 juveniles Greenfinch - 9 Linnet - 2 As you may know House Sparrows are London BAP and Red List so colonies like these are quite important as they are disappearing from Inner London. Also, another fledged brood of Grey Wagtails seen at the north end with 34 Starlings roosting in the Jetty Cranes. Hopefully next year this new female Peregrine will be more bonded and settled and will successfully fledge young, as this is the 2nd year that they have failed. As mentioned before, new pairings can take time to get there act together, so we will see how they go next year.

J5: Applied Ecology Winter Bird Survey

Environmental Statement

Volume II

BATTERSEA POWER STATION
WINTER BIRD SURVEY 2008/09

Report for

URS Corporation Ltd

March 2009

Client: **URS Corporation Ltd.**

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APPENDIX 1 Inter-Tidal Bird Survey Data

1 INTRODUCTION

1.1 BACKGROUND

Applied Ecology Ltd (AEL) was appointed by URS Corporation Ltd to complete a series of six winter ornithological surveys (one per month between October 2008 and March 2009) of Battersea Power Station and the adjoining inter-tidal and open water habitats of the River Thames in order to assess potential development effects upon bird populations.

1.2 PLANNING POLICY STATEMENT 9

Biological and Geological Conservation

In May 1992, the UK and other European Union governments adopted legislation to protect Europe's most important habitats and species. The so called 'Habitats Directive' compliments the earlier 'Birds Directive' adopted in 1979 and at the heart of both Directives is the creation of a Europe-wide network of sites called Natura 2000. The Birds Directive requires the establishment of Special Protection Areas (SPAs) of ornithological importance, and the Habitats Directive requires Special Areas of Conservation (SACs) to be designated for other animal species, and habitats. Together, both SPAs and SACs make up the Natura 2000 series.

The Habitats Directive was adopted into national legislation in 1994 in the form of the Habitats Regulations. In the UK, all terrestrial Natura 2000 sites are already notified Sites of Special Scientific Interest (SSSIs). The Habitats Regulations put in place statutory mechanisms for designating and managing UK marine SACs which host marine habitats and species of European importance.

The Wildlife and Countryside Act 1981 (as amended) provides the main legal framework for nature conservation and species protection in the UK. The Conservation (Natural Habitats, etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000, provide supplementary protected species legislation. Specific protection for Badgers is provided by the Protection of Badgers Act 1992.

National Planning Guidance

Planning Policy Statement 9: Biodiversity and Geological Conservation August 2005 sets out Government's national planning policy on protection of biodiversity and geological conservation through the planning system and replaces *Planning Policy*

Guidance Note 9 (PPG 9) on nature conservation published in October 2004. In the context of PPS 9, biodiversity is taken to mean the variety of life in all its forms as discussed in the *UK Biodiversity Action Plan*[1].

The key principals of PPS 9 with respect to biodiversity which should be adhered to by regional planning bodies and local planning authorities in the context of development planning are as follows:

I. Development plan policies and planning decisions should be based upon up-to-date information about the environmental characteristics of their areas. These characteristics should include the relevant biodiversity resources of the area. In reviewing environmental characteristics, local authorities should assess the potential to sustain and enhance those resources.

II. Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity interests within the wider environment.

III. Plan policies on the form and location of development should take a strategic approach to the conservation, enhancement and restoration of biodiversity, and recognise the contribution that sites, areas and features, both individually and in combination, make to conserving those resources.

IV. Plan policies should promote opportunities for the incorporation of beneficial biodiversity within the design of development.

V. Development proposals where the principal objective is to conserve or enhance biodiversity interests should be permitted.

VI. The aim of the planning decisions should be to prevent harm to biodiversity interests. Where granting planning permission would result in significant harm to those interests, local planning authorities will need to be satisfied that the development cannot reasonably be located on any alternative sites that would result in less or no harm. In the absence of any such alternatives, local planning authorities should ensure that, before planning permission is granted, adequate mitigation measures are put in place. Where a planning decision would result in significant harm to biodiversity interests which cannot be prevented or adequately mitigated against, appropriate compensation measures should be sought. If that significant harm cannot be prevented, adequately mitigated against or compensated for, then planning permission should be refused.

[1] *Biodiversity: The UK Action Plan* published in 1994 – HMSO Cm 2428.

1.3 BIRD LEGISLATION

All UK species of wild bird and their nests and eggs are protected by law (for the whole or part of the year) by the Wildlife and Countryside Act, 1981 (as amended and strengthened by the Countryside and Rights of Way (CROW) Act, 2000). This makes it an offence, with certain exceptions, to intentionally or recklessly kill, injure or take any wild bird, and take, damage or destroy the nest of any wild bird while it is in use or being built. Some bird species with high individual levels of conservation importance are protected at all times under Schedule 1 of the 1981 Act.

The population status of birds regularly found in the UK, Channel Islands and the Isle of Man is reviewed every five years to provide an up-to-date assessment of conservation priorities[2]. A total of 247 species has been assessed and placed onto one of three lists of Conservation Concern – Red, Amber or Green. Forty species are Red-listed, 121 are Amber-listed and 86 are Green-listed.

Seven quantitative criteria are used to assess the population status of each species and to place it on the Red, Amber or Green list. These were: global conservation status, recent decline, historical decline, European conservation status, rare breeders, localised species and international importance.

Red-list species are those that are Globally Threatened according to the IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery.

Amber-list species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations.

Green-list species are those that do not fulfil any of the Red- or Amber-list criteria and they are not considered further here.

[2] Gregory, R D; Wilkinson, N I; Noble, D G; Robinson, J A; Brown, A F; Hughes, J; Procter, D A; Gibbons, D W and Galbraith, C A (2002) *The Population Status of Birds in the United Kingdom, Channel Islands and Isle of Man: an Analysis of Conservation Concern 2002-2007*. British Birds 95: 410-450

1.4 BLACK REDSTART AND PEREGRINE FALCON LEGISLATION

In the UK both Black Redstart and Peregrine Falcon are afforded full protection as Schedule 1 breeding species under the Wildlife and Countryside Act, 1981. They are also Amber-listed species of conservation concern[3] and listed on Appendix II of the Berne Convention on the Conservation of European Wildlife and Natural Habitats, 1979.

[3] Gregory, R D; Wilkinson, N I; Noble, D G; Robinson, J A; Brown, A F; Hughes, J; Procter, D A; Gibbons, D W and Galbraith, C A (2002) The Population Status of Birds in the United Kingdom, Channel Islands and Isle of Man: an Analysis of Conservation Concern 2002-2007. British Birds 95: 410-450

2 EXISTING INFORMATION

2.1 PROTECTED SITES

Waterbird and Wetland Conservation

Special Protection Areas (SPAs)

Special Protection Areas are strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds, also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species.

Ramsar Sites

The text of the Ramsar Convention (Article 2.2) states that "Wetlands should be selected for the List on account of their international significance in terms of ecology, botany, zoology, limnology or hydrology" and indicates that "in the first instance, wetlands of international importance to waterfowl at any season should be included".

The specific criteria based on waterbirds are Criteria's 5 and 6:

- Criteria 5 – a wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds.
- Criteria 6 - a wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

The survey area is not part of any conservation site (either statutory or non-statutory). The nearest sites designated for waterbird interest are 'South West London Waterbodies' (located approximately 25 km to the west), and the 'Thames Estuary and Marshes' (located approximately 50 km to the east and containing part of the north coast of Kent and part of the southern coast of Essex, straddling the Thames Estuary), both of which have been designated as Special Protection Areas and Ramsar sites. South West London Waterbodies SPA supports large overwintering populations of Shoveler and Gadwall. The Thames Estuary and Marshes SPA and Ramsar site supports important wintering populations of Shelduck, Gadwall, Shoveler, Water Rail, Avocet, Spotted Redshank, Grey Plover,

Knot, Dunlin and Common Redshank.

2.2 PREVIOUS SURVEY INFORMATION

Riverine Bird Survey 2003/04

A winter bird survey undertaken in relation to the development of Battersea Power Station was carried out in 2003/04 by an independent bird surveyor on behalf of Parkview International London Plc and in conjunction with Nicholas Pearson Associates[4]. The survey area comprised the River Thames and all sections of inter-tidal habitat from immediately west of Chelsea Bridge to immediately east of Vauxhall Bridge i.e. incorporating the area surveyed by AEL.

The following general conclusions from this survey were given as follows:

- The study area is 'significant in Inner London as a feeding area (and daytime roost) for Cormorants, gull species and Mallards.'
- No overnight roosts of gulls or Cormorants were present.
- The power station development will 'probably' have a slight adverse impact upon feeding areas.
- 'The main impact of the development would appear to be the impact on daytime roosts'

Non-Riverine Bird Survey Autumn/Winter 2003

In addition, four surveys were made of land-birds on the Power Station site between September and December 2003. A total of 14 species were recorded: Kestrel (Amber-listed species of conservation concern), Woodpigeon, Feral Pigeon, Meadow Pipit (Amber-list), Pied Wagtail, Grey Wagtail (Amber-list), Robin, Wren, Blackbird, Magpie, Carrion Crow, Starling (Red-listed species of conservation concern), Magpie, House Sparrow (Red-list) and Linnet (Red-list).

[4] Morgan, K. (2004). River Thames Bird Survey – Main Report relating to the Battersea Power Station Development (Summary of results of Riverine Bird Survey Winter 2003 and Non-Riverine Summary of Results of Monitoring September to December 2003). Parkview International London Plc/Nicholas Pearson Associates.

3 SURVEY APPROACH

3.1 INTER-TIDAL BIRD SURVEY AREA

Battersea Power Station is situated on the south bank of the River Thames between Grosvenor Bridge and Vauxhall Bridge.

All parts of the river and its associated foreshore between Chelsea Bridge (to the west) and Westminster Boat House (to the east) were surveyed for wintering birds. The vantage point was positioned on the derelict crane wharf and was chosen to enable effective survey of the area that may be adversely affected by the development immediately fronting Battersea Power Station, as well as to maximise views of the wider inter-tidal area (**Figure 1.**).

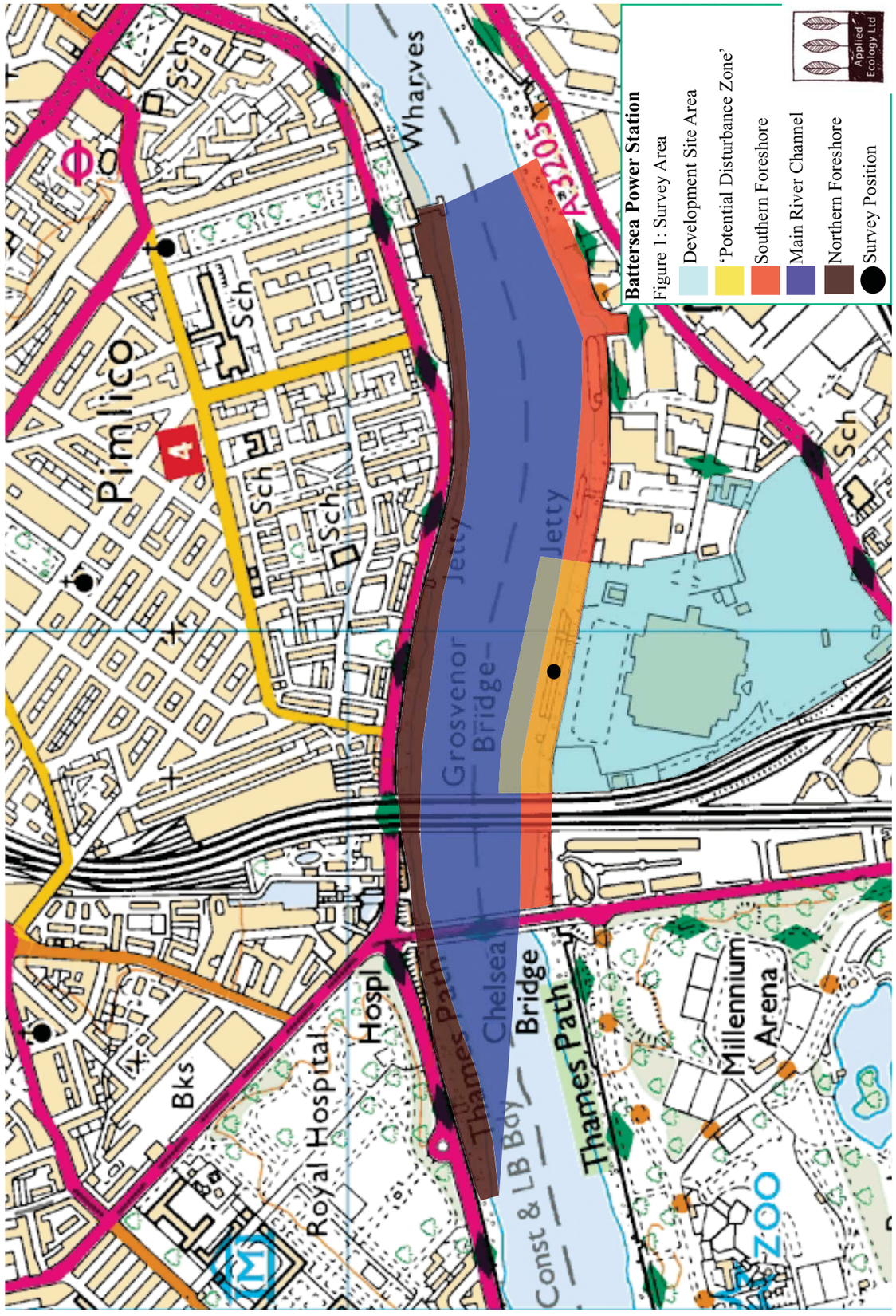
Table 1: River Thames Survey Information

Date	Time of Survey	High Tide	Low Tide	Weather
28 Oct 2008	09.31 – 15.00	14.33	09.31	10-65% cloud cover, sunny, 7° celsius, 1.5 m/s NW wind. No rain
21 Nov 2008	08.18 – 16.00	08.18	15.41	40-80% cloud cover, 4° celsius, 3 m/s NW wind. No rain
10 Dec 2008	10.35 – 17.25	10.35	17.15	0-90% cloud cover, 3° celsius, 1.5 m/s northerly wind. No rain
14 Jan 2009	10.40 – 16.30	16.16	10.41	100-10% cloud cover (foggy at start), 3° Celsius, 1 m/s westerly wind. No rain
11 Feb 2009	09.40 – 15.30	15.12	09.40	10-100% cloud cover; 2° Celsius, 0.5 m/s NW wind. No rain
6 Mar 2009	08.26 – 14.50	08.26	14.27	0-90% cloud cover; 7°Celsius, 0.5 m/s NW wind. No rain

The entire survey area was divided up into three survey sections (as delineated at low tide and shown by **Figure 1.**): Southern Foreshore, Northern Foreshore, and Main River Channel/Open Water. The survey area is 35.58 hectares in total area, comprised at low tide of Southern Foreshore: 6.67 ha; Northern Foreshore: 3.51 ha; and, Main River Channel/Open Water: 25.40 ha.

Counts of birds in each survey area were made using binoculars and a tripod-mounted telescope approximately every hour either following low tide until the tide had fully flooded, or from high tide until low water (a total of six or seven counts each survey).

Many bird species will feed at night, particularly those that forage in inter-tidal



habitats, as optimal feeding times for many waterbird species correspond with the position of the tide. The previous surveys undertaken in 2003/04 found extremely limited bird activity along this stretch of the River Thames during hours of darkness. Only Grey Heron, Mallard, Coot, Pintail and Tufted Duck were present at night in numbers comparable to numbers present during daylight hours. Very small numbers of Moorhen, Common Gull, Black-headed Gull, Herring Gull and Lesser Black-backed Gull were also recorded on occasion. Significantly, no overnight roosts of any species were recorded during these surveys.

Due to the lack of nocturnal activity encountered during the surveys in 2003/04 it was considered that only one of the six surveys undertaken for the present study should incorporate counts made during hours of darkness; these were the final two counts of the December survey.

Potential Disturbance Zone

The development site is located immediately to the south of the Southern Foreshore survey section (see **Figure 1**) and any disturbance effects associated with the re-development of Battersea Power Station are most likely to impact this area. With this in mind close attention was given to birds utilising the area of foreshore and open water directly fronting the development site, the 'Potential Disturbance Zone (PDZ)'. This area, at 3.76 hectares, represents 10.6% of the total survey area (35.58 hectares). At low tide, the habitats present within the PDZ consist of sand/silt and patches of small stones/cobbles, thus representing the best wading bird feeding habitat within the total survey area (see below).

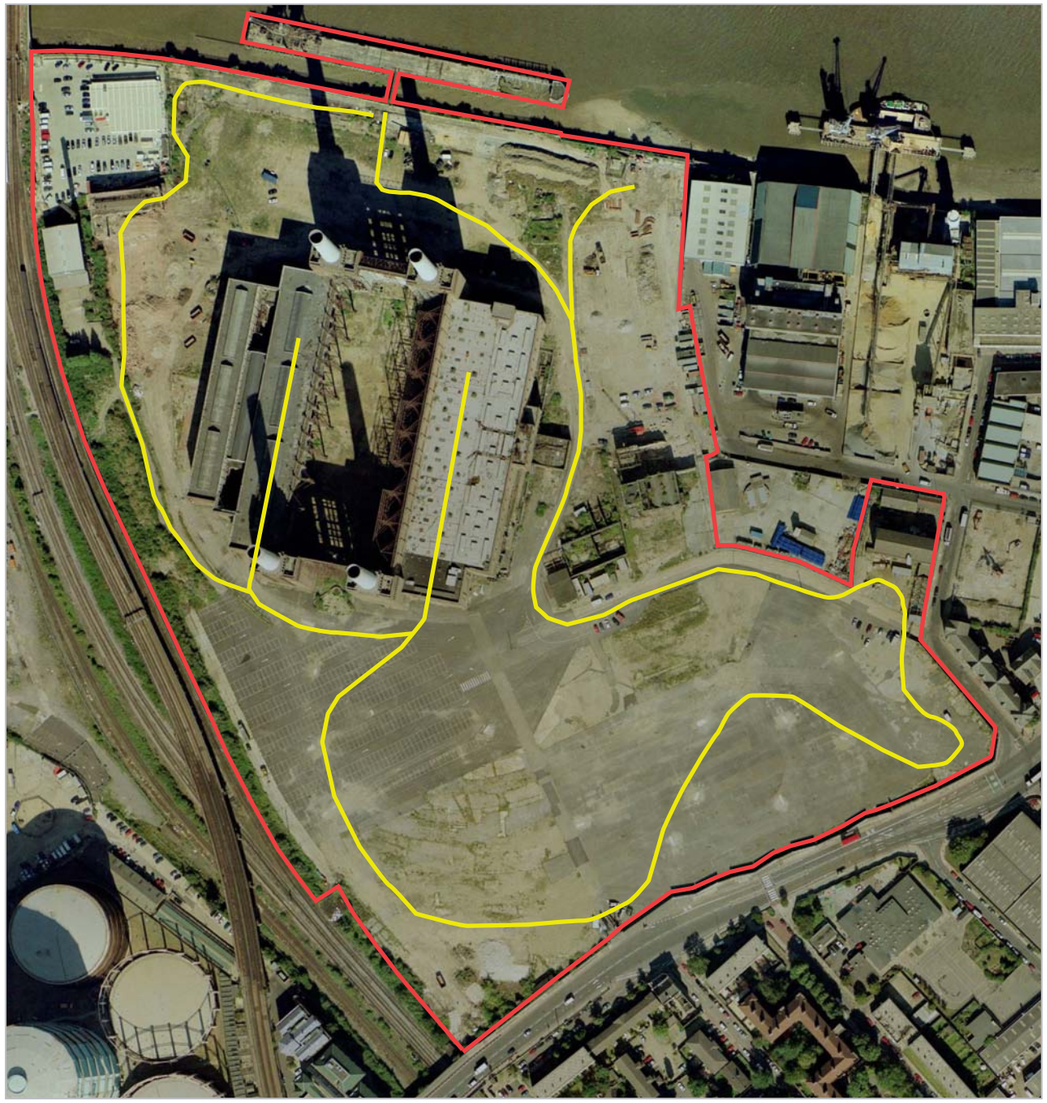
All potential sources of disturbance to the bird populations occupying the total survey area were noted in order to gauge current levels of anthropogenic disturbance.

Inter-tidal Habitats

As detailed previously, the predominant inter-tidal habitat type present within the PDZ is sand/slit, created through the deposition of fine sediment around the derelict crane wharf. The Southern Foreshore (including the eastern- and western-most sections of the PDZ becomes stonier either side of the wharf with larger cobbles and rocks present at both the eastern and western ends of this section. The Northern Foreshore is composed of cobbles/stones with small, scattered patches of larger rocks, particularly near Westminster Boat House.

3.2 LAND BIRD SURVEY AREA

The wintering bird surveys of the site completed to date have been undertaken using a modified version of the British Trust for Ornithology's (BTO) Common Bird Census (CBC). A fixed transect route, incorporating all habitat types present and approaching all points within the site to a maximum of approximately 30 metres, was walked twice (3 hours apart) during each visit (**Figure 2.**).



Key:

Site Boundary

Survey Route

Battersea Power Station
Figure 2: Winter 2008 Land Bird Survey Transect Route

4 SURVEY RESULTS

4.1 INTER-TIDAL BIRDS

A total of 18 bird species were recorded utilising the inter-tidal and open water sections of the River Thames as shown by **Table 1**.

Table 1. Bird species recorded along River Thames (Total Survey Area - Southern Foreshore, Northern Foreshore and Main River Channel)

Species (British vernacular name[5])/Date	28 Oct 2008	21 Nov 2008	10 Dec 2008	14 Jan 2009	11 Feb 2009	6 Mar 2009
	Peak count within total survey area	Peak count within total survey area	Peak count within total survey area	Peak count within total survey area	Peak count within total survey area	Peak count within total survey area
Mute Swan	-	-	2	1	1	-
Greylag Goose	2	-	-	-	-	-
Canada Goose	-	-	-	-	2	6
Teal	-	-	-	1	-	-
Mallard	23	30	55	27	4	19
Great Crested Grebe	-	-	2	1	-	-
Cormorant	16	24	58	31	12	176
Grey Heron	1	2	1	-	-	3
Moorhen	4	6	3	3	3	4
Coot	-	-	-	4	2	4
Black-headed Gull	212	159	103	122	164	179
Common Gull	7	19	12	11	18	15
Yellow-legged Gull	1	-	-	-	1	-
Herring Gull	2	12	1	4	7	6
Lesser Black-backed Gull	3	8	3	3	6	12
Great Black-backed Gull	1	2	-	1	2	2
Feral Pigeon	27	59	112	24	73	113
Carrion Crow	15	63	69	43	49	60

Potential Disturbance Zone

The majority of birds noted in this zone were individuals day-roosting/loafing mainly at high tide, but also throughout the tidal cycle, on the derelict crane wharf and adjacent jetty that fronts Battersea Power Station (**Tables 2a & 2b.**). The most notable record was of a peak of 57 Cormorants day-roosting at high tide during the December survey. The jetty was also the preferred high tide day-roosting location within the entire survey area for gulls. The peak count of day-roosting Black-headed Gulls was 161. Small numbers of Common Gull, Yellow-legged Gull, Herring Gull, Lesser Black-backed Gull and Great Black-backed Gull were also recorded in this location.

The predominant habitat in this zone is sand/silt around the wharf, representing the best wader habitat within the entire survey area; however, wader species that utilise inter-tidal habitats occur only very rarely this far upriver in Inner London[6]. Just ten species were noted feeding at low tide (in very low numbers – maximum counts in parenthesis) on the inter-tidal sand/silt and stones/cobbles in this zone – Mallard (7), Grey Heron (1), Moorhen (4), Black-headed Gull (23), Common Gull (2), Yellow-legged Gull (1), Herring Gull (2), Lesser Black-backed Gull (2), Feral Pigeon (7) and Carrion Crow (2).

Seven species were noted on the open water, usually at high tide, within this zone and comprised a single Great Crested Grebe and a pair of Mute Swans during the December survey, a single Teal and two Coots in January, a pair of Canada Geese in March, as well as small numbers of Black-headed Gulls and Moorhens throughout.

The only notable single species counts were of Black-headed Gull and Cormorant (discussed below). Although in regional, national or international contexts these counts are insignificant and not of conservation importance, at a local scale the two counts listed above for Cormorant are considered notable.

No bird species for which the nearby Thames Estuary and Marshes Special Protection Area (SPA) holds important wintering populations were recorded.

The final two counts of the December survey, undertaken in hours of darkness, saw very little activity within this zone or in the survey area as a whole. All day-roosting/feeding Cormorants were seen to fly west upriver prior to or at dusk, presumably to night-roost in Battersea Park. Three foraging Mallards, two Moorhens and a single Grey Heron were the only birds noted in this zone during the hours of darkness. A single Great Crested Grebe, in the main river channel, was the only other bird recorded during these two counts.

[5] www.bou.org.uk (The British List - official list of bird species recorded in Great Britain)

[6] Self, A.S.M. (eds.) (2008). The London Bird Report 2005 (No.70). London Natural History Society.

Black-headed Gull

In the latest edition of the previously referred to London Bird Report 2005, the status of this species is described as a "very common winter visitor and passage migrant, occasional breeder".

Black-headed Gull is an amber-listed species of conservation concern. The peak count of 179 Black-headed Gulls represents <0.01% of the total Great Britain wintering population of 2,155,147 individuals[7] and is insignificant in comparison to single roost gatherings on inland reservoirs, for example, which can number tens of thousands of birds[8]. Locally, LBR 2005 lists the following example counts from its recording area: 21,900 Rainham Marshes, 13 February 2005; 9,159 Beddington Sewage Farm, January 2005; 12,000 Hilfield Park Reservoir, 31 December 2005.

The survey of the River Thames adjacent to Battersea Power Station undertaken in 2003/04 found peak numbers (c740 individuals) of this species present just to the west of the survey area.

Cormorant

LBR 2005 describes the status of this species as an "increasing breeding resident and common elsewhere, especially in winter".

There were two notable counts of Cormorant recorded during the current survey: a peak of 57 individuals day-roosting on the power station derelict crane wharf at high tide in December; a fishing flock comprising 152 birds just west of Chelsea Bridge (outside of PDZ) in March.

This species is not subject to any elevated conservation status, and no English wintering sites of this species regularly support numbers of international importance (currently 1,200 or more birds). Substantial numbers of Cormorants do occur inland in south-east England in winter and these figures help to put the counts of 57 and 152 birds into perspective: for example Abberton Reservoir (Essex), Haningfield Reservoir (Essex), Queen Mary Reservoir (London) and Walthamstow Reservoir (London) regularly supported peaks of over 400 birds between 1995/96 and 1999/00. A total of eight sites in the London area currently support Cormorant numbers of national importance (1% of national population (230 individuals) -the most recent

[7] Banks, A.N, Burton, N.H.K, Calladine, J.R. & Austin, G.E. (2007). Winter Gulls in the UK: population estimates from the 2003/04 Winter Gull Roost Survey. BTO Research Report No.456.
[8] Brown, A. & Grice, P. (2005). Birds in England. *English Natur*e.

estimate of the British wintering population is 23,000 individuals[9]). The maximum count of this species in the total survey area was 176 individuals.

The peak count made during the 2003/04 surveys was of 41, indicating an increase in numbers in recent years which follows the general trend experienced throughout UK inland waters[10].

In addition, a half-built nest, probably attributable to Cormorant was noted atop the derelict crane wharf in March. A single Cormorant was day-roosting/loafing next to this nest during the March survey but no nest-building was observed.

Disturbance

All of the birds in this zone appeared to be relatively habituated to the presence of low-level anthropogenic disturbance. Only a small percentage of birds roosting/loafing on the derelict crane wharf and adjacent jetty were disturbed by the surveyor when he walked to the vantage point, and it was noted that activities on site (including small-scale construction work and vehicle movements) did not disturb these birds in any way. Boat traffic on the river was regular and it is presumed that the birds present in the area will be used to this activity; indeed, the vast majority of roosting/loafing birds were not disturbed by movements of boat traffic.

[9] Kershaw, M. & Cranswick, P.A. (2003). Numbers of wintering waterbirds in Great Britain, 1994/95-1998/99. *Biological Conservation*, III: 91-104.
[10] Newson, S.E., Ekins, G.R., Marchant, J.H., Rehfisch, M.M. & Sellers, R.M. (2006).The status of inland and coastal breeding Great Cormorants *Phalacrocorax carbo* in England. BTO Research Report No 433

Table 2a. Species counts within the Potential Disturbance Zone October – December 2008

Species (British vernacular name)	Number of birds recorded in each hour between low tide (1) and high tide (6/7) within the Potential Disturbance Zone (maximum counts are shown in bold)																		
	28 Oct 2008						21 Nov 2008							10 Dec 2008					
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Mute Swan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2**	-	-	-
Mallard	8	9	12	11	12	12	-	2	-	-	-	4	1	3	-	-	18	**22**	9	-
Great Crested Grebe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1**
Cormorant	12	13	14	14	8	5	15	10	11	5	6	15	14	-	-	3	3	30	15	**57**
Grey Heron	-	-	-	-	-	-	-	1	1	1	1	1	1	-	1	-	-	-	-	-
Moorhen	4	2	1	2	1	1	**5**	4	2	2	-	1	2	1	2	1	1	2	1	2
Black-headed Gull	121	132	**161**	129	77	52	16	19	27	18	53	31	29	-	-	7	4	32	3	63
Common Gull	-	1	1	2	1	1	-	1	2	-	1	-	-	-	-	2	-	-	1	2
Yellow-legged Gull	-	-	-	**1**	-	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Herring Gull	-	-	2	1	-	-	-	-	1	-	-	-	2	-	-	-	-	-	-	1
Lesser Black-backed Gull	1	2	2	1	1	1	-	3	4	5	**6**	5	5	-	-	-	-	-	-	-
Great Black-backed Gull	1	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Feral Pigeon	-	-	-	-	-	-	-	4	6	2	-	-	-	-	-	-	1	-	-	-
Carrion Crow	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-

Table 2b. Species counts within the Potential Disturbance Zone January – March 2009

Species (British vernacular name)	Number of birds recorded in each hour between low tide (1) and high tide (6/7) within the Potential Disturbance Zone (maximum counts are shown in bold)																			
	14 Jan 2009							11 Feb 2009							6 Mar 2009						
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Canada Goose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2**	-	-
Teal	-	-	-	**1**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mallard	-	-	4	4	-	4	6	-	-	-	-	-	-	-	2	6	-	-	-	-	-
Cormorant	5	4	9	16	15	14	19	4	2	6	8	9	3	4	7	5	17	18	23	24	33
Grey Heron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	**3**
Moorhen	2	-	1	-	3	2	3	3	2	2	1	1	1	2	3	2	3	2	2	1	-
Coot	-	-	2	1	**4**	3	3	-	-	-	-	-	-	-	2	-	2	2	2	2	2
Black-headed Gull	22	29	16	71	76	74	89	33	36	27	92	134	59	56	14	19	39	59	44	39	92
Common Gull	5	**7**	-	3	-	-	1	4	5	2	2	-	4	4	2	4	1	1	-	-	-
Yellow-legged Gull	-	-	-	-	-	-	-	-	-	**1**	-	-	-	-	-	-	-	-	-	-	-
Herring Gull	2	-	-	3	-	-	1	4	1	2	-	-	-	-	3	2	2	1	**6**	5	5
Lesser Black-backed Gull	2	-	1	1	1	3	2	1	1	2	1	1	-	-	1	2	2	2	2	1	1
Great Black-backed Gull	1	-	-	-	-	-	1	**2**	-	-	-	-	-	-	-	-	-	**2**	-	-	-
Feral Pigeon	-	3	**7**	-	-	-	-	**7**	4	-	-	-	-	-	-	-	-	-	-	-	-
Carrion Crow	2	**6**	3	-	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-

4.2 LAND BIRDS

A total of 14 species were recorded during the surveys of the main Power Station site (**Table 3.**).

Table 3. Bird species recorded at Battersea Power Station

Species/Date	28 Oct 2008	21 Nov 2008	10 Dec 2008	14 Jan 2009	11 Feb 2009	6 Mar 2009
Kestrel	-	-	-	-	-	1
Peregrine Falcon	2 (pair)	2 (pair)	2 (pair)	2 (pair)	2 (pair)	2 (pair)
Feral Pigeon	Ubiquitous (not counted)	Ubiquitous (not counted)	Ubiquitous (not counted)	Ubiquitous (not counted)	Ubiquitous (not counted)	Ubiquitous (not counted)
Woodpigeon	2	-	13	3	1	2
Grey Wagtail	1	1	1	-	1	3
Wren	1	-	1	1	-	1
Dunnock	1	-	-	-	3	2
Robin	2	-	1	2	-	1
Black Redstart	-	1	-	-	-	-
Blackbird	3	-	4	1	1	1
Long-tailed Tit	-	-	-	-	-	1
Magpie	1	-	2	1	-	-
Carrion Crow	-	-	3	2	2	2
Linnet	-	-	1	-	-	7

Birds overflying the site only are not listed in the above table but included a single Redwing, Carrion Crows, four Canada Geese, Grey Heron, and gulls. In addition, flocks of Starlings, numbering between one and 75, were noted flying over the north-east corner of the site on each survey visit.

5 CONCLUSIONS

5.1 INTER-TIDAL SUMMARY

The overall numbers and diversity of bird species recorded within the entire survey area is considered to be insignificant in ornithological conservation terms on a regional or national scale. However, the peak day-roosting count of 57 Cormorants noted within the Potential Disturbance Zone and the fishing flock of 152 birds are considered notable counts for Inner London.

Although counts from the entire survey area were low, the section directly fronting Battersea Power Station, the PDZ, supported a high percentage of the total survey area counts of certain species, including roosting/loafing Cormorants and gulls, this is attributable to the presence of the derelict crane wharf, which was a favoured roosting structure.

The only species recorded during the surveys undertaken to date that have elevated conservation interest are Teal, Black-headed Gull, Common Gull, Herring Gull and Lesser Black-backed Gull, all of which are amber-listed species of conservation concern. Herring Gull is also a UK BAP Priority Species[11]. All of these gull species are listed as species of conservation concern due to the status of their UK breeding populations (e.g. localised or declining breeding populations), and also, in the case of Common Gull, due to its unfavourable conservation status in Europe. The UK wintering population statuses of these species are not amongst the qualifying criteria for the birds of conservation concern/UK BAP listings, therefore, the counts of these gull species during the current study are not relevant to their elevated conservation statuses. Teal is listed as a species of conservation concern due to the presence of more than 20% of the North-west European population occurring in the UK outside of the breeding season. An estimated 197,000 Teal winter in the UK[12] with large populations occurring in many SPAs, for example, 5,236 are recorded as wintering at Abberton Reservoir, Essex[13]. Therefore the recorded presence of a single individual in January is not significant.

Only very low numbers of birds and no overnight roosts were recorded during the final two counts of the December surveys undertaken during hours of darkness.

[11] www.ukbap.org.uk
[12] www.rspb.org.uk
[13] www.jncc.gov.uk/pdf/UKSPA/UKSPA-A6-30.pdf

Development Effects

The current level of disturbance to birds using the PDZ is already quite high, particularly from regular boat traffic present on the River Thames. The majority of birds appear to be at least partially habituated to these disturbances and, at this stage, it is considered that further construction work at Battersea Power Station is unlikely to have an adverse effect upon the bird populations currently occupying either the PDZ , fronting the Power Station, or the survey area as a whole. However, once construction work is completed and this section of the site is operational as a busy riverside walkway, then it is considered that birds currently utilising the Power Station frontage for roosting, loafing, and feeding are likely to move away from the area due to increased levels of human disturbance close to the river edge. Such impacts are considered to be minor ecological impacts.

5.2 LAND SUMMARY

The diversity and numbers of bird species using land around Battersea Power Station during winter was very low. Notable records included a single female/1st-winter Black Redstart (listed on Schedule 1 of the Wildlife and Countryside Act 1981) noted foraging on the east side of the site during the November survey. However, this species was not recorded thereafter, indicating that no individuals of this species spent the winter at the site. Although a proportion of England's breeding pairs remain on their breeding grounds year-round, much of the birds' breeding range is vacated in winter[14]. It is likely that the individual recorded in November was the last individual of the seven birds recorded during the breeding season to leave the site prior to the onset of winter.

Other notable records:

- The resident pair of Peregrine Falcons (Schedule 1 species and amber-listed species of conservation concern) was present during each survey visit.
- A single Linnet (red-listed species of conservation concern and UK BAP Priority Species) was noted feeding on the rough grassland at the south end of the site in December. A total of seven Linnets (groups of five and two birds) were recorded utilising the short grass and bare ground on the west and north side of the power station in March.

[14] Brown, A. & Grice, P. (2005). Birds in England. *English Nature*.

- Up to three Grey Wagtails (amber-listed species of conservation concern) were noted each month except January, generally feeding along the river, or on the eastern side of the power station.
- Up to three Dunnocks (amber-listed species of conservation concern and UK BAP Priority Species) were recorded in October, February and March.
- A single Kestrel (amber-listed species of conservation concern) was noted in March. This species breeds on the site but does not winter.

Appendix 1

Inter-Tidal Bird Survey Data

October Survey

Date: 28 October 2008
Low tide: 09.31
High tide: 14.33

Southern Foreshore and Potential Disturbance Zone (in parenthesis - birds outside of Potential Disturbance Zone**)**

Species/Time	09.31	10.31	11.31	12.31	13.31	14.31
Greylag Goose	(2)	-	-	-	-	-
Mallard	8 (2)	9	12	11	12	12 (11)
Cormorant	12	13	14	14	8	5
Grey Heron	(1)	-	-	-	-	-
Moorhen	4	2	1	2	1	1
Black-headed Gull	121 (61)	132	161 (6)	129	77	52
Common Gull	(3)	1	1	2	1	1
Yellow-legged Gull	-	-	-	1	-	1
Herring Gull	-	-	2	1	-	-
Lesser Black-backed Gull	1 (1)	2	2	1	1	1
Great Black-backed Gull	1	-	-	-	1	-
Carrion Crow	(3)	-	-	-	-	-

In addition, a single Green Sandpiper flew through at 09.55 (not seen).

Northern Foreshore - this data in split up into left (west of the power station): central (opposite power station land): right (east of the power station)

Species/Time	09.31	10.31	11.31	12.31	13.31	14.31
Cormorant	0:0:2	-	-	-	-	-
Black-headed Gull	3:0:12	0:0:17	0:0:9	0:0:14	0:0:13	0:0:10
Lesser Black-backed Gull	0:0:1	-	-	-	-	-
Feral Pigeon	2:0:25	-	-	-	-	-
Carrion Crow	10:0:2	-	-	-	-	-

Main River Channel/Open Water

Species/Time	09.31	10.31	11.31	12.31	13.31	14.31
Cormorant	1	3	-	1	-	-
Black-headed Gull	3	8	23	69	95	82
Common Gull	-	2	2	4	6	4
Yellow-legged Gull	-	-	-	-	1	-

November Survey

Date: 21 November 2008
Low tide: 15.41
High tide: 08.18

Southern Foreshore and Potential Disturbance Zone (in parenthesis - birds outside of Potential Disturbance Zone**)**

Species/Time	08.18	09.21	10.24	11.27	12.30	13.33	14.36
Mallard	1	4	0 (4)	0 (2)	0 (4)	2	-
Cormorant	14	15 (9)	6	5 (6)	11	10 (2)	15 (3)
Grey Heron	1	1	1	1	1	1 (1)	-
Moorhen	2	1	-	2 (1)	2 (1)	4 (2)	5
Black-headed Gull	29	31 (1)	53 (41)	18 (83)	27 (73)	19 (75)	16 (43)
Common Gull	-	-	1	0 (9)	2 (11)	1 (9)	0 (6)
Herring Gull	2	-	-	-	1 (6)	0 (1)	0 (1)
Lesser Black-backed Gull	5	5	6	5 (2)	4	3 (1)	-
Great Black-backed Gull	-	-	-	1	-	-	-
Feral Pigeon	-	-	-	2 (10)	6 (12)	4	-
Carrion Crow	1	-	0 (1)	0 (4)	0 (6)	-	-

Northern Foreshore – this data in split up into left (west of the power station): central (opposite power station land): right (east of the power station)

Species/Time	08.18	09.21	10.24	11.27	12.30	13.33	14.36
Mallard	0:0:11	0:0:0	1:0:0	0:0:1	2:0:7	2:6:19	0:2:30
Cormorant	0:0:0	0:0:0	0:0:0	0:0:0	0:0:0	3:0:0	1:0:0
Black-headed Gull	4:0:0	2:0:1	0:0:0	2:0:31	4:0:49	7:2:24	18:0:13
Common Gull	0:0:0	0:0:0	0:0:0	0:0:6	1:0:3	1:0:4	0:0:0
Herring Gull	0:0:0	0:0:0	0:0:0	0:0:0	1:0:4	3:0:2	1:0:0
Lesser Black-backed Gull	0:0:0	0:0:0	0:0:0	0:0:0	1:0:1	1:0:1	0:0:0

Feral Pigeon	0:0:0	0:0:0	0:0:0	7:0:23	6:0:33	12:14:29	0:0:6
Carrion Crow	0:0:0	0:0:0	0:0:0	9:0:4	21:0:4	46:6:11	52:0:0

Main River Channel/Open Water

Species/Time	08.18	09.21	10.24	11.27	12.30	13.33	14.36
Cormorant	-	-	3	3	2	5	2
Black-headed Gull	94	26	14	20	6	4	2
Common Gull	11	6	2	4	1	-	1
Herring Gull	1	1	-	1	-	-	1
Lesser Black-backed Gull	3	2	1	1	1	-	2
Great Black-backed Gull	-	-	-	-	-	2	1

December Survey

Date: 10 December 2008
Low tide: 17.15
High tide: 10.35

Southern Foreshore and Potential Disturbance Zone (in parenthesis - birds outside of Potential Disturbance Zone**)**

Species/Time	10.35	11.41	12.47	13.53	14.59	16.05	17.15
Mute Swan	-	-	-	2	-	-	-
Mallard	-	9 (2)	22 (7)	18 (3)	- (19)	-	3
Great Crested Grebe	1	-	-	-	- (1)	--	-
Cormorant	57	15	30	3	3	-	-
Grey Heron	-	-	-	-	-	1	-
Moorhen	2 (1)	1 (1)	2 (1)	1 (1)	1	2	1
Black-headed Gull	63	3	32 (2)	4 (37)	7 (11)	-	-
Common Gull	2	1	-	- (4)	2 (3)	-	-
Herring Gull	1	-	-	-	-	-	-
Feral Pigeon	-	-	-	1 (23)	-	-	-
Carrion Crow	-	-	-	- (1)	-	-	-

Northern Foreshore – this data in split up into left (west of the power station): central (opposite power station land): right (east of the power station)

Species/Time	10.35	11.41	12.47	13.53	14.59	16.05	17.15
Mallard	0:0:15	-	-	3:5:26	3:0:30	0:0:6	-
Cormorant	-	-	-	-	0:0:1	-	-
Black-headed Gull	-	-	-	0:0:41	4:2:69	-	-
Common Gull	-	-	-	0:0:3	1:0:5	-	-
Herring Gull	-	-	-	-	0:0:1	-	-
Lesser Black-backed Gull	-	-	-	-	0:0:3	-	-
Feral Pigeon	-	-	-	0:0:43	0:0:112	-	-
Carrion Crow	-	-	-	0:0:1	63:0:6	-	-

Main River Channel/Open Water

Species/Time	10.35	11.41	12.47	13.53	14.59	16.05	17.15
Great Crested Grebe	1	-	-	-	-	1	1
Cormorant	1	2	2	4	4	-	-
Black-headed Gull	11	51	16	22	3	-	-
Common Gull	-	5	3	2	1	-	-

January Survey

Date: 14 January 2009
Low tide: 10.41
High tide: 16.16

Southern Foreshore and Potential Disturbance Zone (in parenthesis - birds outside of Potential Disturbance Zone**)**

Species/Time	10.41	11.37	12.33	13.29	14.25	15.21	16.16
Eurasian Teal	-	-	-	1	-	-	-
Mallard	-	-	4 (3)	4	-	4	6
Cormorant	5	4	9 (11)	16	15	14	19
Moorhen	2	-	1	-	3	2	3
Coot	-	-	2 (1)	1 (2)	4	3	3
Black-headed Gull	22	29 (31)	16 (34)	71 (22)	76 (4)	74	89
Common Gull	5	7	- (3)	3 (2)	6	3	5
Herring Gull	2	-	- (1)	3 (1)	- (1)	-	1
Lesser Black-backed Gull	2	-	1 (1)	1	1	3	2

Great Black-backed Gull	1	-	-	-	-	-	1
Feral Pigeon	-	3	7	-	-	-	-
Carrion Crow	2	6	3	-	-	-	-

Northern Foreshore – this data in split up into left (west of the power station): central (opposite power station land): right (east of the power station)

Species/Time	10.41	11.37	12.33	13.29	14.25	15.21	16.16
Mute Swan	0:1:0	0:1:0	0:1:0	0:0:0	0:0:0	0:1:0	0:1:0
Mallard	0:0:0	0:13:2	0:4:7	0:2:18	0:10:0	0:3:0	0:8:0
Cormorant	0:0:0	0:0:0	7:0:0	0:0:0	0:0:0	0:0:0	0:0:0
Black-headed Gull	0:63:0	3:43:16	2:4:1	0:0:6	0:0:0	0:0:0	0:0:0
Common Gull	0:2:0	0:3:1	0:0:0	0:0:0	0:0:0	0:0:0	0:0:0
Herring Gull	0:2:0	0:1:0	0:0:0	0:0:0	0:0:0	0:0:0	0:0:0
Great Black-backed Gull	0:0:0	0:1:0	0:0:0	0:0:0	0:0:0	0:0:0	0:0:0
Feral Pigeon	0:0:0	0:6:14	11:0:6	2:0:10	0:0:0	0:0:0	0:0:0
Carrion Crow	0:0:0	16:1:3	38:0:2	11:0:2	0:0:0	0:0:0	0:0:0

Main River Channel/Open Water

Species/Time	10.41	11.37	12.33	13.29	14.25	15.21	16.16
Mute Swan	-	-	-	1	-	-	-
Eurasian Teal	-	-	-	-	1	1	-
Mallard	-	-	9	-	-	-	-
Great Crested Grebe	-	1	1	-	-	-	-
Cormorant	2	3	4	2	2	1	-
Black-headed Gull	-	-	6	12	16	6	7
Common Gull	-	-	2	1	3	2	1
Herring Gull	-	-	1	-	-	-	-
Lesser Black-backed Gull	-	-	1	-	-	-	-

February Survey

Date: 11 February 2009
Low tide: 09.40
High tide: 15.12

Southern Foreshore and Potential Disturbance Zone (in parenthesis - birds outside of Potential Disturbance Zone**)**

Species/Time	09.40	10.35	11.30	12.25	13.20	14.15	15.10

Mallard	- (2)	-	-	- (2)	-	-	-
Cormorant	4	2 (1)	6 (1)	8	9	3	4
Moorhen	3	2	2	1	1	1	2
Black-headed Gull	33 (29)	36 (43)	27 (49)	92 (8)	134	59	56
Common Gull	4 (3)	5 (4)	2 (6)	2	-	4	4
Yellow-legged Gull	-	-	1	-	-	-	-
Herring Gull	4 (2)	1 (1)	2 (3)	- (1)	-	-	-
Lesser Black-backed Gull	1	1 (3)	2 (2)	1	1	-	-
Great Black-backed Gull	2	-	-	-	-	-	-
Feral Pigeon	7	4	-	-	-	-	-
Carrion Crow	3	2 (4)	- (6)	-	-	-	-

Northern Foreshore – this data in split up into left (west of the power station): central (opposite power station land): right (east of the power station)

Species/Time	**09.40**	**10.35**	**11.30**	**12.25**	**13.20**	**14.15**	**15.10**
Mute Swan	0:0:2	-	1:0:0	-	-	-	-
Canada Goose	2:0:0	-	-	-	-	-	-
Moorhen	0:0:1	-	-	-	-	-	-
Black-headed Gull	31:68:20	22:47:11	12:43:6	3:0:0	-	-	-
Common Gull	4:6:1	2:3:2	1:3:0	-	-	-	-
Herring Gull	1:0:0	0:3:0	0:1:0	-	-	-	-
Lesser Black-backed Gull	2:0:0	0:0:1	1:0:1	-	-	-	-
Great Black-backed Gull	-	2:0:0	-	-	-	-	-
Feral Pigeon	30:19:17	19:14:16	16:12:6	12:0:0	-	-	-
Carrion Crow	20:6:11	26:4:5	14:7:11	49:0:0	2:0:0	-	-

Main River Channel/Open Water

Species/Time	**09.40**	**10.35**	**11.30**	**12.25**	**13.20**	**14.15**	**15.10**
Mallard	-	-	1	2	-	-	-
Cormorant	3	2	2	4	-	2	1
Coot	-	2	-	-	-	-	-
Black-headed Gull	2	1	11	23	12	3	9
Common Gull	-	-	1	2	1	-	1

Herring Gull	-	-	-	-	-	-	1
Lesser Black-backed Gull	-	-	-	1	-	-	1
Great Black-backed Gull	-	-	-	-	-	1	-

March Survey

Date: 6 March 2009
Low tide: 14.27
High tide: 08.26

Southern Foreshore and Potential Disturbance Zone (in parenthesis - birds outside of Potential Disturbance Zone)

Species/Time	**08.26**	**09.26**	**10.26**	**11.26**	**12.26**	**13.26**	**14.26**
Canada Goose	-	-	2	-	-	- (2)	-
Mallard	-	-	-	- (6)	- (2)	2 (2)	6 (2)
Cormorant	33	24	23	18	17	5	7
Grey Heron	3	1	-	1	1	-	-
Moorhen	-	1	2	2 (1)	3	2	3 (1)
Coot	2	2	2 (1)	2 (2)	2	-	2
Black-headed Gull	92	39	44	59 (43)	39 (31)	19 (34)	14 (17)
Common Gull	-	-	-	1	1 (3)	4	2
Herring Gull	5	5	6	1 (1)	2	2	3
Lesser Black-backed Gull	1	1	2	2 (7)	2	2 (2)	1 (3)
Great Black-backed Gull	-	-	-	2	-	-	-
Magpie	-	-	-	-	- (2)	- (2)	-

Northern Foreshore – this data in split up into left (west of the power station): central (opposite power station land): right (east of the power station)

Species/Time	**08.26**	**09.26**	**10.26**	**11.26**	**12.26**	**13.26**	**14.26**
Canada Goose	-	-	-	0:2:0	0:2:0	0:2:2	0:2:4
Mallard	-	-	-	-	0:0:3	0:0:8	0:0:11
Black-headed Gull	-	-	-	6:0:31	17:16:76	11:6:29	1:0:39
Common Gull	-	-	-	-	0:4:7	-	0:2:6
Herring Gull	-	-	-	2:0:0	3:0:0	-	1:0:2
Lesser Black-backed Gull	-	-	-	0:0:3	-	-	1:0:3
Feral Pigeon	-	-	-	-:-:47	24:16:69	18:6:83	24:16:73

Carrion Crow	-	-	-	13:0:2	16:0:0	14:0:0	41:2:16

Main River Channel/Open Water

Species/Time	**08.26**	**09.26**	**10.26**	**11.26**	**12.26**	**13.26**	**14.26**
Cormorant	5	152	3	2	2	1	-
Black-headed Gull	25	23	14	10	6	7	4
Common Gull	1	-	1	-	-	-	-
Herring Gull	-	-	-	-	-	1	1
Lesser Black-backed Gull	-	-	-	-	-	1	-

J6: Peregrine Falcon and Black Redstart Management Strategy

Environmental Statement

Volume II

Battersea Power Station

Peregrine Falcon and Black Redstart Management Strategy, Jan 2011 – Jan 2013

December 2010
Final

Issue No 2
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FIGURE

1. INTRODUCTION

URS Corporation Ltd (URS) has been commissioned by Treasury Holdings UK Limited (THUK) on behalf of REO (Powerstation) Ltd. to complete a peregrine falcon and black redstart Management Strategy to ensure the proposed works at Battersea Power Station do not adversely impact both species that currently breed on site. This document has been produced in conjunction with David Morrison who currently monitors both species on site and THUK to ensure that it coincides with the proposed development plans.

This Management Strategy will be applicable to the next two breeding seasons, from January 2011 until the beginning of the 2013 breeding season; January 2013. A revised Management Strategy will be compiled and implemented prior to the 2013 breeding season, in a similar manner to this Management Strategy.

The Management Strategy will ensure that suitable breeding habitat is present for both species during the 2011 and 2012 breeding seasons, and that disturbance to breeding birds is minimised. The Management Strategy has been developed to minimise the potential to contravene wildlife legislation.

1.1 Background

All breeding birds, their active nests and eggs are protected under the Wildlife and Countryside Act (WCA) 1981 (Ref. 1). This protection makes its an offense to kill, injure or take any wild bird or to take, damage or destroy the nest of any wild bird whilst that nest is in use or being built.

In addition to this, peregrine falcon and black redstart are protected under Schedule 1 of the WCA which makes it illegal to disturb pairs while they are nest building, or at a nest containing eggs or young, or disturb their dependent young.

For the purpose of this document, the ‘breeding season’ will encompass both the breeding period and the dependency period. The breeding season includes nest creation, copulation, egg laying, incubating and fledging. The dependency period also includes the time taken for the young to successfully leave the nest site.

For peregrine falcon, the ‘breeding season’ will encompass the period between the beginning of February and the end of August. Particular periods of heightened sensitivity to disturbance are during incubation and when the chicks first hatch, this is usually from the end of March until the end of May. The other key period is mid June to mid July when the young fledge. Pairs that fail early in the incubation period may re-lay and hence the fledging period may be pushed back to the end of August.

For black redstart, the breeding season is less predictable as they can have multiple broods within one breeding season. In addition to this black redstart is not as territorial as peregrine falcon and multiple breeding pairs may be present on site at the same time (and often breeding at slightly different times). Black redstart can be breeding, or have dependant young, anytime between mid March and the end of the August.

Therefore, for the purpose of this document, to encompass the both species, the breeding season is considered to span from the 1st of February until the 1st of September.

2. PEREGRINE FALCON MANAGEMENT STRATEGY

2.1 Existing Breeding Habitat

There is currently peregrine breeding habitat present on site in the form of a nest box placed on a vertical tower, 53m high, in the northwest corner of the site. This box has been *in situ* since 2004 and is continually used by the resident pair for breeding, perching and roosting. The resident pair have also bred on the Power Station itself.

2.2 Creation of New Breeding Habitat

The existing vertical tower in the northwest corner of the site is due to be removed in January 2011 to make way for the works in this area associated with Phase 1 of the proposed development. A tower will be re-erected in the northeast corner of the site prior to start of the 2011 breeding season. The precise location of this new vertical tower is shown in Figure 1. A reinforced base will be installed for the tower and piling if necessary; this new base will be left *in situ* for a number of days before the new vertical tower is erected.

The existing vertical tower will be de-rigged under an ecological watching brief by David Morrison. The contents of the existing nest box will be cleared by hand into a bag for prey analysis by David Morrison. Once emptied, the box will be removed from the vertical tower and lowered to ground level. The vertical tower will then be dismantled.

A new reinforced base will be installed in the northeast corner. The upper parts of the existing vertical tower will be moved onto the new reinforced base. Once fully erected in the new position, a nest box will be secured. The nest box will be made of plywood, approximately 900mm wide, 800mm high and 900m deep, and will face a western direction. It will be installed under a watching brief by David Morrison. Once the box has been successfully attached to the vertical tower, a camera will be installed inside the box for observation purposes. In addition to this, a red obstacle light will be installed on the top of the vertical tower to comply with aviation standards, principally due to the proximity to the nearby helipad.

2.3 Measures to Reduce Disturbance of Breeding Peregrine Falcon

2.3.1 Measures to Reduce Disturbance to the Installed Nest box

It is often difficult to confirm whether a resident peregrine pair is breeding or not. It is therefore necessary to prevent disturbance to the breeding site for the entire duration of the breeding season. During the breeding season it is crucial that the nest box is not disturbed. This will include minimising noise, vibration and visual disturbance from vehicles movements around the site, use of the helipad, laydown areas, staff movements around the site and jetty activities.

In order to mitigate for this disturbance it is proposed to construct exclusion fencing creating a buffer around the vertical tower with the installed nest box. The location of this fencing is shown in Figure 1.

In addition to this, the nest box will face a western direction which will minimise the disturbance encountered from the helipad to the east. Helicopters landing on this helipad are known to use a north-eastern flight path so in theory should never fly close to the front of the nest box. The westerly direction of the box will also direct fledging young away from the helipad and the adjacent river.

In order to help monitor disturbance impacts on the peregrine pair, a camera will be installed in the nest box. Peregrines are however well known to adapt to quite high levels of local disturbance so long as there is no physical approach to their nest site or vibration to the tower.

2.3.2 Measures to Reduce Disturbance of Breeding in Unfavourable Areas

During the breeding season the peregrines will be continually monitored by David Morrison to ensure that activity and behaviour is recorded throughout the season. It is hoped that the birds will breed on the vertical tower in the northeast corner as they are least likely to be disturbed here. However the birds may attempt to breed elsewhere on site. By continually monitoring the birds, measures can then be put in place prior to egg laying to try to limit availability of alternative breeding sites (such as placing plywood on suitable nest sites) and hence ensure use of the tower nest box. THUK will be informed immediately if they are found to be nesting elsewhere; this will apply specifically to Phase 2 works when works are due to start on the Power Station itself, which is the favoured breeding site for the peregrines.

If works are due to start where the birds are attempting to or are actually breeding, works will be temporarily halted until it has been confirmed by David Morrison that the birds have finished breeding. Alternatively, the scope of the works will be limited to a level considered unlikely to cause disturbance. This will ensure the birds are not disturbed during breeding on any part of the site.

2.4 Measures to Prevent Peregrines Nesting in Unfavourable Locations

It is hoped therefore that the peregrine pair will breed on the vertical tower in the northeast corner, however they have continued to attempt to breed on the Power Station since the nest box on the vertical tower has been present on site. Breeding on the Power Station will become most problematic during Phase 2 basement works and hence prior to this phase commencing it is proposed that the Power Station will be made as unattractive to breeding peregrines as possible. As they nest on ledges, as many ledges as possible will be covered in plywood and netting will be strung up within the Power Station.

2.5 Management of Breeding

The nest box installed on the vertical tower in the northeast corner will be cleaned out prior to the 2012 breeding season commencing. The contents of the box (pellets and prey

remains) will be removed and the box cleaned with a wire brush; if necessary the box may need to be re- weather proofed. This is important in limited the amount of parasites in the box and to make sure it is still structurally sound. The contents of the nest box will, as before, be retained for analysis.

In addition to the camera installed, the nest box will be continually monitored by David Morrison during the breeding periods.

A Falcon Recovery Plan will be made available to all site personnel and notably the site security to inform what should be done if a peregrine falcon chick is found on the ground. This Falcon Recovery Plan will include the following:

All site management, personnel and security will be briefed in the event that they come across a grounded Peregrine Falcon juvenile. One person should stay with the grounded bird at all times; under no circumstances must it be left on its own as it is under great risk from predation. Site security should be alerted, who will alert David Morrison by mobile phone.

A Falcon Recovery Plan will be forwarded to the client team and site security before the start of the 2011 breeding season, likely to include a brief protocol of who should be contacted in the event of a grounded peregrine falcon chick.

3. BLACK RESTART MANAGEMENT STRATEGY

3.1 Existing Breeding Habitat

Black redstart has continually bred at Battersea Power Station since the early 90s; pairs are known to breed in both the Power Station itself and the adjacent Pump House.

3.2 Creation of New Breeding Habitat

It is proposed that within the fenced off area in the northeast corner (Figure 1) that new breeding habitat is created prior to the 2012 breeding season. Black redstart nestboxes will be built and installed by David Morrison. They will be the same design used successfully in previous years. Multiple boxes will be installed in locations such as; an existing brick wall on the northern boundary of the site, on the base of the vertical tower installed for the peregrine nest box and on the northern, eastern and western façade of the existing Dalkia building. The exact location and number of boxes will be confirmed by David Morrison and THUK, prior to their installation.

3.3 Measures to Reduce Disturbance of Breeding Black Redstarts

3.3.1 Measures to Reduce Disturbance from Nest Boxes

As stated above for peregrine falcon, it is crucial that during the breeding season the nest boxes are not disturbed in any way. This will include noise, vibration and visual disturbance from vehicles movements around the site, use of the helipad, laydown areas, and staff movements around the site and jetty activities.

The fencing installed as shown in Figure 1 will ensure that a disturbance buffer will be established around the nest boxes. This will ensure any noise or visual disturbance is limited.

3.3.2 Measures to Reduce Disturbance of Breeding in Unfavourable Areas

During the breeding season all pairs will be continually monitored by David Morrison to ensure the movements of the birds is understood throughout the seasons. It is hoped that pairs will breed in the nest boxes in the northeast corner of the site. By continually monitoring breeding activity, locations of pairs breeding in unfavourable areas will be communicated to THUK. Works will be temporarily halted in the vicinity of any breeding pair, and once it is confirmed by David Morrison that pairs have finished breeding, works can re-commence. This will ensure no disturbance to any breeding pair on any part of the site.

3.4 Measures to Prevent Black Redstarts Nesting in Unfavourable Locations

Ideally the black redstarts will breed in the boxes in the northeast corner of the site. However pairs have bred within the Power Station for a number of years and are likely to continue to attempt to breed there. In addition, to this new habitat may be created as result of the development in the form of bare ground and tall structures such as construction vehicles and buildings constructed.

In order to lower the likelihood of black redstarts nesting in unfavourable locations which may halt works during the breeding season, it is proposed that the Power Station will be made as unattractive to breeding black redstarts as possible prior to the 2012 breeding season, when significant works are due to commence on the Power Station. As black redstarts nest on ledges within nocks and crannies, as many areas as possible considered suitable will be covered with sheeting and netting prior to the 2012 breeding season.

Suitable habitat for black redstart includes piles of material, left undisturbed during the breeding season, such as rubble piles, stockpiles, or areas of bare ground. Any such areas should be kept unsuitable by continual movement of vehicles and machinery, where possible. This will lower the likelihood of black redstarts breeding in unfavourable areas.

3.5 Management of Breeding

As stated above for the peregrine nest box, the black redstart nest boxes will be cleared out prior to the 2012 breeding season commencing. During this time they will be checked for any other structural issues that may need to be resolved. This management will be undertaken by David Morrison.

3.6 Black Redstart Foraging Habitat

There are currently spoil heaps along the western boundary and in the northeast corner of the site. These are important foraging habitats for pairs. The spoil heap on the western boundary will be removed as part of the proposed development. It is proposed that 5-10% of the existing spoil heap on the western boundary will be retained and reintroduced in the northeast corner. The spoil heap in the northeast corner that is currently present will be retained within the exclusion zone (see Figure 1). This will ensure suitable foraging habitat is present for black redstarts for the duration of this Management Strategy.

URS
Battersea Power Station
Peregrine Falcon and Black Redstart Management Strategy

4. REFERENCES

Ref. 1 Her Majesties Stationary Office (HMSO), (1981); 'Wildlife and Countryside Act 1981.'

5. LIMITATIONS

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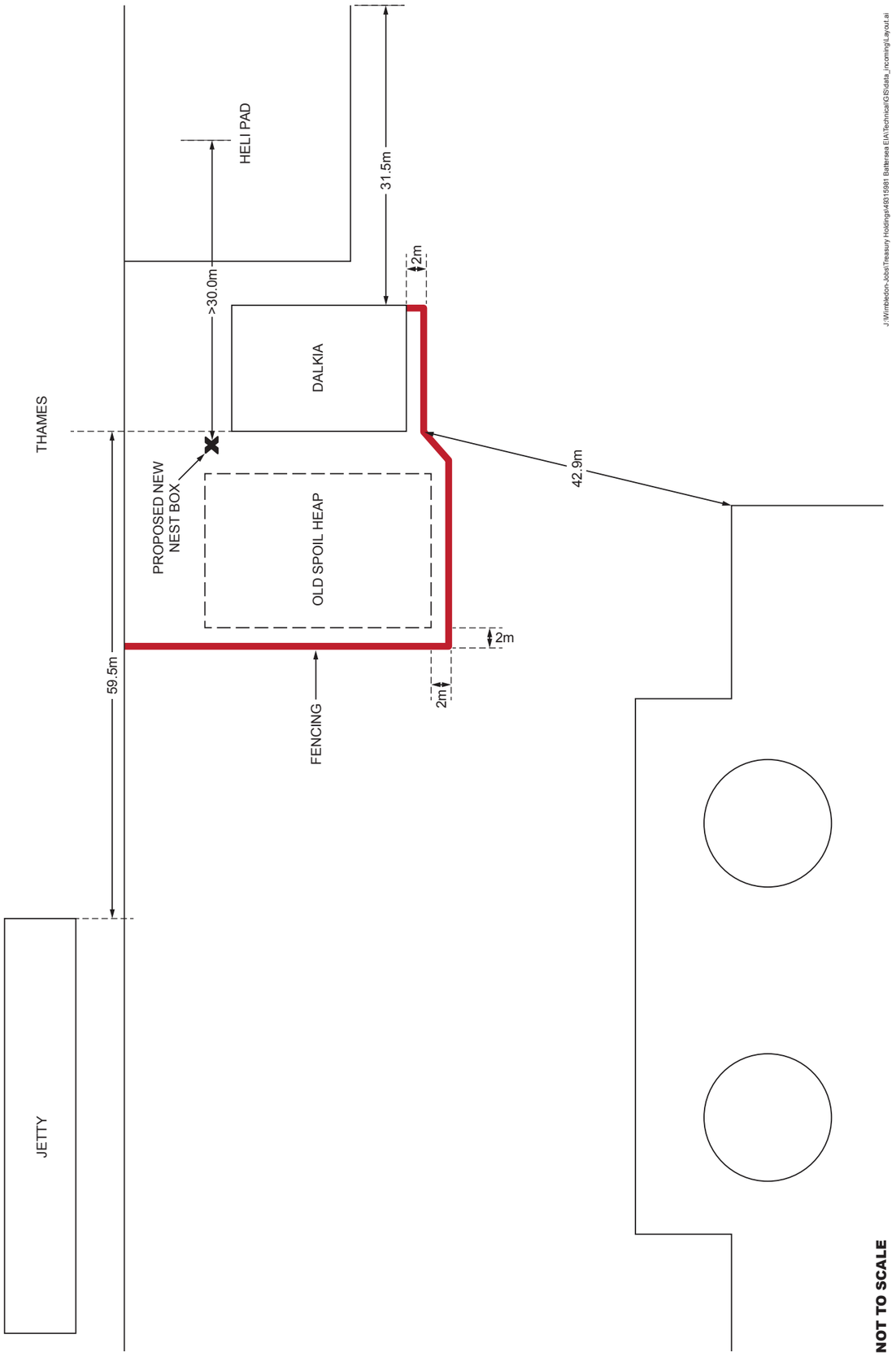
Figure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HELI PAD
31.5m
2m
>30.0m
DALKIA
THAMES
PROPOSED NEW NEST BOX
OLD SPOIL HEAP
42.9m
2m
2m
59.5m
FENCING
JETTY
NOT TO SCALE

Peregrine Falcon Recovery Plan

Battersea Power Station

History

Peregrine Falcons have bred at the Power Station since 2001 and are resident on the structure all year round. The pair are highly territorial, especially so during the breeding season.
With construction works due to start in 2011 it is important that all personnel, management and site security are briefed and made aware of the presence of the birds. This is especially important during the breeding season.

Breeding Season

Peregrines are protected under the Schedule 1 act of the wildlife laws and are given full protection from disturbance at, or near the nest site, including dependant young.
They can be exceptionally vocal during the breeding season, and may scold and mock dive people if they are too close and are perceived as a threat.
The breeding season starts with egg laying around the end of March and chicks first leave the nest (fledging) during the 1st and 2nd weeks of June.
Unfortunately 1st flight juveniles are notorious for 'grounding', caused by insufficient wind which gives uplift on their maiden flight.
On grounding, they will stress/food call to the adults above; the adults in turn will very likely be calling in agitation and concern.
On remote sites like Battersea it can, and has led, to predation by foxes.
This risk of predation as well as other risks associated with the development of the Power Station, namely construction traffic, this recovery plan has been drawn up to assist site personnel in the event of a grounded juvenile.

Actions to be taken

If a grounded bird is located within the site, the following steps must be taken:

1. **If you come across a juvenile Peregrine on the ground, it is important to keep eye contact with the bird to prevent the bird being lost on site. <u>Do not leave it alone under any circumstances.</u>**

2. **If mobile phones are allowed on site, alert the site management/security of the presence of the bird .If mobiles phones are not allowed, alert the nearest person and ask them to inform site management/ security.**

3. **<u>Under no circumstances try to pick it up</u>, you may unwittingly damage the bird and, additionally, juveniles are armed with a powerful hooked beak and 15mm talons. These can and will inflict painful injuries to a person, usually their hands. Normal site working gloves are no protection, the talons will go through these.**

4. **If the juvenile is on a site roadway, if possible alert construction traffic to the bird's presence, do not enter the roadway, ensure your own safety by keeping to the pedestrian paths.**

5. **It is likely that the adults will be stressed and very vocal when a chick is grounded. They may possibly dive at you and attempt to attack. Stay calm and remain still, it is very unlikely they will cause any harm.**

6. **Site management/security will contact David Morrison on 07904877567 or 07899990776. He has a license from Natural England to hold the birds, so will arrive on site as soon as possible to catch the juvenile, if he is not on site already monitoring the birds. David Morrison will place the juvenile in a cardboard box and then take it to a high point for released.**

Juvenile Peregrine

Juvenile in flight – note brown plumage

Juvenile showing brown underside and flanks

D. Morrison – London Peregrines

www.londonperegrines.com

J7: Applied Ecology Battersea Baseline Report

Environmental Statement

Volume II

BATTERSEA POWER STATION ECOLOGY SURVEY

Report for

URS Corporation Ltd

November 2008

Client: URS Corporation Ltd

Title: Battersea Power Station Ecology Survey

Project No: AEL 156

Date of Issue: 4 November 2008

Status: Final

Signed on behalf of Applied Ecology Ltd:

.....
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Director

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APPENDIX 2 HIGHER PLANT SPECIES RECORDS
APPENDIX 3 TERRESTRIAL INVERTEBRATE DATA

1 INTRODUCTION

1.1 BACKGROUND

Applied Ecology Ltd was commissioned by URS Corporation Ltd. in 2008 to complete a range of ecological survey work at Battersea Power Station to inform an Environmental Impact Assessment of proposals to re-develop the site as a mixed commercial and residential development. The main survey area is depicted by **Figure A**.

With the exception of a specialist terrestrial invertebrate survey completed by Dr Peter Kirby on behalf of AEL, all work has been completed by experienced AEL ecologists.

Surveys have been completed for a number of ecological aspects in order to build on and update (as considered necessary) historic ecological survey information for the site as follows:

- Chapter 2: Habitats and Higher Plants;
- Chapter 3: Terrestrial Invertebrates;
- Chapter 4: Reptiles;
- Chapter 5: Breeding Birds; and
- Chapter 6: Bats.

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Battersea Power Station
Figure A: Survey Boundary

2 HABITATS AND HIGHER PLANTS

2.1 SURVEY APPROACH

A Phase 1 Habitat Survey of the Battersea Power Station site was undertaken by an experienced botanist from Applied Ecology Ltd. on 13 May 2008. Some small areas, of apparent low habitat value, were not accessible for Health and Safety reasons and have been mapped using aerial photograph interpretation.

Two additional land areas referred to as 'Site C' and '88 Kirtling Street', both of which are located in close proximity to the main Power Station site, were surveyed 31 July 2008, and 28 August 2008 respectively.

On each survey occasion, all habitats present were classified and mapped according to standard Phase 1 Habitat survey categories[1]. However, an additional grassland category ('unimproved grassland of recent origin') was used to distinguish areas classified and mapped as typical ephemeral/short perennial vegetation (characterised by low-growing, patchy plant associations typical of derelict urban sites) from more closed and grass dominated swards present with the main Power Station site. Typical unimproved grassland (as defined by Phase 1) refers to old grassland sites that have not been subject to agricultural improvement – a habitat that is not present in inner city locations.

Frequent target notes were recorded and, where appropriate, included a list of the plant species present and an estimate of their individual relative abundance following the DAFOR scale. In particular, target notes were used to record land areas with typical and unique botanical character, and areas or features too small to map accurately in the field. In addition, a full list of the higher plant species observed during the Phase 1 survey within the main Power Station site, Site C, and 88 Kirtling Street was compiled.

2.2 SURVEY FINDINGS

The Phase 1 Habitat map is shown in **Figure 1** and Target Notes are provided in **Appendix 1**. A full list of the higher plant species recorded in each of the three sites is provided in **Appendix 2**.

[1] JNCC (1993) *Handbook for Phase 1 Habitat Survey – A technique for Environmental Audit*. JNCC. Peterborough.

Figure 1

Phase I Habitat Survey

Key:

- Unimproved neutral grassland of recent origin
- Semi-improved neutral grassland (SI)
- Semi-improved neutral grassland/tall ruderal mosaic (SI)
- Amenity grassland (A)
- Ephemeral/short perennial vegetation
- Continuous bracken
- Introduced shrub
- Unvegetated earth spoil/rubble mound
- Building/ Structure
- Hard standing/ Bare ground
- Mud/Sand
- River Thames
- Scattered introduced shrub
- Scattered scrub
- Site boundary
- Target note

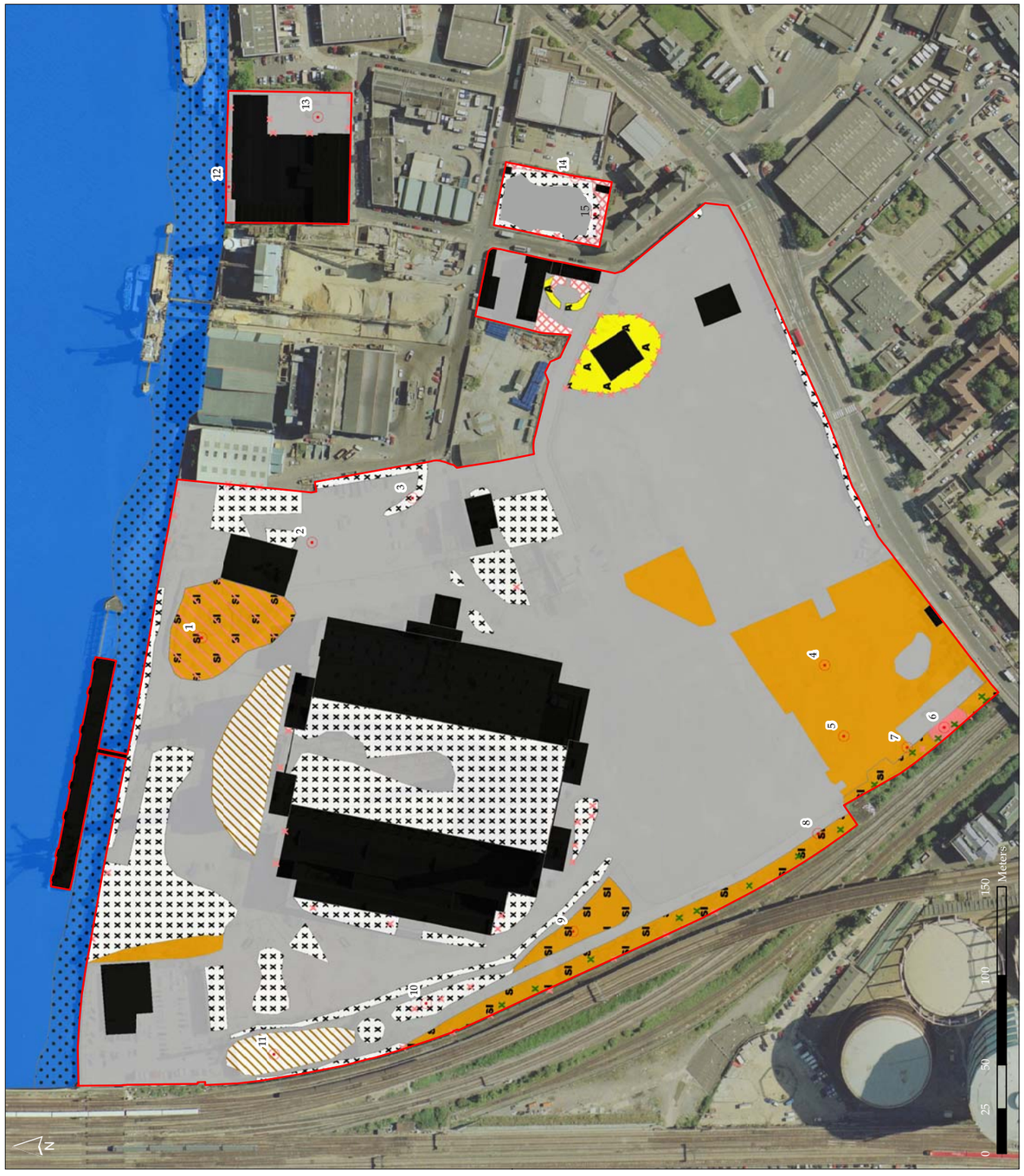
Date of survey: 13 June 08 (Main study area)

Job reference no: 156

Status: Final Draft

Drawn by: LJB

Checked by: RJH



Battersea Power Station

The site was dominated by the Power Station itself and surrounding areas of concrete and gravel hard standing. A range of habitat types, all typical of derelict urban situations, were found in association with locations that possessed sufficient soil structure to enable plants to root i.e. broken and decayed concrete hard-standing, shallow gravels and earth/rubble piles.

Grassland

Aside from small areas of amenity grassland that were of low habitat and botanical value, the site supported two distinct grassland types. The first comprised rank **semi-improved grassland** dominated by false-oat grass *Arrhenatherum elatius*, together with Yorkshire fog *Holcus lanatus*, smooth meadow-grass *Poa pratensis* and a range of forbs, including ribwort plantain *Plantago lanceolata*, hoary mustard *Hirschfeldia incana* and mugwort *Artemisia vulgaris*. This grassland type was confined largely to the site's western boundary, where it occurred in association with scattered woody scrub and introduced shrubs. A particularly rank area of semi-improved grassland, that supported abundant tall ruderal species, was recorded and mapped on a vegetated earth spoil mound to the north of the site. As a whole this grassland type was relatively species-poor and of negligible botanical value.

The second grassland type was classified and mapped as **unimproved grassland of recent origin**, and was associated with thin gravel-rich soil on made ground. This occupied a relatively large area in the south of the site, as well as small and more fragmented patches elsewhere. It was similar to typical ephemeral/short perennial vegetation recorded within the site, and supported an abundance of low-growing annual plants but was mapped as a distinct habitat on account of the dominance of of grasses which formed an almost continuous open sward. Commonly occurring species included rat's-tail fescue *Vulpia myuros*, soft-brome *Bromus hordeaceus*, flattened meadow-grass *Poa compressa*, fern-grass *Catapodium rigidum*, barren brome *Anisantha sterilis*, ribwort plantain, black medick *Medicago lupulina*, and hawkweed oxtongue *Picris hieracioides*. Occasional patches of the alien grass water bent *Polypogon viridis* also occurred.

As a whole this grassland type was a relatively species-rich assemblage, although no plant species were recorded of national importance, or of particular individual significance from a botanical or nature conservation perspective. In the context of greater London this grassland is of Local botanical interest.

Ephemeral/short perennial vegetation

Areas of ephemeral/short perennial vegetation were present in association with very shallow soils, often on broken and cracked concrete hard-standing and compacted gravel substrates. This habitat type consisted of patchy assemblages of a wide range of plants typical of derelict urban sites, including weld *Reseda luteola*, creeping bent *Agrostis stolonifera*, rat's-tail fescue, barren brome, herb-Robert *Geranium robertianum*, wild carrot *Daucus carota*, perennial wall-rocket *Diplotaxis tenuifolia*, wall barley *Hordeum murinum*, and soft-brome. No native species of conservation significance were recorded, although some alien plants (of academic interest only) were present, including water-bent, narrow-leaved ragwort *Senecio inaequidens* and ripgut brome *Anisantha rigida*. The majority of the ephemeral plants present are common within greater London, and can be found on disturbed ground, such as railway-embankments and sidings, and development sites.

Other Habitats

Other habitat types present and mapped during the Phase 1 survey included areas of **introduced shrubs**, which consisted almost entirely of butterfly-bush *Buddleja davidii*, and native scattered scrub including bramble *Rubus fruticosus*, and elder *Sambucus nigra*. A small area of **dense bracken** *Pteridium aquilinum* was also present in the south corner of the site.

It is of note that the invasive alien Japanese knotweed *Fallopia japonica* occurred in a number of locations along the site's western boundary, including a relatively large stand (8 x 5m) at TQ 28981 77214, a small stand (2 x 2m) at TQ 28958 77236, a small stand (2 x 2m) at TQ 28953 77233, and a few stems at TQ 28950 77293.

Site C

This small area of land was comprised of cleared made ground of gravel and broken concrete. Around the perimeter of the site was a fringe of **ephemeral/short perennial vegetation** which included a range of typical and commonplace plant species, including white melilot *Melilotus albus*, hawkweed oxtongue, rat's-tail fescue and hoary mustard. The southern and eastern boundary of the site also supported a fringe of **introduced shrubs**, dominated by buddleja.

88 Kirtling Street

This small site, which abuts the Thames river wall to the north, was dominated by a large warehouse building and associated hard standing surrounds. Vegetation was

restricted to very occasional and scattered buddleja bushes, and individual plants growing within cracks in the hard standing. No well developed areas of ephemeral vegetation occurred, but individual plants recorded include hoary mustard, hawkweed oxtongue, Oxford ragwort *Senecio squalidus*, American willowherb *Epilobium ciliatum*, Canadian fleabane *Conyza Canadensis*, Guernsey fleabane *Conyza sumatrensis,* and pellitory-of-the-wall *Parietaria judaica*.

2.3 IMPLICATIONS FOR DEVELOPMENT

None of the habitats recorded were of high botanical or habitat value, and no native plant species of national importance were present. Wasteland is however a London Biodiversity Action Plan habitat type, and the Power Station site is undoubtedly a relatively large example of this. A long period of dereliction since the Power Station ceased operation has allowed a range of habitats to develop, including semi-improved grassland, ephemeral vegetation and relatively species-rich grassland of recent origin that together support a relatively wide range of characteristic native and alien plant species that have distinct invertebrate interest (see **Chapter 3**).

Japanese Knotweed

It is an offence to plant or cause Japanese knotweed to spread in the wild under the Wildlife and Countryside Act 1981 (as amended) (WCA), and all waste containing Japanese knotweed comes under the control of Part II of the Environmental Protection Act 1990. In advance of development proceeding, and assuming that all stands of this species cannot be avoided, it will be necessary to prepare and implement an appropriate knotweed eradication program.

3 TERRESTRIAL INVERTEBRATES

3.1 BACKGROUND

A survey of the invertebrates of the land around the buildings of the Battersea Power Station site was undertaken in the spring and summer of 2008. The aims of the survey were to assess the significance of the invertebrate fauna of the site, to describe its character, and to determine the distribution of interest. This report presents the findings of the survey. It includes a full species list, highlights the less common species captured, discusses their individual significance and distribution on the site, and makes an overall assessment of the faunal quality.

3.2 SURVEY APPROACH

Invertebrates were sampled by a small range of active collecting methods, supplemented by pitfall trapping. Active collecting methods were:

- sweep-netting of herbaceous vegetation;
- beating of woody vegetation;
- direct search of important invertebrate habitats, including the undersides of stones and debris, bare ground, wet surfaces, and known invertebrate host-plants;
- collection of individual insects from flowers;
- observation of large and readily identified insects in flight; and
- suction sampling.

Suction samples were taken using a petrol-driven garden leaf-blower, modified according to the method of Stewart & Wright (1998) (references are provided in **Appendix 3**), by taping a fine-meshed net in the inlet tube. After three minutes of sampling, the collected material was sifted through a 0.5 centimetre mesh sieve onto a white tray, and invertebrates were sorted in the field, allowing approximately 15 minutes sorting for each three-minute sampling period.

A small number of readily identified species (butterflies, dragonflies, grasshoppers, ladybirds, for example) were noted in the field. Representative examples of most recorded species were taken away for laboratory confirmation of identity. Most were removed alive either in individual glass tubes or in pooters; a few were preserved in

60% iso-propanol in the field.

Pitfall traps were plastic drinking cups, seven centimetres in diameter, sunk to their rims in the ground. To each was added 30ml of a mixture of equal parts of glycerol and a saturated solution of table salt in 5% acetic acid, with the addition of one drop of biodegradable detergent to each 100 ml. of fluid. Traps were set in lines of eight, with a spacing of approximately two metres between traps. Three groups of eight pitfall traps were run throughout the survey period: one group in the grassland and open ground in the south-west; one in the open ground in the north; and one on the lower slopes of a vegetated spoil mound (see below). These traps were emptied by filtering the contents through a fine sieve and removing larger items of debris. The remaining material was later cleaned by gentle agitation in a sieve in a bowl of water to remove mud and fine debris, and the sample preserved in 70% iso-propanol.

Subdivision of the Site for Recording Purposes

The site has been divided into four main components for recording purposes, based partly on geography and partly on habitat character. These areas are shown on **Map 1** in **Appendix 3**, and are briefly described below.

- Grassland and open ground in the south-west. A large, flower-rich area of open-structured grassland, sparse vegetation and bare ground on a substrate of varied character, generally well-drained and predominantly sandy/gravelly in the upper layers, but sometimes with a thin layer of superficial material over hard surfaces or with the hard surface exposed. A wide range of plants, including good populations of some important invertebrate host-plants, were present.
- Open habitats and localised scrub mosaics in the north, up to the riverside barrier. A rather varied area, united by the dominance of very open-structured or sparsely vegetated ground, in mosaic with areas of taller herbs and local scrub; varied structure, areas of dry gravelly ground and a good range of plant species provide potential benefit for invertebrates.
- Vegetated spoil mounds. A series of mounds of varied composition, containing rubble, soil and other material, partly open-structured over large debris fragments, elsewhere occupied by rather dense vegetation, either tall ruderals or grassland depending on age, and modified by further dumping over the course of the survey. The mounds benefit from varied topography, including south-facing slopes, good populations of some foodplants not found, or found in much smaller quantity, elsewhere on the site, and a loose and friable substrate

providing easy shelter; vegetation structure, however, was generally poor except in the most open areas. The mounds do not form a continuous area; most are concentrated in a group west of the Power Station, but a separate, grassy, mound considered of relatively low potential in the north-east is also included.

- The rail-side fringe. In the south of the site, a narrow fringe of vegetation of varied structure is rather clearly demarcated along the boundary with the railway: it includes grassland, a considerable amount of spreading bramble, scrub, especially of buddleia, and small areas of low vegetation, as well as a generally narrow transitional zone to bare and sparsely vegetated ground. West of the Power Station, where the surveyed habitat narrows, the compartment is extended to cover the full width of vegetated ground as far as and partially around the spoil mounds, stopping where the boundary of the survey area turns away from the rail route.

In addition to these main areas, separate records were maintained for species found in the small areas of habitat east of the Power Station, and for species specifically associated with the built surfaces of the railway arches in the west.

This, fairly simplistic, subdivision of the site has been made so as to enable the recorded invertebrates to be assigned to broad geographical areas and habitats, while avoiding the use of fine sub-divisions which would tend to generate high duplication of records, and in the process potentially absorb much survey and identification time, for little additional information.

Dates and Extent of Survey Work

The site was surveyed on three dates: 13 May, 5 June, and 18 July 2008 by a specialist entomologist - Dr Peter Kirby. The weather was warm and dry with at most a light breeze on all visits. The May visit was undertaken in generally sunny weather. On the other visits, the weather was overcast with sunny periods. Pitfall traps were set on the first visit, emptied and re-set on the second visit, and removed on the last visit. All the main survey areas were visited on each occasion; the small areas of habitat east of the Power Station, however, were examined only in May.

Target groups

The survey has been taxonomically wide-ranging, but has concentrated on those groups considered likely to be particularly informative as to conservation interest. It

was never the intention to attempt to generate comprehensive lists of any of these groups for the site, but rather to use taxonomically widespread recording to indicate the quality of the overall fauna of particular features and areas. The extent to which the various groups are represented in the records has been determined partly by the time of year of sampling. Significant groups in the final species list include:

- Coleoptera (beetles), especially phytophagous beetles (Chrysomelidae, Curculionoidea);
- Diptera (flies, especially Tachinidae (bristle-flies));
- Auchenorhyncha (leafhoppers);
- Heteroptera (true bugs);
- Hymenoptera –Aculeata (bees and wasps); and
- Lepidoptera (moths).

3.3 SURVEY FINDINGS

A total of 384 invertebrate species were recorded, including seven which are Red Data Book, sixteen which are Nationally Scarce, and seventeen species, apart from those with formal conservation status, which are considered to be of rare or occasional occurrence in south-eastern counties. Two additional species are priority species in the national Biodiversity Action Plan, and a further six species, without other formal status, are included in the list of priority species and species of conservation concern in the London Biodiversity Action Plan.

Table 1, below, lists and annotates all species with a formal conservation status, all species on the national and/or London Biodiversity Action Plan, and those species considered to be both of rare or occasional occurrence in the south-east, and sufficiently interesting or unusual to be of significance for site assessment. Details of conservation statuses, a full species list table, species descriptions, and references are provided in **Appendix 3.**

Table 1: Summary of Invertebrates with High Individual Nature Conservation Interest

Key to Abbreviations

Status

RDB1	Red Data Book cat 1 (Endangered)
RDB2	Red Data Book cat 2 (Vulnerable)
RDB3	Red Data Book cat 3 (Rare)
X	Extinct
Na	Nationally Scarce category A
Nb	Nationally Scarce category B
N	Nationally Scarce
BAP	National BAP Priority species
LBAP	London BAP species
pLBAP	London BAP Priority species
r	rare
o	occasional
f	frequent
c	common
Est.	Estimated current status in the south-east

Location

S	grassland and open habitats in south-west
N	open habitats in the north
M	spoil mounds
F	rail-side fringe of mosaic habitats
A	railway arches

Taxon	Status		Notes	Location				
	Formal	Est.		S	N	M	F	A
Araneae (spiders)								
Hahniidae								
Argenna subnigra		o	Sparsely vegetated areas, including waste ground; a relatively frequent species along the Thames corridor		+			
Zodariidae								
Zodarion italicum	LBAP	r	An ant-feeding spider, found under stones in open habitats; a fairly recent addition to the British list, it is still open to debate whether it is a recent arrival or an overlooked native; whichever is the case, it appears to have increased in frequency since its discovery		+			
Coleoptera (beetles)								
Anthribidae fungus weevils								
Bruchela rufipes	LBAP	f	Feeds on flowers and seeds of *Reseda lutea*; a recent addition to the British list, but now a frequent species, expected anywhere in the south-east where there are good populations of the host plant; its inclusion in the London BAP list is surprising		+	+	+	
Apionidae seed weevils								
Kalcapion semivittatum	Na LBAP	o	Feeds on *Mercurialis annua*; geographically restricted to a			+		

Taxon	Status		Notes	Location				
	Formal	Est.		S	N	M	F	A
			limited area of the south-east, but reasonably frequent within its range					
Coccinellidae ladybirds								
Hippodamia variegata Adonis' ladybird	Nb LBAP	f	A characteristic species of open-structured to sparse vegetation on dry substrates; a rather frequent species in the south-east, and undoubtedly unworthy of its status, but still rather local	+	+	+	+	
Curculionidae weevils								
Baris picicornis	Nb	f	Feeds on *Reseda lutea*; commoner and more widely distributed than in the past, and at best doubtfully worthy of its status				+	
Larinus planus	Nb	o	On thistles in open-structured dry habitats				+	
Mecinus janthinus	Nb	o	On toadflaxes *Linaria* sp.; a fairly recent addition to the British fauna, and decidedly local and erratic in occurrence, but perhaps still increasing its range	+				
Sitona cylindricollis		o	On *Melilotus* spp. ; a rather characteristic, though local, species of waste land	+	+		+	
Sitona puncticollis		o	On *Trifolium* spp. on light or stony soils; seemingly considerably declined over recent decades	+				
Histeridae								
Kissister minima		o	Sparse vegetation on well-drained, often sandy, ground	+				
Phalacridae smut beetles								
Olibrus flavicornis	RDBK LBAP	r	Open-structured dry grassland in the south-east; though uncommon, the formal status overstates the rarity of this species, which may have increased in recent years	+	+			
Throscidae								
Trixagus elateroides	RDB3	r	A surprising capture; most frequently found in upper saltmarsh, but with a scattering of records from other habitats and inland sites, the habitat requirements of this species are unclear		+			
Diptera (flies)								
Dolichopodidae long-footed flies								
Liancalus virens		o	A characteristic species of					+

Taxon	Status		Notes	Location				
	Formal	Est.		S	N	M	F	A
			seepages and trickles over rock faces, frequent on coastal cliffs and inland rocky places, and known elsewhere from trickles over built structures; here on trickling water running over the railway arches					
Tachinidae bristle-flies								
Cistogaster globosa	RDB1	o	Dry grassland, a parasite of the shieldbug *Aelia acuminata*; more frequent and widespread in recent years, and unworthy of its status				+	
Gymnosoma rotundatum	RDB3	r	Dry grassland, a parasite of the shieldbug *Palomena prasina*; an unexpected finding of a species largely restricted to Surrey and Sussex; possibly increasing				+	
Hemiptera-Auchenorhyncha (froghoppers, leafhoppers and planthoppers)								
Cicadellidae leafhoppers								
Euscelidius variegatus	Nb	f	A species of short dry grassland, always of rather erratic occurrence but more frequent now than at any time in the past, doubtfully worthy of its status	+	+			
Macrosteles quadripunctulatus	Na	o	Open-structured to sparse dry grassland; a very local species highly characteristic of its habitats, but with a gradually increasing number of records and rather easily overlooked	+	+			
Scleroracus decumanus	Nb	o	Short or open-structured dry grassland on well-drained soils; erratic in occurrence		+			
Delphacidae planthoppers								
Asiraca clavicornis	Nb LBAP	f	Characteristically associated with rather dense or tussocky grassland with open areas; at one time of restricted range, but now widely distributed in the south-east and unworthy of its status				+	
Hemiptera-Heteroptera (true bugs)								
Coreidae squashbugs								
Bathysolen nubilus	Nb LBAP	f	Feeds on *Medicago lupulina* in open-structured vegetation with bare ground on well-drained soils; has increased substantially in recent years, and is no longer worthy of its status	+	+			

Taxon	Status		Notes	Location				
	Formal	Est.		S	N	M	F	A
Miridae plant bugs								
Deraeocoris flavilinea	LBAP	c	Included in the list of priority species and species of conservation concern on the London BAP website, dated January 2008, and assigned a status of RDBK, but in fact a recent arrival in Britain, never formally assessed for status in a published review; currently a very common species throughout the south-east, and of no conservation significance			+	+	
Dicyphus ?tamaninii		?	A tentative identification of a species possibly new to Britain; of academic rather than conservation interest, and likely to prove either transient or an early foothold of a species which becomes more widely distributed			+		
Lygus pratensis	RDB3	c	Formerly a rare species of woodland rides, but greatly increased in recent years and now a common species throughout the south-east on ruderal vegetation, and of no conservation significance		+	+	+	
Rhopalidae glazier bugs								
Chorosoma schillingi		o	A dry grassland species, commoner than in the past, especially inland, but still decidedly local	+				
Stictopleurus punctatonervosus	X	c	Recently re-established in Britain; now common in ruderal habitats throughout the south-east, and of no conservation significance	+	+	+	+	
Hymenoptera (bees, wasps, ants, sawflies)								
Apidae bees								
Andrena flavipes	LBAP	c	An increased and increasing species, now common in the south-east, and of little conservation significance				+	
Anthophora quadrimaculata Four-spotted flower bee	Nb	f	Nests in burrows in of dry sunny situations; especially associated with gardens and suburban waste land				+	
Hylaeus signatus	Nb LBAP	o	Nests in hollow stems; feeds from *Reseda* spp. A rather characteristic species of				+	

Taxon	Status		Notes	Location				
	Formal	Est.		S	N	M	F	A
			brownfield land					
Lasioglossum malachurum	Na LBAP	c	A greatly increased and increasing species in the south-east, and now of little conservation significance	+			+	
Chrysididae ruby-tailed wasps								
Hedychridium roseum	LBAP	o	Open areas with sandy ground	+				
Pompilidae spider-hunting wasps								
Auplopus carbonarius	Nb LBAP	r	Often in woodland, where there is access to water and mud; here found in fringing mosaic vegetation, and possibly using the railway arch trickles as the wetland resource				+	
Sphecidae digger wasps								
Ammophila sabulosa Red-banded sand wasp	LBAP	f	Open-structured vegetation on light soils				+	
Mimesa bruxellensis	Na	r	Needs well-drained soils and open vegetation structure for nesting, and tree/shrub foliage for foraging				+	
Lepidoptera (moths & butterflies)								
Arctiidae								
Tyria jacobeae Cinnabar moth	BAP pLBAP	c	A common species on ragwort in open habitats, despite a decline sufficient to justify BAP status					
Noctuidae								
Calophasia lunula Toadflax brocade	RDB3 LBAP	r	Feeds on *Linaria* spp. in open gravelly or shingly habitats; mostly coastal, with inland records tending to be of stray adults or transient colonies; a single larvae was captured at Battersea, though feeding damage suggested the recent presence of others; of limited conservation significance in the absence of known continuity of presence	+				
Nymphalidae								
Coenonympha pamphilus Small heath	BAP pLBAP	c	A common species in dry grassland, despite a decline sufficient to justify BAP status	+	+		+	
Orthoptera (grasshoppers and crickets)								
Tettigoniidae bush-crickets								
Conocephalus discolor Long-winged cone-head	Na LBAP	c	Tall grassland; hugely increased in recent years, now common	+			+	

Taxon	Status		Notes	Location				
	Formal	Est.		S	N	M	F	A
			throughout southern counties and of no conservation significance					
Trichoptera (caddisflies)								
Psychomyiidae								
Tinodes assimilis		o	A characteristic species of seepages and trickles over rock faces, frequent on coastal cliffs, not an uncommon species nationally but scarce or absent in areas where suitable natural habitats are lacking; here on trickling water running over the railway arches					+
No. of key species				**16**	**14**	**7**	**20**	**2**

Several interesting features of the invertebrate fauna described above in **Table 1** are worthy of particular emphasis:

- The beetle *Trixagus elateroides* is an unexpected capture. This is a beetle of somewhat obscure ecology, with a wide scatter of records and associated habitats, but it is not a traditional presence on brownfield sites.
- The bristle fly *Gymnosoma rotundatum* is similarly unexpected. Brownfield sites in the south-east quite often support the related *G. nitens*, a formerly very rare species which has become rather frequent in recent years in such sites, and the finding of *G. rotundatum* instead was surprising. It is, however, logically the more appropriate species for the site: *G. nitens* is a parasite of the shieldbug *Sciocoris cursitans*, which was not recorded, and which would not be expected in a central city site; *G. rotundatum* attacks the shieldbug *Palomena prasina*, which was recorded from the site and is generally a much commoner species. It is far from clear why *G. rotundatum* has historically been such a rare species compared with its host. However, *P. prasina*, though never a rarity, has increased greatly in frequency and range in recent years, and it may be that *G. rotundatum* is similarly increasing. Not only its congener *G. nitens*, but also its closest other relative in the British fauna, *Cistogaster globosa* (recorded from this site, and another shieldbug parasite) have increased in recent years, and for *G. rotundatum* to do likewise would not be unexpected. It has become usual, in recent years, for the discovery of species of high conservation status at new sites to herald the dramatic increase of the species in question, rather than to demonstrate the high quality of the site,

and the tentative assumption is made that this is the likeliest possibility for *Gymnosoma rotundatum* on this occasion.

- The admittedly small assemblage of species associated with the trickles on the railway arches is arguably a curiosity rather than a feature of significant conservation interest. It is difficult to assess because it is far from clear how unusual the assemblage is. The area of brickwork associated with the railways alone within London is huge, and much of it inaccessible, so the frequency of trickles on such brickwork capable of supporting an associated fauna cannot be estimated. The associated fauna is limited: the caddisfly *Tinodes assimilis* and the long-footed fly *Liancalus virens* are absolutely dependent on the trickles, and there is a suspicion that the Nationally Scarce spider-hunting wasp *Auplopus carbonarius* may also be using them as a source of mud and water for nest-building, but despite visits to the trickles on each survey date and the ease with which the brick faces can be searched, the only other associated invertebrates seen were midges (Chironomidae) and moth-flies (Psychodidae), neither of which were identified.
- Traps on one of the spoil mounds captured a substantial number of lesser stag beetles *Dorcus parallelepipedus*. Though not a scarce species, this beetle breeds only in substantial pieces of timber, and no suitable habitat was seen during survey. Presumably, it was breeding in timber buried in the mounds, and dispersing to the surface.
- The finding of a putative species new to Britain is less surprising in general survey work than formerly, and perhaps least surprising in London, but nonetheless always interesting. The tentative identification of *Dicyphus tamaninii* from the site is, however, of academic rather than conservation interest. In fact, it may be doubly academic, since the exact location of the two specimens captured, on vegetation on one of the spoil mounds, was destroyed by the dumping of further material during the course of the survey, and no more of the bug could be found on later visits. Whether the identification proves right or wrong, any new species here will be a recent arrival, and is likely to prove either a transient resident, or to become more widespread and common in future years. *D. tamaninii* is a predator found on a range of plant species, including crop plants, and has attracted attention as a possible biological control agent.

Invertebrate interest was quite widespread across the site and over its contained habitats. However, no evidence of significant interest was found in the small habitat

patches east of the Power Station, and the mounds of rubble and other material proved to be of comparatively low interest, though including some uncommon and surprising species. Areas of open-structured vegetation and sparsely-vegetated ground in the south-west and north produced a good range of invertebrates, and were notable not only for the presence of a number of uncommon species, but also for the abundance of some relatively common ones, notably common blue *Polyommatus icarus* and burnet companion *Euclidimera mi*, in the grassland in the south-west. They were, however, disappointing for some ground-dwelling groups, most notably ground beetles (Coleoptera, Carabidae), of which both hand search and prolonged pitfall trapping produced only a limited range of fairly common species, and ground-bugs (Hemiptera, Lygaeidae), which were very poorly represented. The greatest concentration of interest, however, was in the mosaic and transitional habitats along the railway fringe. Aculeate and fly interest was strongly concentrated in this fringe, and overall invertebrate diversity and activity were higher here than elsewhere.

3.4 SUMMARY

The overall total of Nationally Scarce and Red Data Book species is reasonable, but not dramatically good, for a survey of this type in a brownfield site in the London area. Brownfield sites in the south-east tend to be rich in species with formal conservation status, and the capture of in excess of twenty species with formal conservation status in the course of a survey is quite routine.

The proportion of the recorded fauna composed of species with formal conservation status can be used as a crude measure of the species quality of the fauna. In general, it is rare for species with formal conservation status to comprise more than 10% of the total recorded fauna in a general survey in south-eastern counties, and a proportional representation of scarce and rare species higher than 5% can be taken as indicative of high faunal quality. It should be emphasised that these figures are a personal opinion of the surveyor (Dr Peter Kirby) rather than generally accepted criteria. The total of 23 species of Red Data Book and Nationally Scarce species recorded from Battersea Power Station forms 5.99% of the total recorded fauna, suggesting a significant but unexceptional fauna. Two factors limit the validity of this simplistic assessment: the possible limited size of the fauna; and the invalidity of many of the current formal statuses.

The total number of recorded species is low considering the amount of recording effort. This was not due to weather conditions at the times of survey, when weather

was generally good, nor to difficult recording conditions – the habitats on the site are quite easily sampled. Rather, it seems to result from a genuinely limited fauna. The impression gained from individual visits was also of a limited range of species: on each visit, the number of recorded species was lower than might usually be expected from habitats of this type in the south-east, specific searches for species for which suitable habitat seemed present regularly proved negative, and even amongst common and easily recorded species there are obvious gaps in the species list. Pitfall trapping similarly recorded a limited range of species: catches were large, but diversity was low, and the catches were dominated by a very small range of species.

The chief strength of measures of faunal quality based on proportional representation of uncommon species in a sample of the fauna is that they are, to a reasonable extent, independent of sample size. This, however, becomes a weakness for assessment purposes where the fauna is known or strongly suspected to be of limited extent: a fauna of a thousand species, a hundred of which are rare, gives the same result as a fauna of a hundred species, ten of which are rare. Thus, though the fauna at this site is undoubtedly of good quality, and in large measure very characteristic of good brownfield habitats, it probably does not begin to compare, in overall value, with faunas of similar quality on larger sites, those on the outskirts of the city, and those, as in the outer Thames corridor, which form part of larger, closely-spaced, complex of brownfield sites.

Of the seven Red Data Book species recorded, four are undoubtedly unworthy of their status, one is questionably so, and one (the toadflax brocade *Calophasia lunula*) may well be only a transient resident. Five of the Nationally Scarce species are similarly unambiguously unworthy of their status, two more are highly questionable, and several others leave room for doubt. The two national BAP species are both still common, and though the decline which gives rise to their inclusion in the BAP is a cause of concern, they do not significantly contribute to the overall invertebrate quality of this site. Finally, though it is not the place of this report to question the selection of species included in the London BAP, several species – notably the beetle *Bruchela rufipes* (widespread, frequent and probably increasing), the bug *Deraeocoris flavilinea* (very common), and the bee *Andrena flavipes* (greatly increased in recent years) - cannot be considered of high value for assessment purposes.

Overall, therefore, the fauna must be considered interesting, to include a number of genuinely uncommon species and, as is not infrequent in artificial sites in cities, to include surprising elements. Its value is reduced by the facts that the fauna does not

appear especially rich, and that a substantial proportion of the formal conservation statuses of the recorded species are no longer appropriate. Assessment is made difficult by uncertainty as to the statuses of some species, or of their ecology or degree of permanence on the site. There must also be an element of uncertainty, in some aspects of the fauna, whether what was found is very unusual in the area, or whether the survey has merely allowed a local insight into a more widely established assemblage – this is perhaps especially so with the unexpected fauna associated with trickles on the railway arches.

In summary, therefore, the invertebrate fauna of Battersea Power Station can be considered to be of undoubted value at the **Borough** level, but falls short of significance for London as a whole.

3.5 IMPLICATIONS FOR DEVELOPMENT

Re-development of the site will inevitably lead to a loss in the invertebrate interest of the site has semi-natural brownfield habitats (notably the mosaic and transitional habitats along the railway fringe) are replaced by buildings and hard standing and more formal amenity soft landscaping with limited invertebrate potential. It is recommended that consideration is given to the creation of brownfield type habitats within the new development – possibly at roof-top level within the wider site in order maintain a 'wasteland' type environment for the benefit of Black Redstart (see **Chapter 5**) rather than terrestrial invertebrate conservation per se.

4 REPTILES

4.1 INTRODUCTION

All UK native reptile species are protected by law. The WCA provides the legal framework for this protection. Sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca* are rare species that have restricted distributions in the UK and the greatest level of legal protection. These species are not considered likely to occur at the Battersea Power Station site and need not be considered further by this study.

The more widespread and common reptile species, namely common lizard *Lacerta vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix natrix*, and adder *Vipera berus,* and are protected against deliberate or reckless killing and injury. All six species of British reptile are also listed on the UK Biodiversity Action Plan. Natural England (formerly English Nature[2]) considers that reptiles are likely to be threatened and the law breached by activities such as the following:

- Archaeological and geotechnical investigations;
- Clearing land, installing site offices or digging foundations;
- Cutting vegetation to a low height;
- Laying pipelines or installing other services;
- Driving machinery over sensitive areas; and
- Removing rubble, wood piles and other debris.

Under the WCA, a conviction can result in a fine, and/or up to six months imprisonment for each offence. Harm to more than one animal may be taken as separate offences. The police may also confiscate any item, such as equipment, vehicles or machinery used to commit the offence.

4.2 SURVEY APPROACH

A standard reptile survey of all potentially suitable reptile habitat was undertaken between April and August 2008. A total of 90 artificial reptile basking/shelter refugia measuring approximately 0.5m x 0.5m were cut from rolls of bituminous roofing felt and placed in locations in well-lit grassland locations in the southern corner and along the entire western boundary of the site adjacent to the rail line. A selection of sparsely vegetated areas in the north-west corner and on rubble piles to the north were also surveyed using refugia.

The refugia were put out on 14 April, and thereafter checked on eight separate occasions (25 April, 13, 14, 28 May, 26, 27 June, and 31 July) in the morning (before 10.00am), or in the late afternoon (from 15.30 hours) and always in weather conditions considered suitable for reptiles to be active (avoiding heavy rain, and air temperatures of less than 5^0C).

4.3 SURVEY FINDINGS

No reptiles were recorded on or under any refugia, and no reptiles were seen during other survey work within the site.

4.4 IMPLICATIONS FOR DEVELOPMENT

It can be concluded that reptiles are not currently present within the site, or present in very low and isolated populations. Re-development of the site is, therefore considered unlikely to have any significant adverse impact on reptile populations.

[2] English Nature (2004) *Reptiles: guidelines for developers*.

5 BIRDS

5.1 INTRODUCTION

All UK species of wild bird and their nests and eggs are protected by law (for the whole or part of the year) by the WCA (as amended and strengthened by the Countryside and Rights of Way (CROW) Act, 2000). This makes it an offence, with certain exceptions, to intentionally or recklessly kill, injure or take any wild bird, and take, damage or destroy the nest of any wild bird while it is in use or being built. Some bird species with high individual levels of conservation importance are protected at all times and by special penalties under Schedule 1 of the 1981 Act. Peregrine *Falco peregrinus*, and Black Redstart *Phoenicurus ochruros*, both of which are known to have bred on Battersea Power Station in recent years are listed in Schedule 1.

The population status of birds regularly found in the UK, Channel Islands and the Isle of Man is reviewed every five years to provide an up-to-date assessment of conservation priorities[3]. A total of 247 species has been assessed and placed onto one of three lists of Conservation Concern – Red, Amber or Green. Forty species are Red-listed, 121 are Amber-listed and 86 are Green-listed.

Seven quantitative criteria are used to assess the population status of each species and to place it on the Red, Amber or Green list. These were: global conservation status, recent decline, historical decline, European conservation status, rare breeders, localised species and international importance.

Red-list species are those that are Globally Threatened according to the IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery.

Amber-list species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations.

Green-list species are those that do not fulfil any of the Red or Amber-list criteria and they are not considered further here.

[3] Gregory, R D; Wilkinson, N I; Noble, D G; Robinson, J A; Brown, A F; Hughes, J; Procter, D A; Gibbons, D W and Galbraith, C A (2002) *The Population Status of Birds in the United Kingdom, Channel Islands and Isle of Man: an Analysis of Conservation Concern 2002-2007*. British Birds 95: 410-450.

5.2 SURVEY APPROACH

The entire Battersea Power Station site was surveyed for breeding birds. However, survey concentrated particularly on the two Schedule 1 species known to be regular breeders on the site, i.e. Peregrine and Black Redstart. The presence of other species using the site was noted, and their status assessed, but territories were not mapped.

Black Redstart

Survey for this species followed the methodology cited in Gilbert et al (1998)[4] where at least five fortnightly site visits from mid-April to the end of June are recommended.

In total, seven visits were made to the site between 25 April and 18 July. All visits were made in the early morning, several starting an hour before sunrise because Black Redstart on territory is known to sing in the pre-dawn dark. Surveys lasted between four and six hours, during which times the Power Station and its associated buildings and open ground areas were searched for Black Redstarts and their song listened for.

Registrations of Black Redstart sightings, movements and songs heard were mapped in the field during each visit and then transferred to a single map to give an indication of the extent of any territory held.

Peregrine

This species was surveyed by observation of birds' activity and behaviour during all bird survey visits between 25 April and 18 July 2008. Potential nesting locations were known, since nest boxes, used in past seasons, were positioned on the east face of the building, and on a specially erected gantry in the north-west of the site.

Survey Restrictions

Owing to health and safety considerations, surveys were always undertaken around the periphery of the Power Station and not within it where there was a perceived risk of injury through falling masonry. No adverse weather conditions were encountered which could have significantly reduced the chances of locating birds, though a visit on 19 June encountered considerable noise and human activity related to the filming of a movie, for which a set had been built on the east side of the Power Station.

[4] Gilbert, G: Gibbons, D W; Evans, J (1998) *Bird Monitoring Methods a manual of techniques for key UK species*. RSPB in association with BTO, the WWT, JNCC, ITE and the Seabird Group.

5.3 SURVEY FINDINGS

Black Redstart

Black Redstart registrations made during the surveys are summarised in **Table 2** below. **Figure 2** indicates the locations of all registrations of Black Redstart during the survey. They show that a single male in sub-adult plumage held territory along the eastern edge of the Power Station and sang there from mid-May to at least 19 June. No evidence was found during this period that this bird had a mate or was feeding young, nor that any other Black Redstarts held territory within the site. However, observations by David Morrison of the London Peregrine Working Group, and by on-site personnel, did indicate the presence of more Black Redstarts than this single bird.

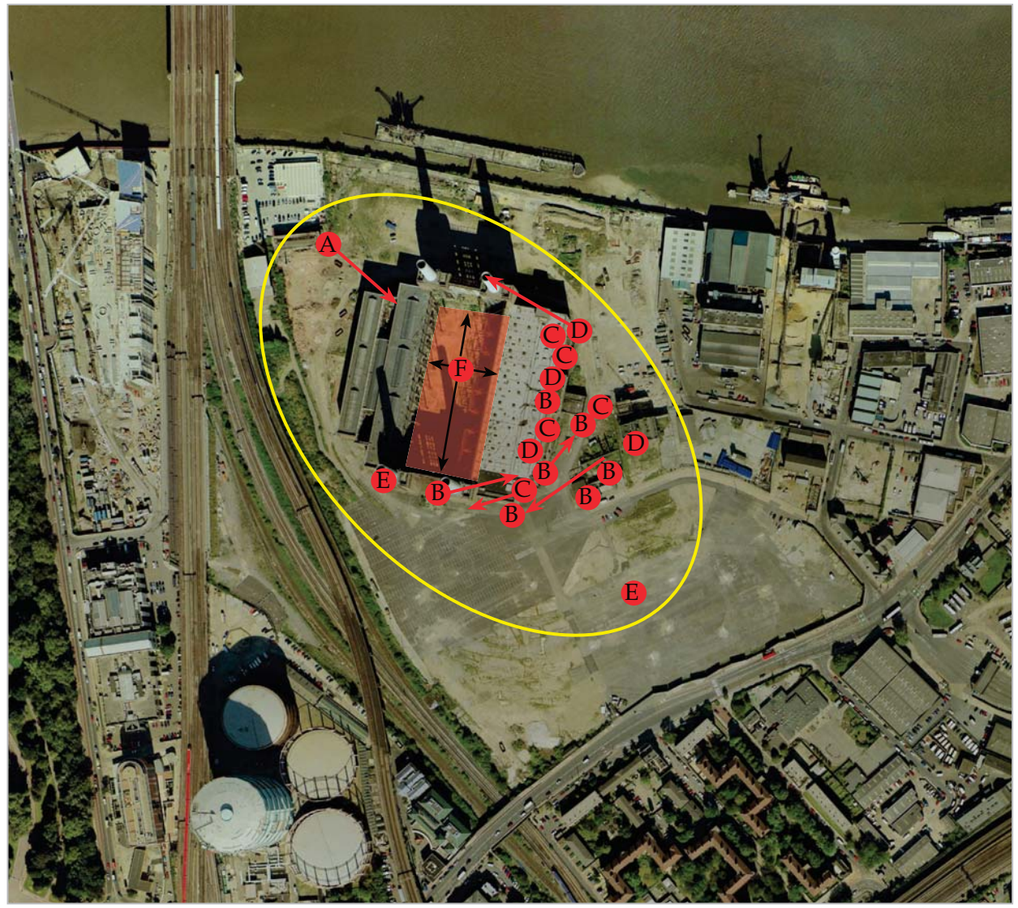
On 19 April, for instance, an adult Black Redstart was noted on the west side of the building and this was seen to disappear inside the Power Station. On 26 April, two male Black Redstarts were reported on site, and a female was also seen. The sub-adult male, recorded on the building's east side, was thought by the observer to be already paired and about to commence breeding.

On 31 May a pair of Black Redstarts was reported favouring the east side of the Power Station, and another male was in song on the west side.

Of particular importance was the observation on 17 July by Mike Dite, Site Restoration Manager, of two Black Redstarts feeding young within the Boiler House inside the Power Station. This led to a visit by an AEL ecologist on the following day, the results of which are shown in **Table 2**.

Table 2: Observations of Black Redstart

Date	Observation
25-April	No Black Redstarts recorded
28 April (visit A)	Single sub – adult male or female foraging on rubble piles and perching on fences in north-west of site.
14 May (visit B)	Single sub-adult male in song, and briefly foraging in south-east sector of the Power Station.
28 May (visit C)	Observations of same bird as on 14 May. Territory seen to extend to north-east corner of Power Station and into scaffolding yard to the south-east of the Power Station.
19 June (visit D)	Observations of same bird in song along eastern aspect of the building, and foraging, though not collecting food for young, amongst rubble piles to the north of the building.



Key

Estimated territory of 1-2 pairs of Black Redstart in 2008

N

A : 28 April 2008 - 1 x female/1st-year bird (not singing)

B : 14 May 2008 - 1 x singing sub-adult male

C : 28 May 2008 - 1 x singing sub-adult male

D : 19 June 2008 - 1 x singing sub-adult male

E : 27 June 2008 - 1 x singing male (not seen)

F : 18 July 2008 - 1 x singing sub-adult male, 3 x immature/1st-year birds, 3 x recently fledged juveniles

Battersea Power Station
Figure 2: Black Redstart 2008 Breeding Survey Results

27 June (visit E)	Black Redstart song heard at west end of the Power Station's southern aspect.
18 July (visit F)	Following-up a report that Mike Dite had observed two Black Redstarts carrying food in the boiler house of the Power Station on 17 July, a total of seven birds were seen there (an adult male, three females/sub-adult males, and three juveniles).

We conclude from these observations over the breeding season that one pair of Black Redstarts certainly bred within the Power Station in 2008. Interpretation of the results of 18 July indicates that this pair may have reared two broods. Based upon some of the reports by David Morrison, we nevertheless consider that it remains possible that a second pair bred or attempted to breed on the site. However, the considerable number of hours of survey undertaken by AEL and the ease and regularity of hearing and observing the single sub-adult male bird, we believe indicates that it is unlikely that further pairs were missed.

Peregrine

A pair of Peregrines was resident at the site, and both birds were watched on every visit except that on 14 May when a lone bird only, a male, was seen. Observations by AEL and by David Morrison of the London Peregrine Working Group, confirmed that Peregrines, though holding territory on the site, failed to breed there in 2008.

Survey visits during April indicated that breeding may have been attempted, since both birds were observed in and close to the southern-most of two nest boxes provided high on the east wall of the Power Station. Other Peregrines, both male and female, were noted overhead on some visits, and on 25 April, this elicited some aggressive territorial behaviour from the pair. However, after this date, AEL surveyors never witnessed any truly territorial behaviour by either member of the pair, though passing Carrion crows were occasionally harassed.

From mid-May, by which time breeding Peregrines should be feeding young several weeks old, there was no evidence from their behaviour that either member of the pair was feeding a brood, or that they were strongly territorial. Both birds spent much time perched on the building's chimneys and on the north wall. Sometimes the selected perch was a tall gas storage structure located off-site to the south-west, beyond the railway line.

Occasionally the Peregrines were seen to fly off some distance to hunt, or to hunt nearby, but on every occasion when observed returning with food (invariably feral

pigeons) the birds would disappear into the southern section of the building and clearly not enter a nest site with it.

It was concluded that Battersea Power Station does constitute a Peregrine breeding territory, but that the known pair failed to breed in 2008.

Other birds

Twenty-two other bird species were recorded on and over the site. **Table 2** lists these, in alphabetical order, and gives comments on their apparent status at Battersea Power Station, based on observations made during surveys primarily for Black Redstart and Peregrine.

Three Red-listed species, and five Amber-listed were recorded. Nesting on the site by the Red-listed species was not observed, and was considered unlikely owing to a lack of suitable habitat, which further decreased as the summer progressed, through active clearance. Nevertheless, the site's open ground, particularly the areas west and south of the Power Station, was seen to provide foraging locations for all three species and was therefore considered to be an important part of the territories of these birds.

Of the Amber-listed species, only Dunnock and Grey Wagtail were judged to be important, since the other species were recorded only as over-flying birds. Grey Wagtail was seen to carry food into the Power Station building itself, and Dunnock held territories along the western edge of the site, in association with scrub adjacent to the railway line.

Table 1: Status of other Bird Species

A = Amber-listed Birds of Conservation Concern
R = Red-listed Birds of Conservation Concern

Species	Comments
Blackbird	At least three territories on the western edge and one in the north of the site. One territory included the south-western corner of the Power Station.
Blackcap	A single male migrant in the southern-most corner on one occasion.
Canada Goose	Occasional singles and groups over- flying the site.
Carrion Crow	Occasional over-flying birds on each visit.
Coot	Two pairs (at least one breeding) at the Thames edge.
Cormorant (A)	Regular and frequent over-flier, usually in a north-east-south-west orientation.
Dunnock (A)	At least two territories along the western edge.
Feral Pigeon	Abundant within the Power Station and frequent over-flier.

Gadwall (A)	Up to six birds over-flying the site, on most visits and usually found on the nearby Thames.
Grey Heron	Singles over-flying the site on most visits.
Grey Wagtail (A)	One pair bred within the site.
House Sparrow (R)	Thought not to breed, but regularly seen foraging in the south of the site. Up to seven birds.
Linnet (R)	Territory occupied by at least two pairs on the western edge of the site.
Magpie	Maximum of two birds foraging in the south of the site on several occasions.
Mallard	Small numbers of birds occasionally over-flying from the Thames.
Robin	Three territories along the western edge of the site.
Starling (R)	Small numbers over-flying the site early in the period, and flocks of up to 40 juveniles foraging on waste ground there in June.
Swallow (A)	Migrants seen overhead during May but thought not to breed on the site.
Swift	Small numbers over-flying but not breeding on the site.
Wheatear	A single migrant in the north of the site in mid-May.
Woodpigeon	An uncommon over-flier.
Wren	At least three territories along the western edge and one to the north of the site.

5.4 IMPLICATIONS FOR DEVELOPMENT

Black Redstart

Black Redstart is a species which, in Britain, habitually nests in extensive derelict buildings. It will also tolerate a considerable amount of human disturbance compared with many other species. Nevertheless, where breeding is known to be taking place, disturbance close to the nest site, especially habitat destruction, must be avoided. Black Redstart is a summer visitor to Britain and this means that the months between the end of one breeding season and the start of the next, say, from early August until early April, constitute a long period of time during which site development may take place without the risk of contravening provisions of the WCA.

Ideally, the site should be made as unattractive as possible to breeding Black Redstarts prior to the species' arrival around mid April. However, Battersea Power Station presents a very large area of potential breeding habitat and nesting locations for this species, so pre-breeding season measures to reduce the chances of Black Redstart nesting on the site will be very difficult to employ successfully.

Reducing the attractiveness of foraging habitat may be one method of reducing the carrying capacity of the site for the species. Thus, the removal of all vegetation (and

the prevention of its re-growth) in the open areas surrounding and within the Power Station, and the resultant reduction in the supply of invertebrate and plant-based food will go some way to rendering the site less Black Redstart friendly.

Where the programme of development works is known far enough in advance, Black Redstarts may be excluded from critical parts of the building where severe disturbance is necessary or likely, by the pre-breeding season blocking or netting of all suitable nesting holes, alcoves and ledges.

These measures may go some way towards preventing use of the site by Black Redstart during its re-development. However, we feel that owing to the large size of the area, the suitability of the habitat (even during the development phase of the site), the presence of suitable foraging ground along the adjacent railway line and the river Thames edges, and the species' ability to cope with human disturbance, Black Redstart is likely to set up one or more breeding territories while site work is on-going. For this reason, it remains essential that a careful watch be maintained for evidence of breeding by more than one pair of this species during the spring and summer months. Should such evidence be found, nesting sites should be identified and exclusion zones must be set up around them, within which all re-development activity should be stopped until the end of July, by which time all young, even from late broods, should have achieved independence from their parents.

It is recommended that measures be put in place during and after site re-development which improves its carrying capacity for Black Redstart. This particularly relates to the provision of suitable nesting locations within the structure of the building, and the provision of so-called 'brown', or 'green' roofs and areas of sparsely vegetated and stony ground attractive as foraging areas for the species.

Peregrine

Peregrine is another species that may breed successfully in areas of considerable human disturbance, such as working quarries where use of explosives and heavy machinery is the norm. Therefore, should traditional and potential nesting sites remain at the site during the re-development, Peregrines may attempt to use them, and may breed successfully if the locations remain undamaged and accessible to them.

Ideally, from the point-of-view of site demolition, the birds should be discouraged from nesting on the building itself and to this end it is recommended that nest boxes presently provided for Peregrine be removed from the building well in advance of

the breeding season. The species occupies territories early in the year, so box removal should take place no later than the end of the year preceding demolition. If proposed development work can allow retention of the gantry and nest box provided for Peregrines, currently positioned in the north-west of the site, this is likely to provide an attractive alternative nest location which the pair could use during re-development of the site.

Nevertheless, it remains likely, in our view, that Peregrines will attempt to nest on the building, even in the absence of nest boxes, owing to the presence of suitable nesting ledges throughout the building. For this reason, it remains essential that a careful watch be maintained for evidence of breeding by this species from early spring to mid-summer. Should evidence be found, the site should be identified and an exclusion zone be set up around it, within which all re-development activity should be stopped until the end of July, by which time young should have fledged and be independent of the nest.

Following site re-development, the replacement of nest boxes for Peregrines is recommended in order to maintain the site's attractiveness for the species. The re-developed site is unlikely to provide the current source of feral pigeon prey used by Peregrines, but the species maintains an extensive hunting range so it is unlikely that reduced pigeon numbers locally will adversely affect the attractiveness of the building as a nesting location for Peregrine.

Red – and Amber-listed Species

It is considered unlikely that the Red-listed House Sparrow, Starling and Linnet will be affected significantly by development of the site. In 2008, these species were not recorded nesting on site, though they did feed on the open ground within its boundary.

Two Amber-listed species bred within the site in 2008; Dunnock and Grey Wagtail. The latter species nested within the Power Station building itself, and Dunnock probably nested, and certainly held territories, within small areas of scrub along the western site boundary. All work that requires the demolition or removal of potential breeding habitat for these and all other bird species should be undertaken to avoid in contravention of the provisions of the WCA.

6 BATS

6.1 INTRODUCTION

Historic bat survey work completed at Battersea Power Station over the main bat activity period in 2003 has verified roosting use of Common 45 kHz Pipistrelle bats within the Power Station building. No evidence was found to suggest that the building supported a maternity roost, with only relatively low numbers (between 2 and 12) individual bats being recorded within the building on any one survey occasion.

Legislation

All UK bat species are protected by two separate legislative frameworks: the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) and the WCA,

Under Section 39 (part 1) of the amended Regulations a person commits an offence if he:

"(b) deliberately disturbs wild animals of any such species [i.e. a European Protected Species] in such a way as to be likely significantly to affect:

I. *the ability of any significant group of animals of that species to survive, breed, or rear or nurture their young; or*

II. *the local distribution or abundance of that species."*

Although the term a 'significant group' cannot easily be defined, and may vary between species, the construction of this limb of the offence clearly excludes individual animals from its scope.

A person would also commit an offence under Section 39 if he:

"(d) damages or destroys a breeding site or resting place of such an animal [European Protected Species]."

Destruction or damage to a bat roost, whether a bat is present or not, would constitute an offence as bats return to the same places year after year, and there are no qualifications, exemptions or defences for this apart from a licence (see below). Any degree of damage could qualify as an offence and there is no threshold of 'significant' as for the deliberate disturbance offence. Section 39 (part 11) goes on to state that a person guilty of an offence "*is liable on summary conviction to imprisonment*

for a term not exceeding six months or a fine not exceeding level 5 on the standard scale, or to both."

Licences

In England, such offences can be licensed by Natural England for a number of purposes set out in regulation 44. These include 'imperative reasons of over-riding public interest', which could cover the deliberate significant disturbance or destruction of a bat roost during development operations. Licences can only be issued where there is no satisfactory alternative and where the action authorised will not adversely affect the conservation status of the species involved.

Section 9 of the WCA make a person guilty of an offence if intentionally or recklessly:

(a) he damages or destroys any structure or place which any wild animal on Schedule 5 [all bat species] uses for shelter or protection;

(b) he disturbs any such animal while it is occupying a structure or place which it uses for shelter or protection; or

(c) he obstructs access to any structure or place which any such animal uses for shelter or protection.

The existence of two separate disturbance offences in two separate legislative frameworks presents a challenge of interpretation and application. Neither can be dismissed as they both operate in rather different ways. The offence in the Regulations does not apply to non-significant disturbance and seems unlikely to apply to individual bats, but is licensable for development purposes, particularly with respect to damage or destruction of a bats breeding site or resting place. The offence in the WCA applies to individual animals, but only in places of shelter or protection, is not licensable for development, but is subject to two important defences. These are:

1. that the action took place within a dwelling-house; or
2. that the act was the incidental result of a lawful operation and could not reasonably have been avoided.

For bats, these defences cannot be relied upon, except in the living-area of a dwelling–house, unless Natural England have been notified and allowed a reasonable time to advise on whether the proposed operation should be carried out

and, if so, the method to be used.

Ecology

The distribution and conservation status of the 17 species known to occur in mainland UK are shown in **Table 1.**

Table 1: Distribution and conservation status of the 17 bat species known to occur in mainland UK (Status from Hutson[5] and the Bat Conservation Trust[6])

COMMON NAME	SPECIES NAME	DISTRIBUTION/STATUS	IUCN STATUS
Natterer's Bat	*Myotis nattereri*	Widespread/Frequent	Vulnerable
Daubenton's Bat	*M. daubentonii*	Widespread/Common	Not threatened
Whiskered Bat	*M. mystacinus*	Widespread/Scarce	Vulnerable
Brandt's Bat	*M. brandtii*	Widespread/Scarce	Vulnerable
Bechstein's Bat	*M. bechsteinii*	Restricted/Rare	Vulnerable
Greater Mouse-eared Bat	*M. myotis*	Classified as extinct within U.K.	Vulnerable
Soprano Pipistrelle Bat	*Pipistrellus pygmaeus*	Widespread/Common	Not threatened
Common Pipistrelle Bat	*Pipistrellus pipistrellus*	Widespread/Common	Not threatened
Nathusius' Pipistrelle Bat	*Pipistrellus nathusii*	Unknown	Not threatened
Brown Long-eared Bat	*Plecotus auritus*	Widespread/Common	Not threatened
Grey Long-eared Bat	*Plecotus austriacus*	Restricted/Rare	Not threatened
Leisler's Bat	*Nyctalus leisleri*	Widespread/Scarce	Vulnerable
Noctule Bat	*Nyctalus noctula*	Widespread/Common	Not threatened
Serotine Bat	*Eptesicus serotinus*	Restricted/ Frequent	Vulnerable
Barbastelle Bat	*Barbastella barbastellus*	Restricted/Rare	Endangered
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	Restricted/Rare	Vulnerable
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	Restricted/Rare	Vulnerable

The Bat Conservation Trust (BCT) lists six of the 17 species that have been identified by the UK Government as needing special conservation help due to their rarity or significant decline. All six species have Species Action Plans (SAPs) listed on the UK Biodiversity Action Plan (BAP). These plans have the objective of increasing their

[5] Hutson, A.M. (1993) Action Plan for the Conservation of bats in the United Kingdom,
[6] The Bat Conservation Trust, accessed at www.bat.org.uk.

existing population levels through protecting and enhancing the quality of their roosting and foraging habitats. Plans exist for the following species:

- Greater Horseshoe Bat (*Rhinolophus ferrumequinum*);
- Lesser Horseshoe Bat (*R. hipposideros*);
- Bechstein's Bat (*Myotis bechsteinii*);
- Barbastelle Bat (*Barbastella barbastellus*);
- Soprano Pipistrelle Bat (*Pipistrellus pygmaeus*);
- Brown Long-eared Bat (*Plecotus auritus*); and
- Noctule (*Nyctalus noctula*).

The majority of the bats found in mainland UK all belong to the family Vespertilionidae. Although each species may have its own specific preferences for the structures it uses for roosting, and different dietary and foraging habitat needs, all of these bats show a common life history and annual cycle of behaviour. These include the following characteristics and/or events:

- All bats use torpor to save energy whenever food supplies are scarce. Torpid bats use less than 1% of the energy used by active bats, even when resting. Winter torpor, or hibernation, involves extended torpor for many days. It generally occurs between November and April. Winter roosts must provide cool, damp conditions. Such conditions occur in underground structures such as caves, disused mines and tunnels.
- When fully active, bats must have access to large amounts of insect food supplies. Individuals may need to eat over 50% of their body weight per day. This particularly applies to females nursing young. Summer roosts must provide bats with warm conditions to reduce the costs of regulating their body temperature. Normally bats congregate in colonies in summer to share the costs of keeping warm. Maternity colonies are the largest. They may use holes and crevices in trees or building attics as summer roosts, especially those warmed by the sun.
- Some bat summer roosts contain only a few, or even a single bat. Mature males often occupy such roosts as mating sites.
- Bats normally use the same summer and winter roosts, especially maternity roosts and hibernation sites, on an annual cycle over long time periods. Species that use trees for roosting are most likely to use a number of different summer

roosts. Some bat populations have been shown to occupy 19 different roosts in a single summer.

- Bat reproduction is unique among mammals. Bats usually mate in the autumn and early winter, but sometimes also in spring. Males may advertise for females from their roosts using social calls (Pipistrelles, Noctules, Leisler's), or visit underground swarming sites and wait for females to arrive (Myotis bats, Brown long-eared, Serotines). Sperm is stored until the spring by both sexes.
- Fertilization occurs in spring, and pregnancy proceeds up to June, when single births occur. Poor weather (cold, or wet and windy) prevents bats from feeding at any time of the summer. The use of torpor to survive poor weather may prolong a female's pregnancy and/or reduce her milk supplies during lactation. Hence climatic conditions affect reproductive performance survival and ultimately population levels over time.
- Numbers at maternity colonies peak between June and mid August, when climate and insect availability are normally most favourable. The single young are large (about 20% or more of the mother's body weight) at birth and grow rapidly. They are fully grown and weaned by about 45 days after birth. By late August large maternity colonies have dispersed; the bats moving to alternative summer roosts. In September and October, bats mate and store fat for winter hibernation.

6.2 SURVEY APPROACH

Emergence and Dawn Return Surveys

Five sets of evening "emergence" and pre-dawn "return" surveys have been completed in an attempt to confirm bat species, number, and roosting activity within Battersea Power Station and a closely located listed building to the east of the Power Station. The use of fixed bat detectors set to record bat activity throughout each survey night have also been employed to build a picture of bat activity across the bat active season in 2008 on the following dates:

- 13 May (emergence) -14 May (return);
- 26 June (emergence) – 27 June (return);
- 31 July (emergence) – 1 August (return);

- 28 August (emergence) – 29 August (return); and
- 2 October (emergence) – 3 October (return).

Four AEL ecologists were utilised on each survey occasion, with assistance from a fifth ecologist from URS during the June survey. The positions of each surveyor during the emergence watches were varied around the outer periphery of the Power Station, and within the building on each occasion in an attempt to establish roost locations. Account was taken of the results of the previous survey visit findings when choosing survey positions.

A single emergence and return survey of the adjoining listed building to the east of the Power Station was completed in June by two AEL surveyors located at opposite corners of the building. On all other occasions, survey activity focussed on the Power Station itself. Access into the large central open void in the centre of the Power Station called the Boiler Room (considered to be unsafe as a result of falling masonry at the start of the survey period) was only possible during the final two surveys in August and October. Access to internal above ground roof voids above Turbine Halls A and B was also restricted to hours of daylight, and then was limited on account of health and safety concerns.

Each surveyor was equipped with a hand-held electronic bat detector (Pettersson D230X, or Bat Box Duet frequency division machine) linked to a time synchronised digital recorder set to record automatically all bat calls heard. In addition to the hand held detectors, up to three time expansion Tranquility Transect (TT) bat detectors (set to record at 320 milliseconds and 32 division and linked to time synchronised digital recorders), and two Anabat SD1 detectors were set up in fixed positions within and around the periphery of the Power Station on each survey occasion. The fixed detectors were set to run throughout the night, and their locations were varied on each survey visit to take account of previous survey findings to maximise survey coverage across the site. A night vision scope with infrared illuminator was also used during the activity survey to assist in establishing the location of roosting bats.

On each survey occasion, the emergence survey commenced fifteen minutes before sunset and continued until it was too dark to see bats effectively at around 90 minutes after sunset. The return surveys commenced in darkness 90 minutes before sun-rise, and continued until 15 minutes after sun-rise. During the pre-dawn survey, surveyors patrolled a wider survey position about the previous evening emergence

location. Persistent rain fell towards the end of the June emergence survey but this did not appear to significantly compromise bat activity that evening. On all other occasions survey weather conditons were suitable for bats to be active.

Building Survey

An internal survey of the Power Station was completed during daylight hours on 13 June 2008 by an AEL ecologist licenced by Natural England to disturb bat roosts (Dr Duncan Painter - NE Licence no. 20073629). The objective of the survey was to record any obvious presence of bat roosting activity within all safely accessible rooms, and roof voids across the entire Power Station building. Areas where access permission was restricted were surveyed in the company of the building's restoration manager Mike Dite. A high powered (1m candle power) torch, small dental mirrors, and ladders were used during the survey as considered necessary. Given the overall size and scale of the Power Station, and reflecting that innumerable potential crevice and hole type features exist within the fabric of the building that could not be accessed, the inspection cannot be considered to be have been a comprehensive survey.

6.3 SURVEY FINDINGS

A summary of the significant findings of the survey work is set out below on a month by month basis.

May

A single Common 45 kHz Pipistrelle was observed and recorded flying in a westerly direction towars the rail line from the west side of the Power Station, at 35 minutes after sunset. No other bats were seen by any surveyor that evening or the following morning. The various fixed detectors recorded low numbers of Common Pipistrelle calls (including social calls) within Turbine Hall B from 21.06 (26 minutes after sunset) until 23.38. Detectors located around the outside of the building recorded Common Pipistrelle calls (including social calls) along the west side of the building throughout the night from 21.18 until 03.06.

June

Two Common Pipistrelle bats were seen briefly at the north end of Turbine Hall B at 23 minutes after sunset. The bats flew around the end of the Hall close to the surveyors position at about 5m above the ground for two minutes before departing

in an unknown direction. A single Common Pipistrelle was witnessed and recorded during the period of first light before dawn flying a repeated circular flight path at the north end of Turbine Hall B (5m above the ground) close to where they were observed during the emergence survey for around one minute before disappearing from sight. A fixed bat detector located on flat external roof above Turbine Hall B recorded 200 Common Pipistrelle calls over a five minute period just prior to first light (02.57-03.01), but very few other calls during the night.

July

Two Common Pipistrelle bats were witnessed and recorded flying around the north east corner of the Boiler Room at an estimated height of 20m above ground from 20.53 (1 minute after sunset). One of these bats stayed in this general location until 21.12, and the second until 21.18. At 21.12, a single Common Pipistrelle bat was recorded and observed flying west from the west side of the Power Station towards the rail line. At 21.33 a single Common Pipistrelle was witnessed flying out of the north-east corner of the Power Station in a north-easterly direction towards the River Thames. Common Pipistrelle calls, including many social calls, were recorded by fixed detectors located in Turbine Hall B virtually continuously throughout the night. A single Common Pipistrelle was witnessed flying up and down the eastern side of the Boiler Room (alongside Turbine Hall B) at 20m above ground level 30 minutes before dawn the following morning. It was not seen to return to a particular roosting location.

Fixed bat detectors recorded Common Pipistrelle calls (including social calls) throughout the night in Turbine Hall B. A fixed bat detector located in the north-east corner of the Power Station recorded calls of a single unidentified *Myotis* bat at 45 and 46 minutes after sunset, followed by another call ay 01.35 in the morning. The bat was not seen to emerge despite a surveyor being located in this area during the evening. However, the possibility exists that the bat was roosting in the Power Station and returned to its roost the following morning. The most likely of the *Myotis* species to be using the site would be Daubenton's bat *Myotis daubentonii*, a species that is widespread and common throughout the UK.

August

In August, when access into the Boiler Room was possible, five individual Common Pipistrelles were observed and recorded interacting and foraging within the airspace of the Bolier Room at 20m above ground level for 27 minutes. They were first

observed in this location at nine minutes after sunset. It was not clear from where within the Power Station the bats had emerged as they were not concentrated in one particular area, and were at a height that made observation difficult against the dark background of the inner Boiler room walls. The following morning before dawn only a single Common Pipistrelle was witnessed. This bat flew into the north-east corner of Turbine Hall B from the Boiler Room at 04.46 (1 hour and 16 minutes before dawn) from where it disappeared from sight. However, calls of Common Pipistrelle (including numerous low ferequency calls characteristic of male song flighting) were recorded at regular intervals within the Boiler Room and Turbine Hall B up until 05.51 (11 minutes before sun rise).

October

Common Pipistrelle calls were first heard in the Boiler Room and Turbine Hall B at 18.46 (8 minutes after sunset). Soon after, two individual Common Pipistrelles were witnessed and recorded interacting 20m above ground level within the Boiler Room for 25 minutes before they departed the area. At 19.01 a single Common Pipistrelle was observed hunting alongside the northern exterior façade of the Power Station for ten minutes before it disapeard from view. Relatively few bat calls were recroded during the night, with the occasional Common Pipsitrelle call recorded up until around 21.30 from within Turbine Hall B. At dawn very little bat activity was recorded with only a single faint Common Pipistrelle call being recorded in the Boiler Room at 06.29 (32 minute before sun-rise).

6.4 SUMMARY

The survey findings are broadly consistent with what was recorded in 2003, but fewer indivudal bats and bat species were recorded making use of the air space within the site.

The 2008 bat survey has verified that up to five individual Common 45 kHz Pipistrelle bats were making use of Battersea Power Station for summer roosting, and often make use of the relatively sheltered airspace within the Boiler Room as an area to socialise and forage prior to departing the confines of the Power Station after emerging from their day roosting positions withn the building. Evidence has also been recorded that individual bats using the Power Station as a day roost forage within the wider Power Station site, but also depart the site to forage elsewhere. Evidence (song flight calls) that the Power Station is used by Common Pipistrelles for mating purposes in the autumn has also been recorded.

It has not been possible to identify the precise location of this roost (or roosts), but there is strong evidence to suggest that two regularly used roost locations occur somewhere within the north-east sector of the Boiler House (close to where it adjoins the northwest corner of Turbine Hall B), and also in the roof void of Turbine Hall B. Small numbers of Common Pipistrelle bats are considered likely to be resident in the Power Station all year round, and probably over-winter (hibernate) in the building. No evidence of roosting bats in the adjoining listed building has been found.

A single fresh bat dropping consistent in size and shape with that produced by a Pipistrelle bat was present on a central gangway at the southern end Turbine Hall B's roof void during the building inspection survey completed in June. The majority of this void was roped off and inaccessible for survey, and less than 5% of the total void area was inspected. No other evidence of bat roosting was found in any of the other parts of the Power Station (including all accessible rooms and voids in Turbine Hall A).

The survey has found no evidence that a maternity roost of Common Pipistrelle bats occurs in the Power Station. The apparent increase in individual bat numbers (from two to five) between the months of July and August, is considered more likely to be a result of bats being overlooked in June and July when surveyor access within the Boiler Room was restricted.

The July survey indicated that a *Myotis* bat (probably Daubenton's bat) may have day roosted in the Power Station. However, no evidence has been recorded to suggest that this was anything than other than a one off event by an individual bat. This roost type of relatively low conservation significance and does not require any specific mitigation above and beyond that set out below in our opinion.

6.5 IMPLICATIONS FOR DEVELOPMENT

The survey findings suggests that the Power Station does not support a large or important bat roost, and that only small numbers of Common Pipistrelle bat make regular use of the building for shelter. These are most likely to be male and/or non-breeding female bats. The survey has verified that a Natural England development licence will be required to re-develop the Power Station once full planning permission is granted, but that given the low conservation status of the bat roosts present, there should be no onerous mitigation or timing restrictions imposed on the work, and compensation for roost loss could be provided using bat boxes attached to the building and/or more purpose built holes and cavities in brickwork around the

building.

It is not feasible to identify the roost locations of individual Common Pipsitrelle bats in the Power Station using conventional bat survey approaches given the inumerable opportunities for bats to roost in locations that would only be visible from high level scaffolding. Given the size and scale of the building, and the relatively low conservation status of the suspected bat roosting activity, it would also be unreasonable, in our opinion, to complete additional detailed dedicated bat survey work to locate roosts. That said, the importance of maintaining a watching brief for evidence of bat roosts (bat droppings, staining, grease marks etc.) in association with gaps in stonework and other hole and crevice features that are the subject to restoration work cannot be over emphasised and should continue going forward.

Appendix 1

Phase 1 Habitat Survey Target Notes

1. A large well vegetated earth and rubble spoil mound supporting mosaics of rank semi-improved neutral grassland and tall ruderal vegetation. The plant species recorded and their relative abundance are shown below.

Latin name	English name	Relative abundance
Arrhenatherum elatius	false oat-grass	Abundant
Mercurialis annua	annual mercury	Locally abundant
Anisantha sterilis	barren brome	Frequent
Calystegia sepium	hedge bindweed	Frequent
Hirschfeldia incana	hoary mustard	Frequent
Picris hieracioides	hawkweed oxtongue	Frequent
Artemisia vulgaris	mugwort	Occasional
Ballota nigra	black horehound	Occasional
Buddleja davidii	butterfly-bush	Occasional
Galium aparine	cleavers	Occasional
Plantago lanceolata	ribwort plantain	Occasional
Rumex obtusifolius	broad-leaved dock	Occasional
Sonchus asper	prickly sow-thistle	Occasional
Urtica dioica	common nettle	Occasional
Artemisia verlotiorum	Chinese mugwort	Rare
Conium maculatum	hemlock	Rare
Geranium robertianum	herb-robert	Rare
Linaria vulgaris	common toadflax	Rare
Papaver dubium	long-headed poppy	Rare
Rubus fruticosus agg.	bramble	Rare
Senecio inaequidens	narrow-leaved ragwort	Rare
Senecio squalidus	Oxford ragwort	Rare

2. An area of ephemeral/short perennial vegetation on compacted ballast/gravel substrate and dominated by barren brome *Anisantha sterilis* and creeping bent *Agrostis stolonifera*. Other plant species recorded and their relative abundance are shown below.

Latin name	English name	Relative abundance
Cerastium glomeratum	sticky mouse-ear	Occasional
Crepis capillaris	smooth hawk's-beard	Occasional
Hordeum murinum	wall barley	Occasional
Lepidium draba	hoary cress	Occasional
Plantago lanceolata	ribwort plantain	Occasional
Plantago major	greater plantain	Occasional

Trifolium repens	white clover	Occasional
Artemisia verlotiorum	Chinese mugwort	Rare
Buddleja davidii	butterfly-bush	Rare
Cerastium fontanum	common mouse-ear	Rare
Galium aparine	cleavers	Rare
Senecio squalidus	Oxford ragwort	Rare
Vulpia myuros	rat's-tail fescue	Rare

3. A narrow fringe of ephemeral/short perennial vegetation along a shallow sloped gravel verge. The vegetation was of similar species composition to that described for Target Note 2, but with a small patch of ripgut brome *Anisantha rigida*.

4. A relatively large area of unimproved grassland of 'recent origin' forming an open grassland sward in the south of the main Power Station site. The grassland had developed on hard standing and compacted gravels, and appeared to be relatively uniform in terms of its species composition and structure. The plant species recorded and their relative abundance are shown below.

Latin name	**English name**	**Relative abundance**
Vulpia myuros	rat's-tail fescue	Abundant
Anisantha sterilis	barren brome	Frequent
Bromus hordeaceus	common soft-brome	Frequent
Catapodium rigidum	fern-grass	Frequent
Picris hieracioides	hawkweed oxtongue	Frequent
Plantago lanceolata	ribwort plantain	Frequent
Poa compressa	flattened meadow-grass	Frequent
Agrostis stolonifera	creeping bent	Occasional
Cerastium glomeratum	sticky mouse-ear	Occasional
Geranium molle	dove's-foot crane's-bill	Occasional
Holcus lanatus	Yorkshire-fog	Occasional
Lepidium draba	hoary cress	Occasional
Medicago lupulina	black medick	Occasional
Polypogon viridis	water bent	Occasional
Reseda luteola	weld	Occasional
Senecio squalidus	Oxford ragwort	Occasional
Trifolium pratense	red clover	Occasional
Trifolium repens	white clover	Occasional
Artemisia verlotiorum	Chinese mugwort	Rare
Artemisia vulgaris	mugwort	Rare
Cirsium arvense	creeping thistle	Rare

Cirsium vulgare	spear thistle	Rare
Daucus carota	carrot	Rare
Elytrigia repens	common couch	Rare
Galium aparine	cleavers	Rare
Hirschfeldia incana	hoary mustard	Rare
Holcus lanatus	Yorkshire-fog	Rare
Hordeum murinum	wall barley	Rare
Hypericum perforatum	perforate st john's-wort	Rare
Leucanthemum vulgare	oxeye daisy	Rare
Melilotus albus	white melilot	Rare
Poa angustifolia	narrow-leaved meadow-grass	Rare
Poa humilis	spreading meadow-grass	Rare
Rubus fruticosus agg.	bramble	Rare
Sonchus asper	prickly sow-thistle	Rare
Taraxacum officinale agg.	dandelion	Rare
Vicia sativa	common vetch	Rare

5. A small stand of Japanese knotweed *Fallopia japonica* consisting of a few short stems only.

6. Small stand of dense braken *Pteridium aquilinum* along the edge of concrete hard standing. Other plant species present include bramble *Rubus fruticosus*, herb-robert *Geranium robertianum* and barren brome *Anisantha sterilis*.

7. Scattered patches of Japanese knotweed *Fallopia japonica* occur along the site's boundary in this location.

8. Narrow fringe of semi-improved neutral grassland with scattered bramble, elder, and buddleja along the site's western boundary. The grassland was unmanaged, rank and dominated by false-oat grass *Arrhenatherum elatius*, together with ribwort plantain *Plantago lanceolata*, Yorkshire fog *Holcus lanatus*, smooth meadow-grass *Poa pratensis*, rat's-tail fescue *Vulpia myuros* and cleavers *Galium aparine*.

9. Rank semi-improved neutral grassland with frequent tall ruderal species. Plant species recorded include barren brome *Anisantha sterilis*, soft brome *Bromus hordeaceus*, creeping bent *Agrostis stolonifera*, hoary mustard *Hirschfeldia incana,* ribwort plantain *Plantago lanceolata*, white clover *Trifolium repens*, hedge bindweed *Calystegia sepium*, creeping thistle *Cirsium arvense*, black horehound *Ballota nigra* and common vetch *Vicia sativa*.

10. Patchy ephemeral/short perennial vegetation developed on raised earth and rubble

spoil mound. The plant species recorded and their relative abundance are shown below.

Latin name	English name	Relative abundance
Galium aparine	cleavers	Frequent
Picris hieracioides	hawkweed oxtongue	Frequent
Reseda luteola	weld	Frequent
Anisantha sterilis	barren brome	Occasional
Cardamine flexuosa	wavy bitter-cress	Occasional
Cirsium vulgare	spear thistle	Occasional
Euphorbia peplus	petty spurge	Occasional
Geranium robertianum	herb-robert	Occasional
Mercurialis annua	annual mercury	Occasional
Rubus fruticosus agg.	bramble	Occasional
Rumex obtusifolius	broad-leaved dock	Occasional
Antirrhinum majus	snapdragon	Rare
Artemisia verlotiorum	Chinese mugwort	Rare
Buddleja davidii	butterfly-bush	Rare
Epilobium tetragonum	square-stalked willowherb	Rare
Senecio squalidus	Oxford ragwort	Rare

11. Recently created or disturbed un-vegetated raised earth and rubble spoil mound.

12. Narrow concrete walkway between warehouse and Thames river wall, with occasional plants growing in concrete cracks. The plant species recorded and their relative abundance are shown below.

Latin name	English name	Relative abundance
Conyza sumatrensis	Guernsey fleabane	Occasional
Picris hieracioides	hawkweed oxtongue	Occasional
Senecio squalidus	Oxford ragwort	Occasional
Buddleja davidii	butterfly-bush	Rare
Cirsium arvense	creeping thistle	Rare
Conyza canadensis	Canadian fleabane	Rare
Epilobium ciliatum	American willowherb	Rare
Epilobium hirsutum	great willowherb	Rare
Epilobium montanum	broad-leaved willowherb	Rare
Galinsoga parviflora	gallant soldier	Rare
Holcus lanatus	Yorkshire-fog	Rare
Lactuca serriola	prickly lettuce	Rare
Mycelis muralis	wall lettuce	Rare
Parietaria judaica	pellitory-of-the-wall	Rare
Rubus fruticosus agg.	bramble	Rare
Sagina procumbens	procumbent pearlwort	Rare
Sambucus nigra	elder	Rare
Sonchus asper	prickly sow-thistle	Rare
Stellaria media	common chickweed	Rare
Taraxacum officinale agg.	dandelion	Rare

13. Area of concrete hard standing with plant growth restricted to individual plants growing in concrete cracks and along the edges of buildings and walls. The plant species recorded are shown below (all species were rare).

Latin name	English name	Relative abundance
Artemisia vulgaris	mugwort	Rare
Buddleja davidii	butterfly-bush	Rare
Conyza canadensis	Canadian fleabane	Rare
Conyza sumatrensis	Guernsey fleabane	Rare
Hirschfeldia incana	hoary mustard	Rare
Persicaria maculosa	redshank	Rare
Picris hieracioides	hawkweed oxtongue	Rare
Plantago lanceolata	ribwort plantain	Rare
Plantago major	greater plantain	Rare
Poa annua	annual meadow-grass	Rare
Polypogon viridis	water bent	Rare
Pulicaria dysenterica	common fleabane	Rare
Stellaria media	common chickweed	Rare
Taraxacum officinale agg.	dandelion	Rare
Vulpia myuros	rat's-tail fescue	Rare

14. A narrow fringe of introduced shrubs, including buddleja *Buddleja davidii* and a cotoneaster species around the southern and eastern boundaries of Site C.

15. Patches of ephemeral/short perennial vegetation around the site's boundary. The plant species recorded and their relative abundance are shown below.

Latin name	English name	Relative abundance
Festuca rubra subsp. *rubra*	a red fescue	Occasional
Holcus lanatus	Yorkshire-fog	Occasional
Picris hieracioides	hawkweed oxtongue	Occasional

Poa annua	annual meadow-grass	Occasional
Agrostis capillaris	common bent	Rare
Agrostis gigantea	black bent	Rare
Agrostis stolonifera	creeping bent	Rare
Arrhenatherum elatius	false oat-grass	Rare
Artemisia verlotiorum	Chinese mugwort	Rare
Artemisia vulgaris	mugwort	Rare
Avena fatua	wild-oat	Rare
Chenopodium album	fat-hen	Rare
Cirsium arvense	creeping thistle	Rare
Conyza sumatrensis	Guernsey fleabane	Rare
Daucus carota	carrot	Rare
Diplotaxis tenuifolia	perennial wall-rocket	Rare
Festuca rubra subsp. *megastachys*	a red fescue	Rare
Hirschfeldia incana	hoary mustard	Rare
Hypericum perforatum	perforate st john's-wort	Rare
Jasminum officinale	summer jasmine	Rare
Medicago lupulina	black medick	Rare
Melilotus albus	white melilot	Rare
Plantago lanceolata	ribwort plantain	Rare
Rubus fruticosus agg.	bramble	Rare
Senecio squalidus	Oxford ragwort	Rare
Senecio viscosus	sticky groundsel	Rare
Sinapis arvensis	charlock	Rare
Taraxacum officinale agg.	dandelion	Rare
Trifolium dubium	lesser trefoil	Rare
Trifolium pratense	red clover	Rare
Trifolium repens	white clover	Rare
Tripleurospermum inodorum	scentless mayweed	Rare
Vulpia myuros	rat's-tail fescue	Rare

Appendix 2

Higher Plant Species Records

(i) Main Study Area

Latin name	English name	Provenance
Acer pseudoplatanus	sycamore	Alien
Agrostis capillaris	common bent	Native
Agrostis gigantea	black bent	Native
Agrostis stolonifera	creeping bent	Native
Ailanthus altissima	tree-of-heaven	Alien
Anisantha rigida	ripgut brome	Alien
Anisantha sterilis	barren brome	Native
Anthriscus sylvestris	cow parsley	Native
Antirrhinum majus	snapdragon	Alien
Arrhenatherum elatius	false oat-grass	Native
Artemisia absinthium	wormwood	Native
Artemisia verlotiorum	Chinese mugwort	Alien
Artemisia vulgaris	mugwort	Native
Aster novi-belgii	confused michaelmas-daisy	Alien
Ballota nigra	black horehound	Native
Bellis perennis	daisy	Native
Bromus hordeaceus	common soft-brome	Native
Buddleja davidii	butterfly-bush	Alien
Calystegia sepium	hedge bindweed	Native
Cardamine flexuosa	wavy bitter-cress	Native
Catapodium rigidum	fern-grass	Native
Cerastium fontanum	common mouse-ear	Native
Cerastium glomeratum	sticky mouse-ear	Native
Chamerion angustifolium	rosebay willowherb	Native
Chenopodium album	fat-hen	Native
Cirsium arvense	creeping thistle	Native
Cirsium vulgare	spear thistle	Native
Conium maculatum	hemlock	Native
Conyza sumatrensis	Guernsey fleabane	Alien
Crepis capillaris	smooth hawk's-beard	Native
Dactylis glomerata	cock's-foot	Native
Daucus carota	wild carrot	Native
Diplotaxis muralis	annual wall-rocket	Alien
Diplotaxis tenuifolia	perennial wall-rocket	Native
Elytrigia repens	common couch	Native
Epilobium hirsutum	great willowherb	Native
Epilobium montanum	broad-leaved willowherb	Native
Epilobium tetragonum	square-stalked willowherb	Native

Equisetum arvense	field horsetail	Native
Euphorbia helioscopia	sun spurge	Native
Euphorbia peplus	petty spurge	Native
Fallopia japonica	Japanese knotweed	Alien
Festuca rubra subsp. *megastachys*	a red fescue	Native
Festuca rubra subsp. *rubra*	a red fescue	Native
Fraxinus excelsior	ash	Native
Galium aparine	cleavers	Native
Geranium molle	dove's-foot crane's-bill	Native
Geranium robertianum	herb-robert	Native
Geranium rotundifolium	round-leaved crane's-bill	Native
Hirschfeldia incana	hoary mustard	Alien
Holcus lanatus	Yorkshire-fog	Native
Hordeum murinum	wall barley	Native
Hypericum perforatum	perforate st john's-wort	Native
Lamium album	white dead-nettle	Native
Lepidium draba	hoary cress	Alien
Leucanthemum vulgare	oxeye daisy	Native
Linaria vulgaris	common toadflax	Native
Lolium perenne	perennial rye-grass	Native
Lotus corniculatus	common bird's-foot-trefoil	Native
Malva sylvestris	common mallow	Native
Matricaria recutita	scented mayweed	Native
Medicago lupulina	black medick	Native
Melilotus albus	white melilot	Alien
Melilotus altissimus	tall melilot	Alien
Mercurialis annua	annual mercury	Alien
Mycelis muralis	wall lettuce	Native
Papaver dubium	long-headed poppy	Native
Parietaria judaica	pellitory-of-the-wall	Native
Pentaglottis sempervirens	green alkanet	Alien
Persicaria maculosa	redshank	Native
Picris hieracioides	hawkweed oxtongue	Native
Plantago lanceolata	ribwort plantain	Native
Plantago major	greater plantain	Native
Poa angustifolia	narrow-leaved meadow-grass	Native
Poa annua	annual meadow-grass	Native
Poa compressa	flattened meadow-grass	Native
Poa humilis	spreading meadow-grass	Native
Poa pratensis	smooth meadow-grass	Native
Polygonum aviculare	knotgrass	Native

Polypogon viridis	water bent	Alien
Pteridium aquilinum	bracken	Native
Ranunculus repens	creeping buttercup	Native
Reseda lutea	wild mignonette	Native
Reseda luteola	weld	Native
Rubus fruticosus agg.	bramble	Native
Rumex crispus	curled dock	Native
Rumex obtusifolius	broad-leaved dock	Native
Sagina apetala	annual pearlwort	Native
Sagina procumbens	procumbent pearlwort	Native
Salix sp.	a willow	Native
Sambucus nigra	elder	Native
Senecio inaequidens	narrow-leaved ragwort	Alien
Senecio jacobaea	common ragwort	Native
Senecio squalidus	Oxford ragwort	Alien
Senecio viscosus	sticky groundsel	Native
Senecio vulgaris	groundsel	Native
Solanum dulcamara	bittersweet	Native
Solanum nigrum	black nightshade	Native
Sonchus asper	prickly sow-thistle	Native
Sonchus oleraceus	smooth sow-thistle	Native
Stellaria media	common chickweed	Native
Taraxacum officinale agg.	dandelion	Native
Trifolium arvense	hare's-foot clover	Native
Trifolium pratense	red clover	Native
Trifolium repens	white clover	Native
Tripleurospermum inodorum	scentless mayweed	Native
Tussilago farfara	colt's-foot	Native
Urtica dioica	common nettle	Native
Verbena bonariensis	Argentinian vervain	Alien
Veronica arvensis	wall speedwell	Native
Vicia sativa	common vetch	Native
Vulpia myuros	rat's-tail fescue	Native

(ii) Site C

Latin name	English name	Provenance
Agrostis capillaris	common bent	Native
Agrostis gigantea	black bent	Native
Agrostis stolonifera	creeping bent	Native
Arrhenatherum elatius	false oat-grass	Native
Artemisia verlotiorum	Chinese mugwort	Alien
Artemisia vulgaris	mugwort	Native
Avena fatua	wild-oat	Alien
Buddleja davidii	butterfly-bush	Alien
Chenopodium album	fat-hen	Native
Cirsium arvense	creeping thistle	Native
Conyza sumatrensis	Guernsey fleabane	Alien
Cotoneaster sp.	a cotoneaster	Alien
Daucus carota	wild carrot	Native
Diplotaxis tenuifolia	perennial wall-rocket	Native
Festuca rubra subsp. *megastachys*	a red fescue	Native
Festuca rubra subsp. *rubra*	a red fescue	Native
Hirschfeldia incana	hoary mustard	Alien
Holcus lanatus	Yorkshire-fog	Native
Hypericum perforatum	perforate st john's-wort	Native
Jasminum officinale	summer jasmine	Alien
Medicago lupulina	black medick	Native
Melilotus albus	white melilot	Alien
Mycelis muralis	wall lettuce	Native
Picris hieracioides	hawkweed oxtongue	Native
Plantago lanceolata	ribwort plantain	Native
Poa annua	annual meadow-grass	Native
Rubus fruticosus agg.	bramble	Native
Senecio squalidus	Oxford ragwort	Alien
Senecio viscosus	sticky groundsel	Native
Senecio vulgaris	groundsel	Native
Sinapis arvensis	charlock	Native
Taraxacum officinale agg.	dandelion	Native
Trifolium dubium	lesser trefoil	Native
Trifolium pratense	red clover	Native
Trifolium repens	white clover	Native
Tripleurospermum inodorum	scentless mayweed	Native
Vulpia myuros	rat's-tail fescue	Native

(iii) 88 Kirtling Street

Latin name	English name	Provenance
Artemisia vulgaris	mugwort	Native
Buddleja davidii	butterfly-bush	Alien
Cirsium arvense	creeping thistle	Native
Conyza canadensis	Canadian fleabane	Alien
Conyza sumatrensis	Guernsey fleabane	Alien
Epilobium ciliatum	American willowherb	Alien
Epilobium hirsutum	great willowherb	Native
Epilobium montanum	broad-leaved willowherb	Native
Galinsoga parviflora	gallant soldier	Alien
Hirschfeldia incana	hoary mustard	Alien
Holcus lanatus	Yorkshire-fog	Native
Lactuca serriola	prickly lettuce	Native
Mycelis muralis	wall lettuce	Native
Parietaria judaica	pellitory-of-the-wall	Native
Persicaria maculosa	redshank	Native
Picris hieracioides	hawkweed oxtongue	Native
Plantago major	greater plantain	Native
Poa annua	annual meadow-grass	Native
Polypogon viridis	water bent	Alien
Pulicaria dysenterica	common fleabane	Native
Rubus fruticosus agg.	bramble	Native
Sagina procumbens	procumbent pearlwort	Native
Sambucus nigra	elder	Native
Senecio squalidus	Oxford ragwort	Alien
Sonchus asper	prickly sow-thistle	Native
Stellaria media	common chickweed	Native
Taraxacum officinale agg.	dandelion	Native
Vulpia myuros	rat's-tail fescue	Native

Appendix 3

Terrestrial Invertebrate Data

Statuses

Each of the species recorded has been assigned at least one status. The better-known groups of invertebrates were assessed for formal conservation status in Red Data Books and National reviews from the mid-1980s onwards, using criteria from the IUCN for the rarest (Red Data Book) species, and defining species believed to occur in 100 or fewer 10-kilometres squares of the National Grid as Notable. The earlier IUCN criteria have been superseded, but only a fraction of the fauna has as yet been assessed, in published reviews, under the newer criteria. The following formal statuses and abbreviations are used in this report:

Red Data Book category 1 – Endangered (RDB1)
Taxa in danger of extinction in Great Britain and whose survival is unlikely if causal factors continue operating. Included are those taxa whose numbers have been reduced to a critical level or whose habitats have been so dramatically reduced that they are deemed to be in immediate danger of extinction. Also included are some taxa that are possibly extinct. Criteria for inclusion are: species which are known or believed to occur as only a single population within one hectad of the National Grid; species which only occur in habitats known to be especially vulnerable; species which have shown a rapid or continuous decline over the last twenty years and are now estimated to exist in five or fewer hectads; species which are possibly extinct but have been recorded within the past century and if rediscovered would need protection.

Red Data Book category 3 – Rare (RDB3)
Taxa with small populations in Great Britain that are not at present Endangered or Vulnerable, but are at risk. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. Included are species which are estimated to exist in only fifteen or fewer hectads. This criterion may be relaxed where populations are likely to exist in over fifteen hectads but occupy small areas of especially vulnerable habitat.

Red Data Book category K (RDBK) - Insufficiently Known
Taxa suspected of falling within categories 1 - 3, but about which there is insufficient information to be certain. Such taxa may be recently discovered or recognised; belong to under-recorded groups of organisms; be difficult to identify; or live in habitats where they are likely to be overlooked. There may be doubts about whether a recently discovered species is native or has been recently introduced by man, and this uncertainty could result in the species being placed in category K.

Red Data Book category Extinct (X)
Taxa which formerly had wild breeding populations in Great Britain but which are now believed to have died out. Lack of records since the beginning of the twentieth century has been applied as a criterion.

Nationally Notable category A (Na)
Taxa which do not fall within RDB categories but which are nonetheless uncommon in Great Britain and are thought to occur in 30 or fewer hectads of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties.

Nationally Notable category B (Nb)
Taxa which do not fall within RDB categories but which are nonetheless uncommon in Great Britain and are thought to occur in between 31 and 100 hectads of the National Grid or, for less-well recorded groups, between eight and twenty vice-counties.

Nationally Scarce (N)
For some less well-recorded groups and species, it has not been possible to determine which of the Nationally Scarce categories (A or B) is most appropriate for scarce species. These species have been assigned to an undivided Nationally Scarce category.

Shirt (1987) was the first publication to give definitive Red Data Book statuses to insects. Subsequent reviews proposed many changes to these statuses. Because the revised statuses were preceded by a "p" (for proposed) and not actually published in a Red Data Book, they have not been universally used as the formal status, the Shirt (1987) status being retained. Whatever the technicalities, the retention of a manifestly outdated status for a species where a formal published alternative exists is, for purposes of assessment, clearly unhelpful, and in this report the most recent published estimate of status is given, without the use of "p"s.

Nationally Notable, Nationally Scarce and Red Data Book statuses have been assigned to the species recorded according to the most conveniently accessible and useful published summary of the most recently published statuses, as follows:

Coleoptera	Hyman & Parsons, 1992
Diptera	Falk, 1991b
Hemiptera	Kirby, 1992
Hymenoptera	Falk, 1991a
Lepidoptera	Waring & Townsend, 2003
Orthoptera	Haes & Harding 1997.

The list has been checked for any species included in the lists of threatened and declining species in the UK Biodiversity Action Plans (Biodiversity Reporting and Information Group, 2007) and for priority species and species of conservation concern in the London Biodiversity Action Plan (list dated January 2008 on the London BAP website).

An estimate has also been made of the current status of each species in the south-east. Statuses have been estimated on a four-point scale: common, frequent, occasional and rare. These estimates are to some extent matters of personal opinion and judgement, though documented evidence supporting changes of status is readily available for most species. No pretence is made that these statuses are assigned after rigorous assessment against precise criteria, but broad guidelines to their significance are as follows:

Common: species found in good numbers over substantial areas, usually in a number of habitats, and either having no very special ecological requirements or having requirements which are easily and widely met (restriction to a common foodplant). Such species are expected or unsurprising in any sizeable tract of "wider countryside" within the central parts of their range.
Frequent: typically species with somewhat more specialised or infrequently met habitat requirements, but expected where these characteristics are met; such species may be restricted to a narrow habitat range or to particular soil types, require a particular foodplant of less than universal occurrence, or be associated with a widespread but erratic habitat resource, such standing dead wood of particular species or in particular conditions. Species in this category are expected or unsurprising wherever the habitat types with which they are associated is found.
Occasional: typically species with a very particular and infrequently met habitat requirement; or species of poor mobility whose presence may be heavily dependent on habitat continuity; and species which, though not obviously of highly restrictive requirements, are nonetheless very rarely recorded. Such species may be erratic in occurrence, and often require specific

search of their specialist niches in order to be located; only in special circumstances are they expected merely on the grounds of broad habitat type.
Rare: Typically species with a particular and infrequently met habitat requirement, but sometimes merely highly geographically restricted. Such species are generally significantly less frequently found than apparently suitable habitat, and are expected, if at all, only when their very particular and special niche is found.

These estimates of frequency are most obviously helpful in the interpretation of records of species without formal conservation status. They are, however, also given to those species which do have formal status and are considered important for the understanding their current significance. The designation of formal statuses has not kept pace with changes in distribution and knowledge, and the inevitable result is that a proportion of the species with formal conservation status recorded from any particular site are undeserving of their status and give a potentially misleading impression of faunal quality. The frequency categories deliberately do not correspond to those of formal conservation status, but any species deserving such formal status would be expected to fall into the "rare" or, at most, the "occasional" category.

Complete list of recorded species

Dates

1 13 May
2 5 June
3 18 July
P1 pitfall traps 13 May – 5 June
P2 pitfall traps 5 June – 18 July

Locations

S grassland and open ground in the south-west
N open habitats near riverside
M spoil mounds
F rail fringe habitats
Other arch railway arches
nth fragmentary habitat east of Power Station

Statuses

Formal statuses ("Formal")
National conservation statuses
RDB1 Red Data Book category 1 (Endangered)
RDB2 Red Data Book category 2 (Vulnerable)
RDB3 Red Data Book category 3 (Rare)
X Extinct
Na Nationally Scarce category A
Nb Nationally Scarce category B
N Nationally Scarce

Biodiversity Action Plan statuses
BAP National BAP Priority species
LBAP London BAP species: all national BAP species are included in the London BAP, as are all species with a formal national conservation status; the LBAP coding has therefore been applied in the table only to those species which do not fall into one or both of these national categories

pLBAP London BAP Priority species

Estimated current status in the south-east ("Est.")
r rare
o occasional
f frequent
c common

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Mollusca								
Arionidae								
Arion ater		c	1,2,3			+	+	nth
Helicidae								
Cepaea nemoralis		c	1					
Cornu aspersum		c	1	+	+	+	+	nth
Hygromiidae								
Candidula intersecta		c	2	+	+			
Monacha cantiana		c	1	+		+	+	nth
Limacidae								
Limax maximus		c	1	+				
Oxychilidae								
Aegopinella nitidula		c	1			+		nth
Oxychilus cellarius		c	1			+		nth
Oxychilus draparnaudi		c	1			+	+	nth
Vitrinidae								
Vitrina pellucida		c	1					nth
Crustacea								
Armadillidiidae								
Armadillidium nasutum		f	1,P1,P2	+	+	+	+	nth
Armadillidium vulgare		c	1	+	+	+		
Oniscidae								
Oniscus asellus		c	1					
Philosciidae								
Philoscia muscorum		c	2				+	
Porcellionidae								
Porcellio scaber		c	1	+	+	+	+	nth
Chilopoda								
Lithobiidae								
Lithobius forficatus		c	1,P1		+	+		nth
Diplopoda								
Glomeridae								
Glomeris marginata		c	1				+	
Araneae								
Agelenidae								
Tegenaria agrestis		c	1,2	+	+			nth
Araneidae								
Araniella cucurbitina		c	1				+	
Larinioides cornutus		c	3				+	
Dysderidae								
Dysdera crocata		c	1,P1	+		+		nth

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Gnaphosidae								
Drassodes lapidosus		f	P2		+			
Drassyllus pusillus		f	1	+				
Micaria pulicaria		c	2					
Zelotes latreillei		f	2		+			
Hahniidae								
Argenna subnigra		o	P1		+			
Linyphiidae								
Erigone atra		c	2,P2	+	+	+	+	
Erigone dentipalpis		c	2,P1	+	+			
Labulla thoracica		c	2				+	
Lepthyphantes tenuis		c	2	+	+			
Meioneta rurestris		c	2,P1		+			
Liocraniidae								
Phrurolithus festivus		f	P2	+				
Lycosidae								
Pardosa palustris		c	P1,P2	+	+	+		
Trochosa terricola		c	2,P1	+	+		+	
Mimetidae								
Ero cambridgei		c	2	+				
Pisauridae								
Pisaura mirabilis		c	1,2		+		+	
Salticidae								
Euophrys frontalis		c	2	+	+			
Heliophanus flavipes		c	2,P1	+	+	+	+	
Salticus scenicus		c	3,P1			+	+	arch
Sitticus pubescens		f	P2			+		
Talavera aequipes		o	2,P1,P2	+	+	+		
Tetragnathidae								
Pachygnatha degeeri		c	2,P1	+	+		+	
Theridiidae								
Anelosimus vittatus		c	2				+	
Robertus lividus		c	2	+				
Thomisidae								
Xysticus cristatus		c	1,2,P1,P2	+	+	+	+	
Xysticus kochi		f	2,P1		+			
Zodariidae								
Zodarion italicum	LBAP	r	P1		+			
Coleoptera								
Anobiidae								
Anobium punctatum		c	3			+		
Anthribidae								
Bruchela rufipes	LBAP	f	3		+	+	+	
Apionidae								
Apion frumentarium		c	2				+	
Aspidapion aeneum		c	2,3			+	+	
Aspidapion radiolus		c	2			+		
Ceratapion onopordi		c	3,P1			+		
Diplapion confluens		f	2		+			

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Ischnopterapion virens		c	3	+	+			
Kalcapion semivittatum	Na LBAP	o	3,P1			+		
Malvapion malvae		c	1,2			+	+	
Protapion apricans		c	1,P1		+			
Protapion fulvipes		c	1,3	+	+		+	
Protapion nigritarse		c	1	+	+		+	
Protapion trifolii		c	2	+				
Pseudapion rufirostre		c	3			+	+	
Stenopterapion tenue		c	2	+	+			
Byrrhidae								
Byrrhus pilula		c	1	+				
Simplocaria semistriata		c	P1			+		
Byturidae								
Byturus tomentosus		c	2				+	
Cantharidae								
Cantharis nigra		c	3	+	+	+	+	
Cantharis pellucida		c	2	+			+	
Cantharis rustica		c	1,2	+		+	+	
Rhagonycha fulva		c	3	+	+	+	+	
Carabidae								
Amara aenea		c	P2	+		+		
Amara communis		c	P2		+			
Amara eurynota		f	1,3,P1,P2	+	+	+	+	nth
Amara similata		c	P1			+		
Amara tibialis		c	1,2,P2	+	+			nth
Anisodactylus binotatus		f	P1,P2			+		
Bembidion lampros		c	1,3,P2	+	+			nth
Bradycellus harpalinus		c	P2	+				
Calathus fuscipes		c	P2	+		+		
Harpalus affinis		c	1,3,P1,P2	+	+	+		
Harpalus attenuatus		o	P2	+				
Harpalus rubripes		c	3	+	+			
Harpalus rufipes		c	2,3,P1,P2	+	+	+	+	
Leistus spinibarbis		c	3,P1			+	+	
Microlestes maurus		c	1,2					
Nebria brevicollis		c	1,3,P1		+	+		
Notiophilus biguttatus		c	P1,P2	+	+	+	+	nth
Notiophilus substriatus		c	2		+			
Ophonus puncticeps		c	1,2	+				
Poecilus cupreus		c	1,P2	+	+			
Pterostichus madidus		c	1,2,P1,P2	+	+	+	+	nth
Syntomus foveatus		c	1,2,3,P1,P2	+	+			nth
Trechus quadristriatus		c	3,P2	+		+		
Cerambycidae								
Stenurella melanura		f	2				+	
Chrysomelidae								
Aphthona euphorbiae		c	1			+		
Bruchidius varius		c	2	+	+			

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Bruchus rufimanus		c	1	+				
Cassida rubiginosa		c	1,2				+	
Chaetocnema concinna		c	3			+		
Chrysolina hyperici		f	2	+				
Cryptocephalus fulvus		f	3	+	+		+	
Cryptocephalus moraei		o	2	+				
Neocrepidodera transversa		c	3				+	
Phaedon cochleariae		c	2			+		
Phyllotreta atra		c	P1			+		
Phyllotreta nigripes		c	P1			+		
Phyllotreta nodicornis		f	2			+	+	
Phyllotreta undulata		c	2			+		
Psylliodes affinis		c	2			+		
Psylliodes chrysocephala		c	2,3,P1,P2	+	+	+	+	
Coccinellidae								
Adalia bipunctata		c	1,2,3			+	+	
Adalia decempunctata		c	3				+	
Coccinella septempunctata		c	1,2,3,P1	+	+	+	+	+
Harmonia axyridis		c	1,2,3					
Hippodamia variegata	Nb LBAP	f	1,3,P1,P2	+	+	+	+	
Nephus redtenbacheri		c	3	+				
Rhyzobius litura		c	3			+		
Scymnus frontalis		f	3	+	+			
Scymnus haemorrhoidalis		f	3				+	
Thea vigintiduopunctata		c	1			+	+	
Tytthaspis sedecimpunctata		c	1,2,3	+	+			
Cryptophagidae								
Antherophagus pallens		f	2				+	
Curculionidae								
Baris picicornis	Nb	f	1				+	
Ceutorhynchus assimilis		c	2			+		
Ceutorhynchus pallidactylus		c	P1			+		
Ceutorhynchus picitarsis		c	P1			+		
Glocianus distinctus		c	2	+				
Gymnetron antirrhini		f	2	+				
Hypera plantaginis		c	2	+	+			
Hypera postica		c	2	+	+			
Larinus planus	Nb	o	1,2				+	
Mecinus janthinus	Nb	o	1	+				
Mecinus pyraster		c	1	+	+		+	
Nedyus quadrimaculatus		c	2			+	+	
Otiorhynchus sulcatous		c	P2		+			
Sitona cylindricollis		o	2	+	+		+	
Sitona hispidulus		c	1	+	+			
Sitona humeralis		c	P1	+		+		
Sitona lineatus		c	1,2	+	+	+	+	
Sitona puncticollis		o	2	+				
Tychius meliloti		c	2		+		+	

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Tychius picirostris		c	1	+	+		+	
Elateridae								
Agriotes sputator		c	1	+		+		
Athous haemorrhoidalis		c	2				+	
Hemicrepidius hirtus		c	3				+	
Histeridae								
Kissister minima		o	2	+				
Margarinotus purpurascens		c	P1			+		
Kateretidae								
Brachypterolus pulicarius		c	3			+		
Lucanidae								
Dorcus parallelepipedus		f	P2			+		
Melyridae								
Cordylepherus viridis		c	2,3	+	+	+	+	
Mordellidae								
Mordellistena pumila		f	3	+				
Oedemeridae								
Oedemera lurida		c	1,2,3,P1,P2	+	+	+	+	
Oedemera nobilis		c	2,3,P1,P2	+	+	+	+	
Phalacridae								
Olibrus aeneus		c	3	+	+	+	+	
Olibrus flavicornis	RDBK LBAP	r	2	+	+			
Stilbus testaceus		c	P1	+	+	+		
Rhynchitidae								
Neocoenorrhinus aequatus		c	3				+	
Scarabaeidae								
Hoplia philanthus		o	P2	+				
Scraptiidae								
Anaspis pulicarius		c	2				+	
Anaspis regimbarti		c	1				+	
Silphidae								
Nicrophorus vespillo		c	P1			+		
Silpha laevigata		o	1,3,P1,P2	+	+	+	+	
Silpha tristis		c	P1			+		
Staphylinidae								
Ocypus olens		c	3				+	
Othius punctulatus		c	2				+	
Tasgius ater		f	3,P2		+		+	
Throscidae								
Trixagus dermestoides		c	2,P1		+	+		
Trixagus elateroides	RDB3	r	2		+			
Dermaptera								
Forficulidae								
Forficula auricularia		c	1,2,3	+				nth
Diptera								
Conopidae								
Conops quadrifasciatus		c	3				+	
Sicus ferrugineus		c	3		+	+	+	

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Thecophora atra		f	3,P1			+		
Dolichopodidae								
Liancalus virens		o	2,3					arch
Scellus notatus		f	3	+	+		+	
Empididae								
Tachypeza nubila		c	P1			+		
Sciomyzidae								
Dichetophora obliterata		f	2		+			
Pherbellia cinerella		c	1,2,3	+	+	+	+	
Stratiomyidae								
Chloromyia formosa		c	3	+	+	+	+	
Chorisops tibialis		c	P2			+		
Microchrysa flavicornis		c	2				+	
Pachygaster atra		c	3				+	
Syrphidae								
Chrysotoxum bicinctum		f	3	+			+	
Epistrophe eligans		c	1				+	
Episyrphus balteatus		c	3	+	+	+	+	
Eristalinus sepulchralis		f	3			+		
Eristalis intricarius		c	3				+	
Eristalis nemorum		c	3	+	+	+	+	
Eristalis pertinax		c	1	+			+	
Eristalis tenax		c	3	+	+	+	+	
Helophilus pendulus		c	3	+	+		+	
Helophilus trivittatus		f	3	+				
Melanostoma mellinum		c	3	+	+	+	+	
Neoascia tenur		c	3			+		
Paragus haemorrhous		c	3	+	+			
Pipizella viduata		c	3	+	+		+	
Platycheirus albimanus		c	3			+	+	
Scaeva pyrastri		c	3				+	
Sphaerophoria scripta		c	1,3	+	+	+	+	
Syritta pipiens		c	3	+	+	+	+	
Syrphus ribesii		c	1,3	+		+	+	
Volucella bombylans		c	3				+	
Xanthogramma pedissequum		f	3	+			+	
Tachinidae								
Cistogaster globosa	RDB1	o	2				+	
Eriothrix rufomaculatus		c	3	+	+	+	+	
Gymnosoma rotundatum	RDB3	r	2				+	
Phasia pusilla		c	3	+	+			
Tephritidae								
Chaetostomella cylindrica		c	3				+	
Oxyna parietina		c	3	+	+		+	
Paroxyna misella		c	2,3	+	+		+	
Tephritis neesii		c	3				+	
Tephritis vespertina		c	2,3	+				
Terellia ruficauda		c	3			+	+	
Urophora stylata		c	3		+		+	

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Xyphosia miliaria		c	3				+	
Tipulidae								
Nephrotoma flavescens		c	1	+				
Ulidiidae								
Ceroxys urticae		f	3		+			
Hemiptera-Auchenorhyncha								
Cercopidae								
Aphrophora alni		c	3		+		+	
Neophilaenus campestris		f	3	+	+		+	
Neophilaenus lineatus		c	3	+	+	+	+	
Philaenus spumarius		c	3	+	+	+	+	
Cicadellidae								
Agallia ribauti		c	2,P2	+		+		
Aphrodes albifrons		c	3		+			
Aphrodes makarovi		c	1,2,3,P2	+	+	+	+	
Empoasca decipiens		c	2			+		
Eupelix cuspidata		c	3	+				
Eupteryx aurata		c	3			+	+	
Eupteryx florida		c	1,2,3	+		+		
Eupteryx stachydearum		c	3				+	
Eupteryx urticae		c	1			+	+	
Euscelidius variegatus	Nb	f	2.P2	+	+			
Euscelis incisus		c	1,2,3	+	+	+	+	
Macrosteles quadripunctulatus	Na	o	2	+	+			
Megophthalmus scabripennis		c	P2		+	+		
Mocydiopsis attenuata		f	3	+				
Psammotettix confinis		c	2,3	+	+			
Scleroracus decumanus	Nb	o	2		+			
Zygina hyperici		o	2	+				
Zyginidia scutellaris		c	3	+	+		+	
Delphacidae								
Asiraca clavicornis	Nb LBAP	f	1				+	
Ditropis pteridis		c	1				+	
Javesella pellucida		c	2	+			+	
Hemiptera-Heteroptera								
Anthocoridae								
Anthocoris nemoralis		c	1,3		+		+	
Anthocoris nemorum		c	1,2,3	+	+	+	+	
Orius niger		c	1,2,3	+	+	+	+	
Berytidae								
Berytinus signoreti		f	2	+				
Coreidae								
Bathysolen nubilus	Nb LBAP	f	2	+	+			
Coreus marginatus		c	3	+		+	+	
Coriomeris denticulatus		c	2,3,P2	+	+		+	
Lygaeidae								

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Drymus sylvaticus		c	1			+		
Heterogaster urticae		c	3				+	
Nysius ericae		c	3	+	+			
Nysius senecionis		c	1,2,3	+	+			
Scolopostethus affinis		c	1,P1			+		
Stygnocoris fuligineus		c	2,3,P1,P2	+	+	+		
Taphropeltus contractus		f	3,P2	+		+		
Miridae								
Adelphocoris lineolatus		f	3	+	+		+	
Amblytylus nasutus		c	3	+	+		+	
Chlamydatus pullus		f	2,3		+			
Chlamydatus saltitans		f	3		+			
Closterotomus norwegicus		c	2,3	+	+	+	+	
Deraeocoris flavilinea	LBAP*	c	3			+	+	
Deraeocoris ruber		c	3			+	+	
Dicyphus errans		c	1			+		
Dicyphus ?tamaninii		?	1			+		
Europiella artemisiae		c	2	+	+		+	
Heterotoma planicornis		c	3			+	+	
Leptopterna ferrugata		c	2,3	+	+	+	+	
Liocoris tripustulatus		c	1,2			+	+	
Lopus decolor		c	3	+	+			
Lygocoris lucorum		c	3				+	
Lygocoris pabulinus		c	3			+	+	
Lygocoris spinolai		c	3			+		
Lygus maritimus		c	1,2,3		+	+	+	
Lygus pratensis	RDB3	c	3		+	+	+	
Lygus rugulipennis		c	3	+	+	+		
Macrolophus nubilus		f	3				+	
Macrotylus horvathi		f	3				+	
Megaloceraea recticornis		c	3	+			+	
Megalocoleus pilosus		c	3		+			
Notostira elongata		c	3	+	+		+	
Orthocephalus saltator		f	3	+	+			
Orthops campestris		c	3				+	
Pinalitus cervinus		c	3				+	
Pithanus maerkeli		c	3	+	+			
Plagiognathus arbustorum		c	3	+	+	+	+	
Plagiognathus chrysanthemi		c	3	+	+	+	+	
Stenodema calcaratum		c	3				+	
Stenodema laevigatum		c	1,3	+			+	
Stenotus binotatus		c	3	+	+	+	+	
Trigonotylus coelestialium		c	3	+				
Nabidae								
Himacerus major		c	2		+			
Himacerus mirmicoides		c	1,2	+	+	+	+	
Nabis ferus		c	1,2	+				
Pentatomidae								
Aelia acuminata		c	1,2,3	+	+		+	

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Dolycoris baccarum		c	1,2,3	+	+			
Eurydema oleracea		f	1,2,3	+		+	+	
Eysarcoris venustissimus		c	3				+	
Palomena prasina		c	2,3			+	+	
Podops inuncta		c	3	+				
Rhopalidae								
Brachycarenus tigrinus		f	1,P1			+		nth
Chorosoma schillingi		o	3	+				
Rhopalus subrufus		f	1,2,3	+				
Stictopleurus punctatonervosus	X	c	1,3,P2	+	+	+	+	
Tingidae								
Acalypta parvula		c	1	+				
Kalama tricornis		f	2	+	+			
Tingis ampliata		c	1				+	
Tingis cardui		c	3			+	+	
Hymenoptera								
Apidae								
Andrena bicolor		c	3				+	
Andrena flavipes	LBAP	c	2,3				+	
Andrena haemorrhoa		c	1	+				
Andrena minutula		c	2					
Anthophora quadrimaculata	Nb	f	2				+	
Apis mellifera		c	3	+	+	+	+	
Bombus campestris		f	2				+	
Bombus lapidarius		c	1,3			+	+	
Bombus lucorum		c	2	+	+	+	+	
Bombus pascuorum		c	1,3	+	+	+	+	
Bombus terrestris		c	1,2,3		+	+	+	
Bombus vestalis		c	2,3				+	
Halictus rubicundus		c	2,3	+	+	+	+	
Hylaeus brevicornis		c	3				+	
Hylaeus communis		c	2,3		+		+	
Hylaeus confusus		c	2,3	+		+	+	
Hylaeus signatus	Nb LBAP	o	3				+	
Lasioglossum leucopus		c	3				+	
Lasioglossum malachurum	Na LBAP	c	3	+			+	
Lasioglossum morio		c	2,3	+	+	+	+	
Lasioglossum villosulum		c	3		+			
Megachile centuncularis		c	2,3				+	
Megachile willughbiella		c	2,3				+	
Nomada flavoguttata		c	1				+	
Nomada goodeniana		c	1				+	
Osmia leiana		f	3				+	
Panurgus calcaratus		f	3	+	+		+	
Sphecodes gibbus		f	3				+	
Sphecodes monilicornis		c	2				+	

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Chrysididae								
Hedychridium roseum	LBAP	o	2	+				
Omalus aeneus		c	2				+	
Formicidae								
Formica fusca		c	1					
Lasius niger		c	1					
Pompilidae								
Agenoideus cinctellus		o	3	+			+	
Auplopus carbonarius	Nb LBAP	r	2				+	
Calliadurgus fasciatellus		o	2				+	
Dipogon variegatus		o	2,3				+	
Evagetes crassicornis		c	3		+			
Priocnemis exaltata		c	3				+	
Sphecidae								
Ammophila sabulosa	LBAP	f	2				+	
Crossocerus annulipes		c	2				+	
Crossocerus elongatulus		c	3				+	
Crossocerus wesmaeli		c	3		+		+	
Ectemnius continuus		c	2,3				+	
Ectemnius dives		c	2				+	
Entomognathus brevis		c	3				+	
Lindenius albilabris		c	2,3			+	+	
Mimesa bruxellensis	Na	r	3				+	
Mimumesa dahlbomi		o	2				+	
Oxybelus uniglumis		f	3	+			+	
Passaloecus singularis		c	3				+	
Pemphredon lugubris		c	2,3		+		+	
Psenulus pallipes		f	3				+	
Tachysphex pompiliformis		f	2				+	
Trypoxylon attenuatum		c	2,3			+	+	
Vespidae								
Ancistrocerus gazella		f	2,3				+	
Vespula vulgaris		c	3			+	+	
Lepidoptera								
Arctiidae								
Tyria jacobeae	BAP pLBAP	c						
Hesperiidae								
Thymelicus lineola		c	3	+	+		+	
Lycaenidae								
Polyommatus icarus		c	2,3	+	+			
Noctuidae								
Autographa gamma		c	3	+		+	+	
Calophasia lunula	RDB3 LBAP	r	3	+				
Ectidea glyphica		f	2	+	+			
Nymphalidae								
Aglais urticae		c	3			+	+	

Taxon	Status		Dates	Locations				
	Formal	Est.		S	N	M	F	Other
Coenonympha pamphilus	BAP pLBAP	c	2	+	+		+	
Inachis io		c	3	+	+	+	+	
Maniola jurtina		c	3	+	+		+	
Pyronia tithonus		c	3	+	+		+	
Vanessa atalanta		c	3				+	
Pieridae								
Pieris brassicae		c	3	+	+	+	+	
Pieris napi		c	3				+	
Pieris rapae		c	3		+	+	+	
Orthoptera								
Acrididae								
Chorthippus albomarginatus		c	3	+	+		+	
Chorthippus brunneus		c	3	+	+	+	+	
Tetrigidae								
Tetrix subulata		c	1		+			
Tetrix undulata		c	2	+	+			
Tettigoniidae								
Conocephalus discolor	Na LBAP	c	3	+			+	
Trichoptera								
Psychomyiidae								
Tinodes assimilis		o	2					arch

Notes on Nationally Scarce and Red Data Book species

Anthophora quadrimaculata **(Hymenoptera, Apidae)**
Nationally Scarce category B
The four-spotted flower bee. A fairly large bee which nests in burrows in a range of dry sunny situations, including light soils, sandy banks, coastal cliffs, and the soft mortar of stone walls. South-facing nesting sites are favoured. Though recorded from a range of habitats, including coastal cliffs, dunes and heathland, this species is especially associated with gardens and suburban waste land. A wide range of forage plants have been recorded, but there seems to be a preference for labiates. Though very localised it may be common where it occurs. It is a southern species, occurring north to Gloucestershire and Cambridgeshire; recent records are rather widely scattered across southern counties of England.

Asiraca clavicornis **(Hemiptera, Delphacidae)**
Nationally Scarce category B
A distinctive planthopper characteristically found in ungrazed, often tall and tussocky grassland on dry soils. It is especially frequent on ruderal sites and those recently released from management, where tussocks or patches of dense grassland are found on bare ground or amongst shorter vegetation. It is a south-eastern species, the recorded British range extending from Norfolk and Cambridgeshire to Hampshire. For some time records were heavily concentrated in the London area, implying a decline in the peripheral parts of its range, but in recent years it has been found much more widely and more frequently. It is now a fairly common species in parts at least of the south-east, and occurs up to and beyond the limits of its former range. Nationally Scarce status is no longer appropriate.

Auplopus carbonarius **(Hymenoptera, Pompilidae)**
Nationally Scarce category B
A moderately-sized black spider-hunting wasp which lives chiefly in woodland, having a preference for areas with streams or wetlands which provide mud or wet clay for nesting materials. Nests are built in cavities in a wide range of situations, including under bark, in beetle burrows in dead wood, in stone walls, and beneath stones. Nest cells are stocked with a wide variety of spiders, with Clubionidae the most frequent prey. It is a southern species, occurring almost entirely south of the Wash-Severn line, except for a few records from south Wales. Though local in distribution, it is generally inconspicuous and may be under-recorded.

Baris picicornis **(Coleoptera, Curculionidae)**
Nationally Scarce category B
A bright blue weevil which feeds on wild mignonette *Reseda lutea*, and also found on weld *Reseda luteola* in mainland Europe. Larvae develop in the stems of the host plant. It occurs on disturbed ground and in grassland, and is most frequent in disturbed areas on calcareous soils. It is widespread in England north to the midlands, but most frequent in the south-east. It has increased in frequency in recent years, at least in the north of its range, and is likely to be technically unworthy of its formal status, but it remains rather local.

Bathysolen nubilus **(Hemiptera, Coreidae)**
Nationally Scarce category B
A cryptic ground-dwelling bug which feeds on black medick *Medicago lupulina*, and is occasionally reported from other species of Fabaceae. It requires a well-drained soil and short, open-structured or even sparse vegetation cover. It has been found in semi-natural habitats in unimproved grassland, dunes, and coastal shingle, but is more frequently associated with disturbed ground in quarries, gravel pits, clay pits, urban wasteland, and trampled and disturbed areas beside paths and tracks. For many years this species appears to have been a considerable rarity confined to a small number of places in the south-east, but it was increasingly frequently recorded during the latter half of the twentieth century, both increasing within its historical range and spreading beyond its old boundaries. Isolated records at the fringe of its range, with long periods of apparent absence in the same areas, suggest that it may be prone to considerable spread in favourable years, followed by decline. Since the 1990s the rate of spread appears to have accelerated, and *B. nubilus* is now widespread, though still somewhat local, in eastern England north to The Wash. It is undoubtedly now unworthy of its formal status.

Calophasia lunula **(Lepidoptera, Noctuidae)**
Red Data Book category 3 (Rare)
The toadflax brocade. A medium-sized moth patterned in browns and greys, with a very distinctive grey, yellow and black caterpillar which feeds on toadflaxes *Linaria* spp., usually yellow toadflax *L. vulgaris* or purple toadflax *L. purpurea*. It is a well-established breeding species on coastal shingle in Sussex and Kent, with more isolated records from other coastal locations and occasional breeding populations inland, on disturbed ground and in gardens. Inland colonies appear to be transitory, resulting from temporary colonisation either by immigrants from mainland Europe or wandered from coastal populations, and the more isolated coastal records are also believed to be of immigrants.

Cistogaster globosa **(Diptera, Tachinidae)**
Red Data Book category 1 (Endangered)
A distinctive bristle-fly, black with silver-white dusting in the male, black and orange in the female, the larvae of which are parasites of the shieldbug *Aelia acuminata*. Until recently, this species was known only from a scattering of sites on calcareous grassland in southern English counties: Wiltshire, Hampshire, Surrey and Berkshire. It has been found more widely in the last few years, from Huntingdonshire in the north to Monmouthshire in the west, and over a rather wider range of grasslands, though all appear to be at least mildly calcareous. The recent records include large

populations in species-poor grassland recently established on former arable land. There is no doubt that the species has increased considerably in range, but it seems still to be local and erratic in occurrence. The host bug has also greatly increased in abundance and range in recent years, but has done so over a broad front. The current formal status of this species is no longer appropriate.

Conocephalus discolor **(Orthoptera, Tettigoniidae)**
Nationally Scarce category A
The long-winged conehead. A bush cricket found in tall grassland, usually either unmanaged or lightly grazed, including ungrazed downland turf, urban wasteland, woodland rides and clearings, coastal reed-beds, the upper levels of ungrazed saltmarshes, and wet and dry heathland. At one time a considerable rarity, this species has expanded its range considerably over recent decades, and especially over the last few years, and is now known to occur in many southern English counties up to the south midlands. Its status as a Nationally Scarce species is no longer appropriate.

Euscelidius variegatus **(Hemiptera, Cicadellidae)**
Nationally Scarce category B
A black-spotted pale brown leafhopper which probably feeds chiefly on grasses, though it has been reported from a range of other plants. It is largely confined, in Britain, to very open-structured, dry, well-drained grassy places, and until recently was found primarily in dunes, breckland, acid grassland and chalk downland in southern coastal counties. It has become much more widespread in recent years, however. It is now frequent inland and is known to occur north to Yorkshire. It occurs in early successional stages in quarries, gravel pits and other disturbed ground, and is increasingly found at arable field margins. It is doubtful that the species now deserves its Nationally Scarce status, but it can be quite local in its occurrence and may also be sensitive to small changes in climate, so its status may not be an entirely stable one.

Gymnosoma rotundatum **(Diptera, Tachinidae)**
Red Data Book category 3 (Rare)
A distinctive bristle-fly, with black-marked rounded orange abdomen, the larvae of which are parasites of the shieldbug *Palomena prasina*. It is found primarily in dry areas on friable soils on heathland and calcareous grassland where there is scattered scrub. The recorded distribution in heavily concentrated in Surrey and Sussex, from which, over a limited area, there are many records and reports of substantial populations. The reason for the geographical restriction of this species is not immediately obvious: there are records from Kent and Middlesex, and there may be scattered isolated populations more widely in the south-east.

Hippodamia variegata **(Coleoptera, Coccinellidae)**
Nationally Scarce category B
Adonis' ladybird. A distinctively marked red, black and white ladybird found in low open-structured vegetation on dry ground. It has been recorded from heathland, dry grassland, parkland, sand dunes, riverbanks, ruderal vegetation in mineral workings, derelict and setaside arable land. It is widespread but local in southern and eastern England, much more local further north and west, recorded from south Wales but not known from Scotland. Though especially associated with coastal sites, there are many inland records and it appears to have increased substantially inland in recent years, both in brownfield sites and at arable field margins and the early stages of setaside. The Nationally Scarce status currently applied to this species cannot be justified.

Hylaeus signatus **(Hymenoptera, Apidae)**
Nationally Scarce category B
A small bee which nests in stems of such plants as bramble and rose, and takes pollen almost exclusively from *Reseda* species (wild mignonette *Reseda lutea* and weld *Reseda luteola*). It has been recorded from downland, heathland and open woodland as well as ruderal habitats. It is a southern species, recorded north to Yorkshire, always local but very scarce in the north of its range.

***Kalcapion semivittatum* (Coleoptera, Apionidae)**
Nationally Scarce category A
A small black seed weevil with red legs, which feeds on annual mercury *Mercurialis annua*. It seems potentially able to occur in any habitat where good populations of its host plant grow. It is perhaps most frequently recorded from waste ground where there is good continuity of the host plant and associated shelter for overwintering, but can be found at arable field margins and in gardens, and does not require a large area of habitat. It has a restricted distribution, particularly concentrated in Kent, extending just north of the Thames into South Essex, and with scattered records west to Wiltshire and Dorset.

***Larinus planus* (Coleoptera, Curculionidae)**
Nationally Scarce category B
A stoutly-built black weevil which feeds on thistles, including creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, marsh thistle *Cirsium palustre*, and musk thistle *Carduus nutans*. It may also feed on carline thistle *Carlina vulgaris* and knapweed *Centaurea* sp. It is most frequent in coastal grassland, but also occurs inland, especially on disturbed and partly bare ground. It is a southern species, most frequent in southern coastal counties of England from Cornwall to Kent, recorded north to Gloucestershire and in South Wales.

***Lasioglossum malachurus* (Hymenoptera, Apidae)**
Nationally Scarce category B
A small brownish solitary bee found in open habitats. It nests in aggregations in open habitats on fairly firm level or gently sloping ground in full sun, and adults feed from a wide range of flowers. It is a southern, and especially south-eastern, species, found in coastal habitats, open grasslands, disused quarries and other brownfield sites, and even in gardens. Historical records suggest a decline, especially in inland sites, and it was for a time regarded as a very scarce species, but it always remained reasonably frequent in some areas, including north Kent. In recent years it has again been recorded much more widely and frequently, especially in inland sites, and it is now a fairly common species in substantial areas of the south-east. It is now unambiguously unworthy of Nationally Scarce status.

***Lygus pratensis* (Hemiptera, Miridae)**
Red Data Book category 3 (Rare)
A rather brightly marked phytophagous plant-bug. Though polyphagous and found in a wide range of habitats in mainland Europe, most confirmed British records have, until very recently, come from rides and clearings in ancient woodland in southern England. There has, however, always been some uncertainty over its status and distribution. It was not separated from other members of the genus in Britain until 1966, and there has been a certain amount of taxonomic confusion even since then. The number of confirmed records is thus rather few. There is a record of the species being taken from an area of gorse and heather at Witley Common, Surrey, some years ago, so the restriction to ancient woodland has perhaps never been absolute. In the last few years *L. pratensis* has been found abundantly amongst ruderal vegetation in several southern counties. Whatever the past status of the species, this abundance in this habitat is certainly a new occurrence. It seems likely either that pre-existing British populations have spread to this new habitat in response to the changed climate of recent years, or that there has been a secondary invasion of the species from the near continent. Whichever is the case, it is clear that the status of *L. pratensis* in Britain is in need of revision.

***Macrosteles quadripunctulatus* (Hemiptera, Cicadellidae)**
Nationally Scarce category A
A small pale green leafhopper found in open-structured, often sparse vegetation with some grasses on well-drained open ground in full sun. It has been recorded from a wide range of habitats and substrates, including coastal dunes, acid grassland, chalk and limestone grassland and quarries. It is believed to be a grass-feeder, but the British hosts are not known. It has a scattered distribution in southern England, from Devon to Kent and north to Northamptonshire and Warwickshire. The small size, varied habitats and ability to colonise newly available habitats tend to suggest that this species

may be under-recorded: it is, however, easily captured, often present in large numbers, and usually the only member of its genus in the very dry open habitats in which it occurs.

***Mecinus janthinus* (Coleoptera, Curculionidae)**
Nationally Scarce category A
A shining blue weevil which feeds on common toadflax *Linaria vulgaris* in grassland, disturbed ground and roadside verges, usually on calcareous soils. This species was first found in Britain in 1948, and has spread rather slowly in the south-east. Recent records are concentrated in Kent and South Essex, but a thinner scatter of records extends the range to Surrey and Northamptonshire.

Mimesa bruxellensis **(Hymenoptera, Sphecidae)**
Nationally Scarce category A
A fairly small black and red solitary wasp found in open sunny situations on sandy soils. There are records from heathland, dry grassland, open woodland, coastal dunes, sandpits and quarries. Nests are constructed in burrows in the ground, and are stocked with leafhoppers. Adults visit flowers growing amongst herbaceous vegetation, but appear to hunt chiefly amongst tree and bush foliage. This is a very local species, recorded from scattered localities in southern England from Dorset to Kent and north to Berkshire, and also known from Glamorgan and a very isolated colony on the Lancashire coast.

***Olibrus flavicornis* (Coleoptera, Phalacridae)**
Red Data Book category K (Insufficiently Known)
A small shining black beetle found in open dry habitats on well-drained soils. It is probably associated with autumn hawkbit *Leontodon autumnale*, and larvae are likely to develop in the flower-heads. It has been recorded from south-eastern counties from Suffolk to Hampshire. A dearth of modern records led to Red Data Book designation, but in recent years it has been recorded rather more often, though it remains an uncommon species of restricted British range.

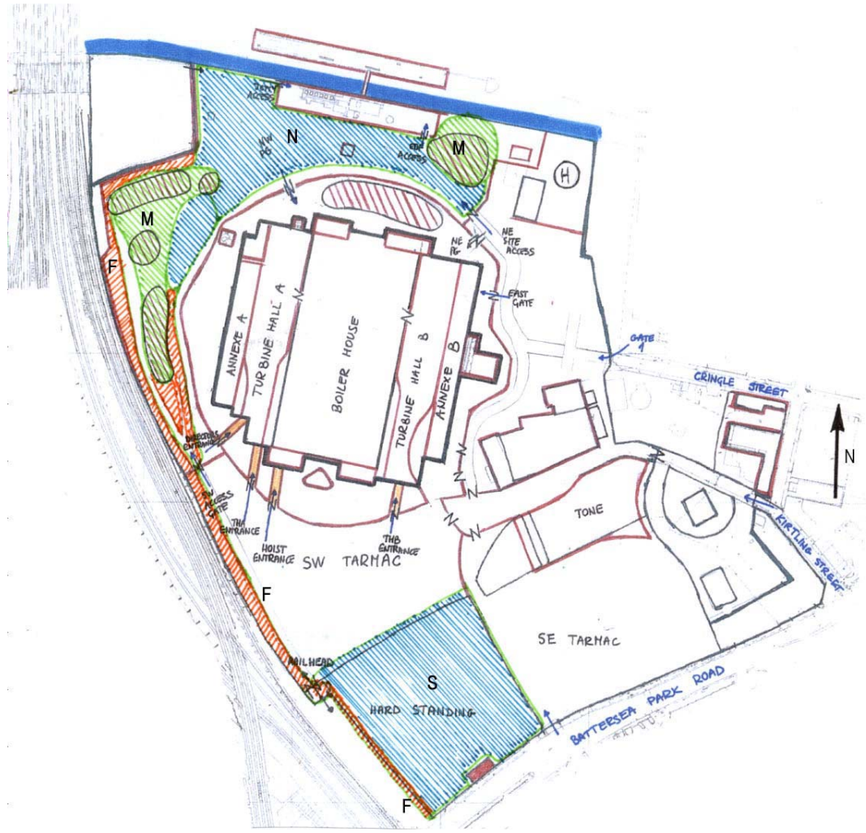
***Scleroracus decumanus* (Hemiptera, Cicadellidae)**
Nationally Scarce category B
A small leafhopper, patterned in black and brown, which lives in dry open habitats and probably feeds on grasses. It has been recorded from coastal dunes, grassy heathland, sparse grassland on brownfield sites, amongst regenerating grassland following birch clearance on dry peat, chalk heath, and possibly on chalk grassland. Apart from a very isolated record from Arran, the British distribution is predominantly southern, from Dorset, Carmarthen and Anglesey in the west to Kent in the east and Yorkshire in the north. Records are very widely scattered within this broad range, and there are no obvious concentrations of populations.

***Stictopleurus punctatonervosus* (Hemiptera, Rhopalidae)**
Extinct
A glazier bug, which feeds on composites growing in at least moderately tall but open-structured vegetation on well-drained soils. The official status is no longer appropriate. Though seemingly established in southern England in the past this species almost certainly became extinct as a British species in the nineteenth century. It has re-colonised in recent years, however, and over the past decade has become widely distributed and common over a large area of southern England, occurring especially in brownfield sites and on fallow arable land.

***Trixagus elateroides* (Coleoptera, Throscidae)**
Red Data Book category 3 (Rare)
A small brown beetle found in grassland and other open-structured vegetation, spending much time low amongst litter and tussocks during the day and most active in the evening. It is most characteristically a coastal and estuarine species found in the upper fringe of saltmarshes, but is also recorded from coastal shingle and from inland sites, including grassland in pasture woodland. It is largely a species of south-eastern coasts, from Essex to Hampshire, with a particular concentration of records along the Thames estuary, with inland records extending the historical range to Hertfordshire

and Dorset, together with a very isolated record from Herefordshire, and the recent range to Surrey. It is possible that misidentifications result in the species being erroneously recorded or overlooked.

Map 1
Main recording areas



Locations

S	grassland and open ground in the south-west
N	open habitats near riverside
M	spoil mounds
F	rail fringe habitats

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