

Brookhurst Wood MBT Facility

Environmental Permit Variation - EPR/HP3238GW
Impact Assessment Report

Biffa Waste Services Limited

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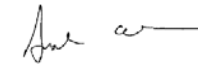
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1. Report Context

1.1 Introduction

AECOM has been commissioned by Biffa Waste Services Limited (“the Operator” or Biffa) to prepare an application to vary the existing environmental permit (EPR/ HP3238GW) to include an additional area of land in proximity to the current Mechanical and Biological Treatment (MBT) Facility for the loading, storage and dispatch of MBT outputs. The site is located at Brookhurst Wood, Horsham, West Sussex.

This report summarises the Impact Assessment which has been prepared in accordance with the EA methodology for “*Environmental Risk Assessment for Permits*” and details the potential impact of the new waste storage area on surrounding receptors. The report should be read in conjunction with other supporting application information.

1.2 Proposed Facility

There are no changes proposed to the existing MBT Facility operations.

Biffa plan to extend the existing MBT Facility to include an area of land (known as Site Ha) to be used as a waste storage and transfer area for loose or baled RDF and compost like outputs (CLO) produced by the MBT process to meet the requirements of the West Sussex County Council Materials Resource Management Contract (MRMC).

The area will be operated as a trailer park whereby up to 36 transport trailers may be delivered to site empty and subsequently filled with RDF. It is intended that alternate bays will be used for the full and empty trailers so the drivers can drop off and collect in the same trip. The RDF will be stored for a maximum 72 hours prior to export from site to EfW's in the UK or abroad.

It is also proposed to allocate a controlled area for the storage of containerised covered CLO, this material will be a by-product of the food waste process and will be taken to land spreading within the vicinity of the site during the week. Over weekends there will be a need to store the CLO at the site.

No waste treatment or processing will take place as part of this activity and total waste storage (daily maximum) is estimated at 450 tonnes of RDF and estimated 100 tonnes of digestate.

2. Impact Evaluation

2.1 Introduction

This section outlines the approach taken to evaluate the risks to the environment and to human health associated with the operation of the Brookhurst Wood Waste Storage and Transfer Area. The impact evaluation process has made reference to the appropriate guidance within:

- Environment Agency Guidance “Risk Assessments for your Environmental Permit”; and
- Environment Agency “A Practical Guide to Environmental Risk Assessment for Waste Management Facilities.”

2.2 Impact Evaluation Methodology

The evaluation methodology used involves three stages:

- a. Source characterisation, to identify the potential hazards and risks associated with the operation of the facility. This is covered in detail in Section 3 below, but broadly covers:
 - Point source emissions to air, land and water;
 - Fugitive emissions to air, land and water;
 - Odour emissions; and
 - Noise and vibration.
- b. Receptor evaluation, to review the receptors which could be impacted by the hazards and risks from the operation of the facility. This is discussed in more detail in Section 4 below, but broadly covers:
 - Residential, commercial and industrial human receptors;
 - Habitat receptors associated with designated and other sensitive sites; and
 - Location related receptors associated with site geology, hydrogeology and hydrology.
- c. Risk assessment which evaluates the hazards and risks in terms of the probability of occurrence and the severity of the impact on the identified receptors. The risk assessment also summarises the management plan approach that will be used to mitigate the identified risks.

3. Source Characterisation

3.1 Emissions to Air, Water and Land

Assessments take into account environmental as well as health and safety hazards and the main areas of consideration are:

- Point source emissions to air, land and water;
- Fugitive emissions to air, land and water;
- Odour emissions; and
- Noise and vibration.

3.1.1 Point Source Releases to Air

There are no changes proposed to the existing point source releases at the MBT facility and these remain as previously assessed.

There are no new point source releases to air associated with the new waste transfer and storage site and no further consideration of point source releases to air is therefore required within this assessment.

3.1.2 Point Source Releases to Water

3.1.2.1 Surface Water

Surface water arrangements for the existing MBT area remain unchanged.

Surface run off from the new trailer park area will be directed via a collection channel into the proposed site lagoon. Water will be subject to sampling and testing to ensure it can be released into the wider Brookhurst Wood surface water management system which discharges from the main MBT lagoon. If water is confirmed as not suitable to be directed into the surface water management system, then this will be removed by tanker or similar and directed for treatment through the MBT facility.

Surface run off from the CLO storage area will be contained in a dedicated drainage system and will be transferred for processing at the MBT.

As no new discharge point will be introduced as part of this variation no further consideration of point source releases to water will be required within this assessment.

3.1.2.2 Ground Water

There are no point source releases to ground water associated with the MBT. No changes are proposed as part of this variation.

3.1.2.3 Sewer

There is a point source discharge to sewer from the existing MBT facility which facilitates the discharge of water from the MBR treatment plant that can't be reused in the treatment process.

There will be no new point source discharges to the foul sewer from the new waste transfer and storage area - waters which are not suitable for release as surface water will be transferred by tanker or similar to the MBR plant at the MRF for treatment and reuse. Such waters will be managed via the existing permitted consents.

3.1.3 Fugitive Releases to Air

No changes are proposed at the existing MBT facility.

The following activities at the new waste transfer and storage area have been identified as potential release sources:

- Loading of vehicles;
- Transfer of waste through Site Ha;
- Windblown dust and particulates from external roads and surfaces; and
- Windblown dust from storage of incoming wastes and process outputs.

A separate Dust Management Plan including a dust risk assessment has been completed and is presented as Section 5 of the Application.

3.1.4 Litter

No changes are proposed at the existing MBT facility.

The potential for litter from the new waste transfer and storage facility is associated with material becoming windborne during:

- Storage and loading of loose RDF; and
- Transport of materials.

3.1.5 Mud and Debris

No changes are proposed at the existing MBT facility.

The potential for mud and debris at the new transfer and storage area have been evaluated and the following potential sources noted:

- Waste collection vehicles;
- RDF and CLO storage; and
- Plant spillage and leaks.

3.1.6 Fugitive Releases to Water

No changes are proposed at the existing MBT facility.

The potential for fugitive releases to water (surface water, ground water and sewer) and land at the new transfer and storage area have been evaluated and the following potential sources noted:

- Overflow of storage containers;
- Surface run-off from pavements, roads and hardstanding; and
- Firewater.

3.2 Odour

No changes are proposed at the existing MBT facility.

The following activities at the new waste transfer and storage area have been identified as potential release sources:

- Loading of waste
- Storage of RDF and CLO outputs from the MBT.

A separate Odour Management Plan including an odour risk assessment has been completed and is presented as Section 4 of the Application. Odour Risk has not been considered further in this document.

3.3 Noise and Vibration

No changes are proposed at the existing MBT facility.

The following potential noise and vibration sources have been identified as at the new waste transfer and storage area:

- Vehicle movements associated with the transfer and collection of waste; and
- Vehicle movements associated with use of on-site mobile plant.

A Noise and Vibration Management Plan has been completed and is presented in Section 6 of the Application.

3.4 Accidents and Abnormal Incidents

No changes are proposed at the existing MBT facility.

The following abnormal operations and emergency situations have been identified for the new waste transfer and storage area:

- failure of containment (for example, bund failure, or drainage sumps overflowing)
- failure to contain firefighting water
- making the wrong connections in drains or other systems
- preventing incompatible substances coming into contact with each other
- vandalism and arson
- extreme weather conditions, such as flooding or very high winds
- accessibility of control equipment in emergency situations
- failure of main services
- operator error
- security breach
- major vehicle accident
- inappropriate waste storage.

3.5 Fire Risk

In addition to the above abnormal operations and emergency situations, specific considerations have been given to fire risk in accordance with the EA Guidance “*Fire Prevention Plans: Environmental Permits*” (January 2021) – this assessment is considered in the separate Fire Prevention Plan (application part 7) which accompanies the application and is not considered further in this document.

4. Receptor Evaluation

4.1 Introduction

The new waste transfer and storage area is located to the west of the existing installation boundary of the MBT Facility. The new waste transfer and storage area extends to approximately 1.55 ha – see Drawings in Section 11 of the application.

The centre of the new waste transfer and storage area is located at National Grid Reference (NGR) E517050, N134483 at Brookhurst Wood, Langhurstwood, Horsham, West Sussex.

Potential receptors which could be impacted by the operations of the proposed facility include:

- Residential, commercial and industrial human receptors;
- Habitat receptors associated with designated and other sensitive sites; and
- Location related receptors associated with site geology, hydrogeology and hydrology.

The list of potentially sensitive receptors to a 1km radius of the site is presented in Drawing 60586541-BHW-DEMP-001 in Appendix A.

4.2 Human Receptors

A range of potentially sensitive human receptors have been considered as detailed below and these are shown on a receptor plan which is attached in Appendix A.

Table 1: Human Receptors

Receptor	Description	Type	Approximate Distance (m)	Direction
R1	Graylands Industrial Park	Commercial & Residential	619	NE
R2	Graylands Lodge	Residential	309	NE
R3	Graylands Farm	Farm	527	SSE
		Residential		
R4	Andrews Farm	Farm	564	SSW
		Residential		
R5	Lower Chickens Farm	Farm	782	W
		Residential		
R6	Cox Farm Lodge	Residential	570	ENE
R7	Cox Farm	Farm	338	ENE
R8	Sussex Camper Vans	Commercial	548	NE
R9	Orchard Lodge	Care Home	605	NW
R10	Durford Hill Farm	Farm	775	NNW
		Residential		
R11	Fisher Clinical Services	Industrial	756	N
R12	Broadlands Business Centre	Commercial	1055	NNE
R13	Weinerburger Brickworks and adjacent Business Park	Industrial	281	S
R14	Warnham Railway Station	Commercial	453	S
R15	South Lodge	Residential	521	NE
R16	Boldings Brook Academy	School	613	NW
R17	Langhurst Moat Cottage	Residential	341	SE
R18	Holmwood	Commercial	1052	NNE
R19	Gunborn Crossing Cottages	Residential	840	N
R20	Nowhere House	Residential	884	NNW

Receptor	Description	Type	Approximate Distance (m)	Direction
R21	Richmond House	Residential	945	NNW
R22	Wood Farm	Farm	1098	NNW
		Residential		
R23	Upper Chickens – Houses and Pet Supply Company	Residential & Commercial	1113	NNW
R24	Highland House, The Mount & other residences	Residential	674	NW
R25	Dog & Duck Pub	Commercial	895	NNW
R26	Geerings	Residential	908	WNW
R27	Police House and other adjacent residences	Residential	869	SW
R28	Westons Farm & Westons Place Residential Properties	Farm	794	SW
		Residential		
R29	Lower Gate House	Residential & Commercial	502	S
R30	Pondtail Farm	Farm	816	SSE
		Residential		
R31	Britaniacrest Recycling	Industrial	103	S
R32	Existing Biffa MBT area	Industrial	173	E
R33	Panel 2 Panel & Greens	Commercial	415	S
R34	Sewage Works adjacent to Farm	Industrial	423	SW
R35	Wealdon	Residential	395	SE
R36	Denhams Auctioneers	Commercial	590	NW
R37	Sussex Health Centre	Nursing Home	633	NW
R38	Male Journey	Commercial	653	NW
R39	White Cottage Cake Company	Commercial	698	NW
R40	Houses on Station Road	Residential	469	SSW
R41	Little London Hill	Residential	656	WNW
R42	Vale Stud Riding School	Commercial	1011	NNW

In line with EA guidance receptor sensitivity is considered as:

- High sensitivity receptors would be generally residential properties, commercial properties such as pubs and hotels, schools, care homes and hospitals;
- Moderate sensitivity receptors would be commercial and industrial workplaces; and
- Low sensitivity would be footpaths, roads.

4.3 Habitat Receptors

4.3.1 Designated Sites

Information regarding designated sites was obtained from the Landmark Information Group, the Multi-Agency Geographic Information for the Countryside (MAGIC) website and the Environment Agency Enhanced Conservation Screening Report, relating to:

- European Nature Conservation Sites;
- Special Protection Areas (SPAs);
- Special Areas of Conservation (SACs);
- RAMSAR sites; and

- Sites of Special Scientific Interest (SSSIs).

The searches which are provided as Appendix B and Appendix C of the Site Condition Report (reference: 60586541-ACM-XX-00-RP-EN-SCR-R02, Application Part 9) identified:

- The site is within close proximity to the Warnham SSSI, which is designated due to the specific geological qualities of this land;
- The Warnham local nature reserve (LNR) lies approximately 1,000m to the south of the site boundary;
- There are a number of Local Wildlife Sites (LWS) within 2km of the site, including; Benland Wood, Brookhurst Wood, Brookhurst Gill and Morris' Wood, Tickfold Gill and Warnham Mill Pond; and
- There are areas of ancient woodland within 2km of the site, in all directions including but not limited to:
 - Allingham Wood
 - Benhams Gill
 - Blackmead Copse
 - Dutshell Copse
 - Furzefield Copse
 - Hawksbourne Wood
 - Holming Wood
 - Hurst Wood
 - Langhurst Copse
 - North Heath Copse
 - Old Barn Gill
 - Tickfold Gill
 - Upper Rapeland Wood
- The application site does not lie in, or overlap with, any other statutory, non-statutory or international designated sites.

4.3.2 Other Sensitive Locations

In addition to the statutory designated sites, a further three sites with non-statutory designations were identified as being present within 2km of the site boundary. These are Sites of Nature Conservation Importance (SNCI) designated for their ecological value in a local context and are included in the Horsham District Local Plan:

- Brookhurst Wood, Brookhurst Gill and Morris' Wood, Horsham (SNCI H07);
- Warnham SNCI (SNCI H51);
- Tickfold Gill, Kingsfold (SNCI H11); and
- Warnham SNCI is also designated as a Local Nature Reserve (LNR).

4.3.3 Protected Species

The EA Enhanced Conservation Screening Report also identified the potential for protected species in the locality of the plant. A Preliminary Ecological Appraisal (PEA) was completed by AECOM on the proposed area for development of Site Ha which reviewed potential ecological constraints and recommended further action. This is summarised in the table below and a copy of the PEA Report is presented in Appendix B:

Table 2: Summary of Ecological Constraints and Recommended Further Action

Receptor	Scale of Constraint	Further Action and Potential Mitigation
Bats	High	<ul style="list-style-type: none"> All buildings within the site were confirmed as having negligible suitability for bats, therefore no further survey is required. Tree 1 was found to have moderate suitability and tree 2 was of low suitability. Depending on the nature of the works, further survey of Tree 1 may be required. Tree 2 would not require further survey; however, if felling is required this would need to be in accordance with a precautionary working method.
Nesting Birds	Low	<ul style="list-style-type: none"> Vegetation clearance and building demolition to be undertaken during October – February to avoid nesting season. A nesting bird survey may be required if work undertaken at other times of the year.
Reptiles	High	<ul style="list-style-type: none"> The Site comprises some suitable habitat for reptiles, and they are present within the wider site. Given the limited land take compared to the amount of suitable habitat it is unlikely the Proposed Development would involve significant impacts on reptiles providing care is taken to avoid killing and injury (such as undertaking vegetation removal during March) through the use of a precautionary working method.
Great Crested Newt (GCN)	High	<ul style="list-style-type: none"> Suitable habitat for great crested newt is present within the Site. Further survey to assess the presence/absence of great crested newt is required before works can commence. The additional survey for GCN was completed and is attached in Appendix C and no further issues were noted.
Badgers	Low	<ul style="list-style-type: none"> Badgers are not considered to be present on the site, but it is recommended that a pre-construction walkover is completed due to the mobile nature of badgers.

4.4 Location Based Receptors

4.4.1 Geological Considerations

In respect of designing appropriate controls and mitigation measures for the proposed WSTA, geological features on the site need to be considered. The main issues are:

- The area is situated on an exposed outcrop of Weald Clay;
- The clays are composed predominantly of illite, kaolinite and mica, with some mixed layer mica-vermiculite phases; and
- The clay strata in the quarries consists of grey silty clays, shales and mudstones, with beds of sand, ironstone and shelly limestone from the Lower Cretaceous period.

4.4.2 Hydrogeological Considerations

The Weald Clay formation is classified as a non-aquifer and is largely impermeable, although it does contain sandstone and limestone horizons, which may be locally important as Minor Aquifers.

- The Environment Agency groundwater vulnerability map indicates that the site is not located within a Groundwater Water Source Protection Zone;
- There is not a major aquifer present at the site; and
- There are no licensed groundwater abstraction sites within a 1km radius of the overall site.

The base of the Brookhurst Wood and former Warnham Landfill quarries does, however, lie below the regional groundwater table, and there is potential for issues if the leachate derived from the Brookhurst Wood or closed Warnham Landfill Site is not correctly managed.

4.4.3 Hydrological Considerations

The Great Brookhurst Gill (a watercourse) is located approximately 665 metres to the north east of the MBT site. The MBT site is located between the proposed waste transfer and storage area and the Great Brookhurst Gill and has been landscaped such that its topography slopes towards the pond. It is therefore very unlikely that the Great Brookhurst Gill will be affected by the amendment of the development on the site.

Boldings Brook is located to the west of the proposed waste transfer and storage area and is approximately 60m away at its closest point to the site. The London-Dorking Railway line runs between the site and the Brook. The Environment Agency classifies the Brook as a 'main river' and the water quality has been classed as D (fair/moderate quality).

4.4.4 Historical Land Use Considerations

Checks on the historical land use for the site confirm that the area has been used for industrial purposes, mainly the Warnham brickworks, which have been in operation for the past 100 years or so. More recently, a landfill site has been developed to the north of the proposed development area.

The main considerations for the proposed site development being:

- There is a low risk to human health for future occupants or workers to be employed at a new facility built on the site;
- There is a low risk to controlled water receptors on the site, due to the presence of the impermeable Weald Clay underlying the site; and
- No specific groundwater remediation works were considered necessary.

4.4.5 Air Quality

The site falls within the Horsham District Council Area. The site does not lie within, or in close proximity to, a declared Air Quality Management Area (AQMA).

5. Risk Assessment of Fugitive Releases

5.1 Methodology

The risk assessment (see Appendix D) has been completed by considering each of the hazards identified in section 3 above in terms of:

- Frequency of occurrence;
- Nature and quantity of substance released;
- Pathways and receptors involved;
- Environmental consequence(s) of the event;
- Overall risk and its significance to the environment; and
- Control and mitigation measures needed to prevent or reduce the risk.

5.2 Scoring Mechanism

The risk assessment methodology has been developed using a scoring mechanism, whereby scores are assigned to:

- The probability of the hazard occurring without the use of protective measures;
- The consequences of the hazard to the environment or human health; and
- The effectiveness of the control/mitigation used to prevent the hazard occurring.

The scoring system used for the assessment is shown in Table 3 below.

Table 3: Risk Assessment Scoring System

Frequency of Occurrence		
Frequency	Comment	Score
Never	Incident occurs once every 100 to 10,000 years	1
Very Unlikely	Incident occurs once every 10 to 100 years	2
Unlikely	Incident occurs once every 1 to 10 years	3
Somewhat Unlikely	Incident occurs at least once per year	4
Fairly Probable	Incident occurs at least once per month	5
Probable	Incident occurs at least once per week	6
Consequence of Hazard to Environment or to Human Health		
Consequence	Comment	Score
Minor	<ul style="list-style-type: none"> • Onsite nuisance only no outside complaint • No breach of permit 	1
Noticeable	<ul style="list-style-type: none"> • Nuisance noticeable off-site • Potential for 1 – 2 complaints • Reportable breach of permit • Minor plant damage • Health and safety 'near miss' 	2
Significant	<ul style="list-style-type: none"> • Severe sustained nuisance • Significant plant damage • Injury requiring on-site medical treatment • Major breach of environmental permit • Numerous public complaints 	3
Severe	<ul style="list-style-type: none"> • Hospital treatment required for injured persons • Site evacuation required (partial or full) • Partial plant shutdown required • Replacement of part of plant • Hazardous substance release to water course with ½-mile effect • Off-site emergency services involved • Regulator (EA/HSE) involved 	4
Major	<ul style="list-style-type: none"> • Hospitalisation of injured persons • Public warning and off-site emergency plan implemented 	5

	<ul style="list-style-type: none"> • Serious toxic effect on local protected habitat • Widespread but temporary damage to land • Significant fish kill over a 5 mile range • Full plant shut-down required • Regulatory prosecution likely 	
Catastrophic	<ul style="list-style-type: none"> • Major airborne release requiring evacuation of local population • Plant shutdown for longer than 1 week • Partial or full rebuild of plant • Significant contamination of land and/or water sources requiring significant remediation. 	6
Effectiveness of Mitigation		
Mitigation Factor	Comment	Score
Non-existent	<ul style="list-style-type: none"> • No mitigation in place 	1
Ineffective	<ul style="list-style-type: none"> • Some minor controls in place but mitigation not achieved 	2
Partly effective	<ul style="list-style-type: none"> • Basic controls in place and hazard partly mitigated but significant residual risk remains 	3
Effective	<ul style="list-style-type: none"> • Basic controls in place and hazard mitigated to an acceptable level although moderate level of residual risk may exist 	4
Very effective	<ul style="list-style-type: none"> • Processes fully controlled (basic/advanced) and hazard mitigated to recognised standard. Some minor residual risk may remain 	5
Entirely effective	<ul style="list-style-type: none"> • Processes fully controlled to level in excess of recognised standards. Hazard mitigation entirely effective and no residual risk remains 	6

5.3 Potential Hazards

A list of potential hazards associated with the new waste transfer and storage area has been developed from the issues identified in section 3 and these are shown in Table 4 along with the anticipated pathways and receptors.

Table 4: Potential Fugitive Emission Hazards

Potential Hazard	Pathway	Receptor
1. Releases To Air		
Dust, particulates and litter during loading and unloading of vehicles	<ul style="list-style-type: none"> • Air 	<ul style="list-style-type: none"> • Public • Staff • Local Environment
Windblown dust from external roads, pathways and other surfaces	<ul style="list-style-type: none"> ▪ Air 	<ul style="list-style-type: none"> ▪ Public ▪ Staff
Windblown dust from storage of RDF and CLO.	<ul style="list-style-type: none"> ▪ Air 	<ul style="list-style-type: none"> ▪ Public ▪ Staff ▪ Local environment
2. Releases To Land and Water		
Spillage of waste and materials during the operation of t of the new waste transfer and storage area	<ul style="list-style-type: none"> ▪ Water • Land 	<ul style="list-style-type: none"> ▪ Surface water ▪ Ground water ▪ Sewer system
Contaminated surface run-off	<ul style="list-style-type: none"> • Water • Land 	<ul style="list-style-type: none"> ▪ Surface water ▪ Groundwater ▪ Sewer system
Contamination of groundwater	<ul style="list-style-type: none"> • Water • Land 	<ul style="list-style-type: none"> ▪ Ground water
3. Nuisance Issues		
Mud/litter carried onto highway	<ul style="list-style-type: none"> • Water ▪ Land 	<ul style="list-style-type: none"> ▪ Public
Pest, vermin and scavengers	<ul style="list-style-type: none"> ▪ Land 	<ul style="list-style-type: none"> ▪ Staff ▪ Public
4. Odour		
Odour from loading and storage of RDF	<ul style="list-style-type: none"> • Air 	<ul style="list-style-type: none"> ▪ Staff ▪ Public
Odour release from loading and storage of the CLO	<ul style="list-style-type: none"> • Air 	<ul style="list-style-type: none"> ▪ Staff ▪ Public

Potential Hazard	Pathway	Receptor
5. Noise and Vibration		
Noise from vehicles delivering/collecting waste	• Air	▪ Staff ▪ Public
Noise from on-site mobile plant movements	• Air	▪ Staff ▪ Public

5.4 Risk Reduction and Management

5.4.1 Controls and Mitigations

Controls and mitigations for the main MBT facility remain unchanged. The controls and mitigations employed at the new waste transfer and storage area are summarised in Table 5 below. These are supported by site operating procedures and management plan as appropriate.

Table 5: Fugitive Emission Controls and Mitigations

Potential Hazard	Controls and Mitigations
1. Releases to Air	
Dust, particulates and litter during loading and unloading of vehicles	<ul style="list-style-type: none"> • Loose RDF and CLO is loaded into enclosed containers inside the MBT building and covered prior to transfer to the external storage area. • Baled RDF is loaded into a curtain sider inside the MBT building and curtain secured prior to transfer to the external storage area. • . • Site is equipped with equipment which can be used to suppress levels of dust and particulates. • All loads leaving the site are fully covered to minimise the potential for material becoming airborne. • Site operators and drivers are fully trained. • Material clean-up via road sweeping is utilised in the event of a spillage.
Windblown dust from external roads, pathways and other surfaces	<ul style="list-style-type: none"> • A hard surfaced access road is provided from the site entrance on Langhurstwood Road. • Speed restrictions of 10mph will be imposed for all vehicles driving on the site, in order to minimise emissions of dust from internal road surfaces • All vehicles using the installation will be required to ensure that all loads are adequately sheeted or otherwise contained prior to exiting the site onto the public highway. • Road and yard surfacing are subject to routine inspection and maintenance – any accumulation of materials is removed promptly. • Water suppression to abate dust emissions is available for use during dry periods.
Windblown dust from storage of RDF and CLO	<ul style="list-style-type: none"> • Baled RDF will be stored in curtain-sided trailers with curtain secure or as loose RDF in enclosed containers; • CLO will be stored in enclosed containers; • Good housekeeping standards will ensure that the site areas are kept clean to prevent build-up of spillage waste • Use of appropriate dust suppression systems to maintain the condition of the stockpiles during dry, windy conditions.
2. Releases to Land and Water	

Potential Hazard	Controls and Mitigations
Spillage of waste and materials during the operation of the new waste transfer and storage area	<ul style="list-style-type: none"> Operator checks daily for signs of leak and repairs are dealt with promptly if identified. High standards of housekeeping are maintained across the site. Spill kits are available to deal with any leaks.
Contamination of groundwater	<ul style="list-style-type: none"> Site surfacing for all areas accessed by vehicles are concrete designed to an appropriate standard and contains anti-crack mesh to improve surface durability.
Contaminated surface run-off	<ul style="list-style-type: none"> RDF storage area will be equipped with drainage which will direct surface run-off to the new lagoon. Water will be tested to ensure it can be discharged to the wider site surface water management system. If water quality prevents release to the surface water management system then water will be removed from the lagoon by tanker or similar for recycling or processing at the MBT plant. The CLO storage area will include a separate engineered site drainage system which allows the collection of potentially contaminated run-off , which will be directed for recycling or processing at the MBT plant. Drainage systems will be subject to routine inspection along with a preventative maintenance regime. Emergency spills kits used in conjunction with a site emergency response plan (GF17-01) is available to help mitigate the effects of any contamination.
3. Nuisance	
Mud/litter carried onto highway	<ul style="list-style-type: none"> The site will implement the Litter Management Plan (BWS LMP [WS212]). All incoming loads from the MBT plant and outgoing loads will be contained or sheeted. All internal roads and storage areas are hard-surfaced with concrete or tarmac and swept regularly. A wheel wash is provided adjacent to the weighbridge. This mechanical wheel wash will be maintained in accordance with the manufacturer's instructions and the water will be recirculated where possible. When deemed necessary by the Plant Manager, MBT vehicles exiting the installation will use the wheel wash in order to prevent materials being deposited on the highway
Pest, vermin and scavengers	<ul style="list-style-type: none"> Use of registered pest control contractors and rodenticide will be considered if required. Implementation of a site Pest Management Plan (BSW PMP [WS213]).
4. Odour	
Odour from loading and storage, of RDF.	<ul style="list-style-type: none"> Loading of loose RDF and CLO into the containers for offsite transfer will take place inside the MBT building which is equipped with an extraction system to control odours and fast acting doors. If needed closed containers will be transferred for temporary storage at the new waste storage and transfer area. No handling or processing of loose RDF or CLO will take place outside the MBT Building and once final containers are filled inside the MBT building, they will be closed/sealed, and they will remain closed until they are transferred off-site. Loading of baled and plastic wrapped RDF onto curtain-sided trailers will take place either inside the MBT building or adjacent to MBT door. Curtains will be secured prior to transfer for storage at the new waste storage and transfer area. No further handling or processing of the baled RDF will take place in the new waste storage and transfer area.

Potential Hazard	Controls and Mitigations
	<ul style="list-style-type: none"> • Staff training includes raising employee awareness with respect to normal plant operational odour levels and actions to be taken to rectify any faults. • Dust suppression available when required. Mist sprays can be supplemented with de-odourising agents if required. • Rejection of highly odorous materials at acceptance stage screening for the MBT will minimise the risk of highly odorous materials being transferred to the new RDF transfer and storage area. • Material to be stored for a maximum of 3 days in the waste storage and transfer area. • Implement odour management plan (60586541-ACM-XX-00-RP-MBT-OMP-R01).
<p>Odour release from loading and storage of CLO.</p>	<ul style="list-style-type: none"> • CLO materials will be loaded into enclosed containers within the MBT building and will be sealed prior to transfer to the external storage area. • CLO will be stored in enclosed containers and remain sealed; • Staff training includes raising employee awareness with respect to normal plant operational odour levels and actions to be taken to rectify any faults. • Material to be stored for a maximum of 3 days. • Implement odour management plan (60586541-ACM-XX-00-RP-MBT-OMP-R01).
<p>5. Noise and Vibration</p>	
<p>Noise from vehicles delivering/collecting waste</p>	<ul style="list-style-type: none"> • Reversing is minimised where possible • Engines are switched off when not in use. • Vehicles will arrive/depart from the site in accordance with the current hours permitted by planning. • Implement Noise and Vibration Management Plan (60586541-ACM-XX-00-RP-MBT-NVMP-R01) and associated Noise Management Procedure (BWS 214 NMP) and Vibration Management Procedure (BSW VMP).
<p>Noise from on-site mobile plant movements</p>	<ul style="list-style-type: none"> • Mobile plant is maintained in accordance with manufacturer's recommendations to ensure potential vehicle noise is minimised. • Plant operator training includes using the plant effectively to minimise noise emissions, switching off when not in use, ensuring daily vehicle checks are completed to identify defects as early as possible and ensuring vehicle inspection hatches are kept closed when vehicle in use. • Implement Noise and Vibration Management Plan (60586541-ACM-XX-00-RP-MBT-NVMP-R01) and associated Noise Management Procedure (BWS 214 NMP) and Vibration Management Procedure (BSW VMP).

5.4.2 Monitoring

Site monitoring arrangements include:

- Daily site inspections to assess odour, noise, fugitive emissions, housekeeping and security; corrective action will be undertaken as necessary;
- Odour checks are undertaken on all waste loads during acceptance checks, if necessary a waste load will be rejected in the event that a strong odour is detected;

- No specific environmental noise monitoring has been undertaken at the facility to date, however noise levels will be monitored in relation to workplace safety levels as appropriate;
- Sampling and testing of clean surface water in the lagoon collected from the RDF storage are, prior to its discharge into the wider site surface water management system; and
- The complaint procedure for the site will record any complaints associated with the site - should complaints be received consideration will be given to boundary monitoring as appropriate.

5.5 Conclusion

Summary risk assessments in line with the EA guidance for fugitive releases are provided in Appendix D of this report.

Based on the assessment in relation to the identified receptors, only those in closest proximity are felt to be highly sensitive to fugitive releases. However, the implementation of the identified controls and mitigations will significantly reduce any potential impact on the receptors to an acceptable level.

6. Noise

6.1 Risk Assessment Method

6.1.1 Assessment Methodology

A detailed noise assessment was undertaken by AECOM as part of the planning application for the Waste Storage and Transfer Facility. SoundPLAN acoustic modelling software (version 8.2) implementing the calculation procedures of ISO 9613¹ has been employed to predict the propagation of noise away from the site in all directions and to quantify resultant noise levels at the identified noise sensitive receptor locations.

The assessment of the significance of the noise impacts at residential properties has been based on the guidance in BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound'.

A copy of the noise assessment is provided in Appendix E. .

6.1.2 Sensitive Noise Receptors

The residential receptors closest to the application site boundary are summarised in Table 6 below. Table 6: Environmental Noise Receptors

Receptor ID	Description	Distance from Planning Application Site Boundary (m)	Direction
R1	South Lodge	465	Northeast
R2	Graylands Lodge	230	East
R3	Bramblehurst	10	Southeast
R4	Cox Farm	335	West
R5	Gunbarn / The Nowhere House	825	Northwest

6.1.3 Establishment of Baseline

Baseline noise monitoring was carried out to establish the existing noise climate in the area. The monitoring procedures followed guidance from BS 7445-1:2003² and BS 4142:2014.

Baseline noise measurements were undertaken from 26th February to 4th March 2019 at locations representative of the surrounding residential receptors closest to the application site boundary. The measurement locations were considered to provide the optimal secure position to capture representative background sound levels at receptors.

- Location 1 (Long-term) – Located on the junction with Langhurst Wood Road and the entrance to the site. This location is considered representative of receptors R1, R2 and R3.
- Location 2 (Long-term) – Located along Dorking Road on a green area outside Sussex Healthcare Headquarters. This location is considered representative of receptors R4 and R5.

These locations are illustrated on the plan in Appendix B of the attached Noise Assessment Report.

The background results are shown in Tables 3 and 4 of the attached Noise Assessment Report.

6.2 Risk Assessment Results

In the determination of rating levels (per guidance from BS4142 section 9.2 'Subjective method'), a +9 dB acoustic feature correction has been applied to the predicted levels set out in Table 6 as a worst-case estimate, comprising +3 dB for intermittency and +6 dB to account for the possibility of tonal reversing alarms. This is a robust estimate that assumes there are periods of lulls in vehicle movements

¹ ISO 9613, Acoustics – Attenuation of Sound During Propagation Outdoors. Part 1: Calculation of the absorption of sound by the atmosphere (1993) and Part 2: General Method of Calculation (1996).

² British Standards Institute (2003) BS 7445 – Description and measurement of environmental noise – Part 1: Guide to quantities and procedures, BSi, London.

and background sound such that individual movements may be distinctly identifiable, and assumes that there are tonal reversing alarms which are highly perceptibly tonal at the receptors, which may not be the case.

Predicted rating levels have been compared against representative background levels (as established in Table 3 and Table 4) at each receptor to assess impacts per BS 4142 guidance and the NPSE LOAEL/SOAEL thresholds. These results are found in Table 7.

Table 7: BS4142 Assessment – Daytime (07:00 – 18:00)

Receptor	Predicted Rating Level, dB L _{Ar,Tr}	Background Level, dB L _{A90,T}	Difference between Rating & Background Level, dB	BS4142 Guidance	Effect Level
R1 South Lodge	42	55	-13	'Low impact'	Below LOAEL
R2 Graylands Lodge	48	55	-7	'Low impact'	Below LOAEL
R3 Bramblehurst	35	55	-20	'Low impact'	Below LOAEL
R4 Cox Farm	44	54	-10	'Low impact'	Below LOAEL
R5 Gunbarn / The Nowhere House	40	54	-14	'Low impact'	Below LOAEL

Predicted rating levels are below the LOAEL for all assessment time periods and are sufficiently below background sound levels such that BS 4142 advises this is a 'low impact' depending on context.

6.2.1 Context

It should be noted that the development does not result in additional HGV movements, only a change in location of the movements on site. The residual acoustic environment must also be considered, comprising a substantial proportion of anthropogenic sources, including the existing industrial and commercial sounds from the facility operations nearby, as well as road traffic noise from the A24 and A264 to the west and south respectively, and occasional railway noise. As such, the nature of the area will not be changed due to the development. The context is considered to be neutral to marginally favourable towards the site, and thus the predicted impact will not be changed due to these contextual factors.

6.3 Risk Management and Control

6.3.1 Construction Noise and Vibration

It is expected that during construction Best Practicable Means to minimise the noise impact upon the local community will be used which may include the following:

All construction plant and equipment should comply with EU noise emission limits.

- use of 'quieter option' vehicle reversing alarms, such as adjustable or broadband ('white noise') systems. Broadband reversing alarms rely less on increased sound pressure level to be effective in the near field and are also less distinguishable at receptor locations at increased distances. Therefore, these alarms are considered of lesser significance with regard to potential noise impact at the closest of receptors;
- avoid unnecessary revving of engines, and switching off plant when not in use;
- ensure all plant and machinery is regularly maintained;
- ensure internal haul routes are well maintained and have as low a gradient as possible;
- minimise drop height of materials; and
- start-up plant and vehicles sequentially rather than together.

6.3.2 Operational Noise and Vibration

PPG advises the following for sound levels below the LOAEL threshold: "Noise may be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life." With regards to the mitigation of sound levels below the LOAEL threshold, PPG advises the following: "No specific measures required".

No adverse noise effects have been identified at any of the noise-sensitive receptors, and as such no further noise-specific mitigation measures are considered to be required other than the routine noise management controls employed which include:

- Management of on-site traffic to minimize delivery vehicles queuing with engines running;
- Minimization or elimination of use of reversing alarms;
- Management of materials handling to minimize noise emissions; and
- Implementing the Noise and Vibration Management Plan (reference 60586541-ACM-XX-00-RP-MBT-NVMP-R03, Application Part 6) and associated Noise Management Procedure (BWS 214 NMP) and Vibration Management Procedure (BSW VMP).

6.4 Conclusion

AECOM has undertaken an environmental noise impact assessment of the proposed HGV delivery area at the Biffa Brookhurst Wood site.

A baseline survey was carried out in February and March 2019 to establish background sound levels at surrounding noise-sensitive receptors.

Sound levels as a result of operation of the proposed changes to the site have been predicted using acoustic modelling software. Operational sound levels have been assessed as below the LOAEL, and sufficiently below existing background sound levels such that there is a low likelihood of adverse effects on surrounding receptors or any increase to the local sound environment.

Based on the predicted sound levels and comparison with the existing sound climate, no specific noise mitigation measures are considered necessary or proposed.

7. Abnormal Operations, Accident & Fire Risk Assessment

7.1 Introduction

This section of the impact assessment considers the specific issues around abnormal operations, potential accidents and potential fire hazards as required by the relevant EA Guidance and BREF notes as detailed in:

- Environment Agency Guidance “*Non-Hazardous and Inert Waste: Appropriate Measures (NHAM) for Permitted Facilities*” (July 2021), sections 2.3 and 2.4; and
- “Best Available Techniques (BAT) Conclusions for Waste Treatment under Directive 2010/75/EU of the European Parliament and of the Council” (Decision 2018/1147).

The risk assessment details the proposed controls and mitigations and is supported by an appropriate Emergency Management Plan as detailed in Section 5 of the Management Plan (60586541-ACM-XX-00-RP-MMP-R03, Application, Part 3).

It should be noted that as the waste transfer and storage area will be subject to Environment Agency Guidance “*Fire Prevention Plans: Environmental Permits*”, (January 2021) that specific fire risks are considered separately in the Fire Prevention Plan (Application Part 7).

7.2 Methodology

The risk assessment (see Appendix F) has been completed by considering each of the hazards identified in section 3 relating to above in terms of:

- Frequency of occurrence;
- Nature and quantity of substance released;
- Pathways and receptors involved;
- Environmental consequence(s) of the event;
- Overall risk and its significance to the environment; and
- Control and mitigation measures needed to prevent or reduce the risk.

7.3 Scoring Mechanism

The risk assessment methodology has been developed using a scoring mechanism, whereby scores are assigned to:

- The probability of the hazard occurring without the use of protective measures;
- The consequences of the hazard to the environment or human health; and
- The effectiveness of the control/mitigation used to prevent the hazard occurring.

The scoring system used for the assessment is shown in Table 3 above.

7.4 Potential Hazards

A list of potential hazards has been developed from the issues identified in section 3 for the waste transfer and storage area and these are shown in Table 8: Potential Abnormal Operations, Accident and Fire Hazards on the following page along with the anticipated pathways and receptors.

Table 8: Potential Abnormal Operations, Accident and Fire Hazards

Potential Hazard	Pathway	Receptor
Flooding	<ul style="list-style-type: none"> • Water 	<ul style="list-style-type: none"> ▪ Surface or ground water
Main services failure	<ul style="list-style-type: none"> • Air • Water 	<ul style="list-style-type: none"> ▪ Staff ▪ Public
Operator Error	<ul style="list-style-type: none"> • Air • Water • Land 	<ul style="list-style-type: none"> ▪ Staff ▪ Public

Potential Hazard	Pathway	Receptor
Site Security Breach: <ul style="list-style-type: none"> • entry by intruders • damage to equipment • theft • fly-tipping • arson 	<ul style="list-style-type: none"> • Air • Water • Land 	<ul style="list-style-type: none"> ▪ Staff ▪ Public ▪ Surface or ground water
Major vehicle accident – leading to a significant loss of waste	<ul style="list-style-type: none"> • Air • Water • Land 	<ul style="list-style-type: none"> ▪ Staff ▪ Public
Inappropriate waste storage (RDF and CLO)	<ul style="list-style-type: none"> • Water • Land 	<ul style="list-style-type: none"> ▪ Staff ▪ Public
Failure of containment on Wastewater Sump at CLO storage area	<ul style="list-style-type: none"> • Water • Land 	<ul style="list-style-type: none"> ▪ Surface or ground water
Overflow of Wastewater sump at CLO storage area	<ul style="list-style-type: none"> • Water • Land 	<ul style="list-style-type: none"> ▪ Surface or ground water
Contamination Detected in Surface Water Lagoon from RDF storage area	<ul style="list-style-type: none"> • Water • Land 	<ul style="list-style-type: none"> ▪ Surface or ground water
Failure of mobile plant and equipment	<ul style="list-style-type: none"> • Air • Water • Land 	<ul style="list-style-type: none"> • Staff • Public ▪ Surface or groundwater
Wrong connections in drains or other systems	<ul style="list-style-type: none"> • Water • Land 	<ul style="list-style-type: none"> ▪ Surface or ground water
Incompatible substances coming into contact with each other	<ul style="list-style-type: none"> • Air • Water • Land 	<ul style="list-style-type: none"> • Staff • Public ▪ Surface or groundwater
Very high winds	<ul style="list-style-type: none"> • Air 	<ul style="list-style-type: none"> • Staff ▪ Public
Accessibility of control equipment in emergency situations	<ul style="list-style-type: none"> • Air • Water • Land 	<ul style="list-style-type: none"> • Staff • Public ▪ Surface or groundwater

7.5 Risk Reduction and Management

7.5.1 Controls and Mitigation

The controls and mitigations employed at the new waste transfer and storage area are summarised in Table 9: Hazardous Events below. These are supported by site operating procedures and management plan as appropriate.

Table 9: Hazardous Events

Potential Hazard	Controls and Mitigations
Flooding	<ul style="list-style-type: none"> • Site is not located in a floodplain and no history of flooding. • Site drainage has been designed taking 1:30 year and 1:100 year flood events.
Main services failure	<ul style="list-style-type: none"> • Failure of mains services from the local grid will result in an emergency generator being utilised.
Operator Error	<ul style="list-style-type: none"> • Provision of appropriate operator training. • Technically competent person available at site. • Internal operational control procedures. • Strict compliance with site integrated management system.
Site security breach: <ul style="list-style-type: none"> • entry by intruders • damage to equipment • vandalism • theft • fly-tipping • arson 	<ul style="list-style-type: none"> • Site secured by a perimeter fence and lockable gates. • Site covered by CCTV. • A vehicle number recording system is utilised.

Potential Hazard	Controls and Mitigations
Major vehicle accident – leading to a significant loss of waste	<ul style="list-style-type: none"> Site speed restrictions in place and compliance with highway speed restrictions. Approved carriers (i.e. trained hauliers employed by WCA). Material clean-up arrangements in place. Road vehicles are robust and designed to withstand high speed collisions that may occur on public highways. suitable barriers to prevent moving vehicles damaging equipment
Inappropriate waste storage (RDF and CLO)	<ul style="list-style-type: none"> RDF is stored baled on a curtain sided trailer or loose in a enclosed containers. Storage of loaded vehicles takes place in the RDF designated trailer park area in the allocated bay. CLO is stored in enclosed containers in the dedicated CLO storage area with its separate drainage system. Storage of the RDF vehicles or the CLO containers allows for easy inspection. All handling of RDF and CLO materials takes place in the MBT building – only preloaded containers or vehicles will be stored in the new waste transfer and storage area and handling will be restricted to the movement of full or empty vehicles. Waste transfer and storage area will be away from watercourses and sensitive perimeters and within a secure area of the facility to prevent unauthorised access and vandalism.
Failure of containment on the CLO Wastewater Sump	<ul style="list-style-type: none"> CLO drainage system and sump is designed in line with industry standards. Storage area will be inspected daily for accumulation of material in the drainage system or damage to integrity – repairs will be completed as a priority. Drainage sump will be emptied in the event that a leak is detected and repairs will be completed.
Overflow of CLO Wastewater Sump	<ul style="list-style-type: none"> The sump will be equipped with a level alarm and level will be checked at daily intervals and following any significant period of heavy rain. Any material overflow will be directed to the lagoon – the material can then be sampled for testing prior to transfer to the MBT plant for processing.
Contamination Detected in Surface Water Lagoon from RDF Storage Area	<ul style="list-style-type: none"> Surface water runoff from the RDF storage area will be tested to confirm it is suitable for discharge to the site-wide surface water management system. In the event that testing shows elevated levels of potential pollutants, the lagoon will be manually isolated, and water within lagoon will be transferred via tanker or similar to the MBT plant for processing.
Failure of mobile plant and equipment	<ul style="list-style-type: none"> Mobile plant/equipment is designed in accordance with relevant design and fabrication standards. Preventative maintenance includes regulator inspection and maintenance regimes. Plant is subject to a first use check on a daily basis to facilitate defect detection and reporting.
Wrong connections in drains or other systems	<ul style="list-style-type: none"> Drainage design undertaken by suitably qualified engineers Drainage design has been completed using appropriate modelling software Construction of drainage will be undertaken in accordance with the specified designs
Incompatible substances coming into contact with each other	<ul style="list-style-type: none"> The waste transfer and storage area will only accept RDF and CLO from the MBT facility. RDF and CLO are kept within separate storage areas.
Very high winds	<ul style="list-style-type: none"> Dust suppression and other controls as stipulated in the Dust Management Plan will be implemented. In conditions where winds exceed 25 mph, waste acceptance to the site will cease.
Accessibility of control equipment in emergency situations	<ul style="list-style-type: none"> Emergency spill kits, fire extinguishers and access to water supplies in the event of an emergency are available from various locations both on the MBT, MWRf and in the wider Brookhurstwood site.

7.5.2 Monitoring and Recording

Site monitoring and emergency arrangements include:

- Daily site inspections to assess operational maintenance of waste materials, including waste segregation and housekeeping to prevent the build-up of loose combustible material (including waste and dust), particularly around storage areas, equipment and other potential sources of ignition; corrective action will be undertaken as necessary.

- Visual checks are undertaken on all waste loads during acceptance checks, if necessary a waste load will be investigated prior to tipping if smoke or odour detected.
- Keeping an up-to-date record of all accidents, incidents, near misses, changes to procedures, abnormal events, and the findings of maintenance inspections.
- Investigating accidents, incidents, near misses and abnormal events and recording actions taken to prevent a reoccurrence.
- Maintaining an inventory of substances, which are present (or likely to be) and which could have environmental consequences if they escape.

7.5.3 Emergency Plan

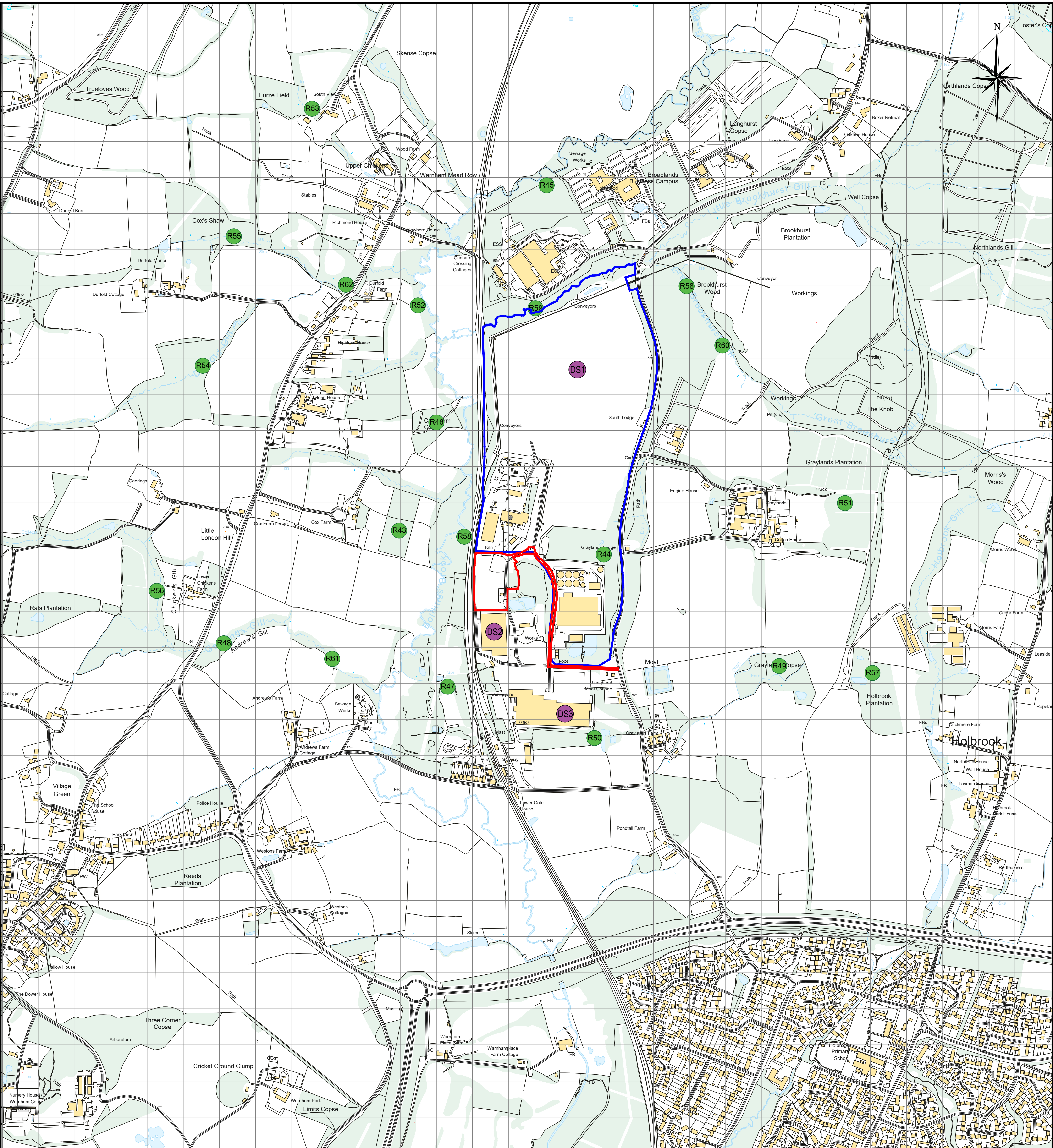
The site maintains an Emergency Plan (GF17-01) as part of the IMS, details of this are provided in section 5 of the Management Plan (reference 60596541-ACM-XX-00-RP-EN-MBT-MMP-R03, Application Part 3).

7.6 Conclusion

The proposed controls and mitigation measures are in place to reduce the likelihood and impact of an accident or fire at the site on the surrounding area and local receptors.

The risk assessment with identified controls and mitigation coupled with the Emergency Plan (GF17-01) as detailed in Section 5 of the Management Plan (60586541-ACM-XX-00-RP-MBT-MMP-R04, Application, Part 3) should meet the requirements of the relevant EA/BREF guidance.

Appendix A – Receptor Plan



KEY

— DEVELOPMENT PROPOSALS SUBJECT TO THIS PLANNING APPLICATION

— LAND IN BIFFA CONTROL

SENSITIVE ENVIRONMENTAL RECEPTORS

- R44 Unnamed Woodland
- R45 Unnamed Woodland
- R46 Cox Farm Copse
- R47 Unnamed Woodland
- R48 Unnamed Woodland
- R49 Graylands Copse
- R50 Unnamed Woodland
- R51 Graylands Plantation
- R52 Unnamed Woodland
- R53 Unnamed Woodland
- R54 Unnamed Woodland
- R55 Cox's Shaw
- R56 Raf's Plantation
- R57 Holbrook Plantation
- R58 Brookhurstwood
- R58 Bouldings Brook
- R59 Little Brookhurst Gill
- R60 Great Brookhurst Gill
- R61 Geerings Gill
- R62 Durfield Gill

POTENTIAL SOURCES OF DUST

- DS1 Adjacent Landfill
- DS2 Britannia Crest Waste Transfer Station
- DS3 Wienerberger Brickworks

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PROJECT	MATERIALS WASHING AND RECYCLING FACILITY	DRAWN	AAO
LOCATION	BROOKHURSTWOOD LANDFILL SITE	DATE	01/23
DRAWING TITLE	DUST RECEPTOR PLAN	SCALE(S)	1:500 @ A1
DRAWING No.	WZD230900	COMPUTER REF.	

Appendix B – Preliminary Ecological Appraisal (PEA)

Biffa Brookhurst Wood Landfill Site

Proposed MBT Facility - Preliminary Ecological Appraisal

Biffa Waste Services Ltd

Project number: 60586541

April 2022

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
00	13/12/2021	Draft for comment	15/12/2021	A Graham	Project Manager
01	28/04/2022	Final	28/04/2022	R Walton	Principal Ecologist
02	21/07/2022	Updated as trees with bat roost suitability will be retained	21/07/2022	R Walton	Principal Ecologist
03	03/08/2022	Update to habitat areas	03/03/2022	E. Castel	Associate Ecologist

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Executive Summary

AECOM Ltd (hereafter 'AECOM') was instructed by Biffa Waste Services Ltd (hereafter 'Biffa') to carry out a Preliminary Ecological Appraisal (PEA) of a section of the Brookhurst Wood landfill site and immediately surrounding area, near Horsham (hereafter referred to as the 'Site').

At the time of preparing this report, the Proposed Development comprises extension of the existing Mechanical Biological Treatment (MBT) Facility to include an area of land known as Site Ha to be used as a waste storage and transfer area for loose or baled Refuse Derived Fuel (RDF) produced by the MBT process to meet the requirements of the West Sussex County Council Materials Resource Management Contract (MRMC). The area will be operated as a trailer park whereby up to 36 empty transport trailers may be delivered to site empty and subsequently filled with RDF. It is intended that alternate bays will be used for the full and empty trailers so the drivers can drop off and collect in the same trip (the 'Proposed Development').

This PEA was commissioned to identify whether there are known or potential ecological receptors (nature conservation designations and protected and notable habitats and species) and/or potentially invasive non-native species that may constrain or influence the design and implementation of the Proposed Development.

The desk study returned records of two statutorily designated sites for nature conservation within 2km of the Proposed Development, the closest of which 0.5 km north-east of the Site. There are three non-statutorily designated sites for nature conservation, the closest of which is located 0.3km east of the Site. Due to the distance between these sites and the Proposed Development, it is considered that there is no link between the Proposed Development and the designated sites. Ten areas of ancient woodland were identified within 2km of the Proposed Development, the closest of which is an unnamed area of woodland located 0.2km north west of the Proposed Development. Standard best practice measures for construction should be followed to avoid impacts on the ancient woodland.

A Phase 1 habitat survey was undertaken by two AECOM ecologists on 15th November 2021 in accordance with the standard survey method (Joint Nature Conservation Committee, 2010). The survey was 'extended' to include target notes on protected, notable and invasive species. This included an external inspection of buildings within the Site for their suitability to support roosting bats. This was also undertaken on the 15th November 2021 and was conducted in line with best practice bat survey guidelines (Collins, 2016).

The Site predominantly comprises broadleaved woodland and bare ground with some buildings and hardstanding and small areas of dense and scattered scrub, standing water, ephemeral vegetation and tall ruderal vegetation.

AECOM understands that woodland habitat will be retained as shown in drawing number 21501-KP-GF-DR-S-3011. Replacement planting may be required if there is a loss of woodland habitat. It is recommended that lighting of woodland is avoided, and CEMP is place during construction to reduce dust deposition.

Two trees within the Site are suitable for roosting bats. Tree 1 was found to have moderate suitability for roosting bats and Tree 2 was of low suitability for roosting bats. Both trees will be retained. To prevent disturbance of bats, directional lighting of trees and woodland during construction & operation should be avoided.

Trees and scrub within the Site have the potential to support common nesting bird species. Therefore, it is recommended that all vegetation clearance takes place during the winter months (October – February inclusive) in order to avoid impacts on nesting birds. If site clearance is required between March and September inclusive, absence of nesting birds must be confirmed by a suitably qualified ecologist immediately prior to works commencing.

Suitable habitat for great crested newt (*Triturus cristatus*) is present within the Site. While suitable aquatic habitat will be retained, suitable terrestrial habitat will be lost. Therefore, four surveys between mid-March and mid-June, with three of these undertaken between mid-April and mid-May of the two ponds present within the Site, and three ponds present in the wider area will be required to determine presence/absence of great crested newt. Further surveys may be required if presence is confirmed.

The Site supports some limited areas suitable for reptiles. It is recommended that clearance works within suitable reptile habitat is carried out under a precautionary working method. Given the limited land take compared to the

amount of suitable habitat it is unlikely the Proposed Development would involve significant impacts on reptiles, provided care is taken to avoid killing and injury.

No signs of badgers (*Meles meles*) were recorded within the Site. However, it is recommended that a pre-construction walkover is completed due to the mobile nature of badgers.

1. Introduction

AECOM Ltd (hereafter 'AECOM') was instructed in October 2021 by Biffa Waste Services Ltd (hereafter 'Biffa') to carry out a Preliminary Ecological Appraisal (PEA) of an area of the Brookhurst Wood landfill site and immediately surrounding area, near Horsham (hereafter referred to as the 'Site'). The central grid reference for the Site is TQ 170 344; the boundary of the Site is shown on Figure 1.

At the time of preparing this report, the Proposed Development comprises an extension of the existing Mechanical Biological Treatment (MBT) Facility to include an area of land known as Site Ha to be used as a waste storage and transfer area for loose or baled Refuse Derived Fuel (RDF) produced by the MBT process to meet the requirements of the West Sussex County Council Materials Resource Management Contract (MRMC) (the 'Proposed Development'). The area will be operated as a trailer park whereby up to 36 empty transport trailers may be delivered to site empty and subsequently filled with RDF. It is intended that alternate bays will be used for the full and empty trailers so the drivers can drop off and collect in the same trip.

It is also proposed to allocate a controlled area for the storage of containerised covered CLO (Compost Like Organic), this material will be a by-product of the food waste process and will be taken to land spreading within the vicinity, but over weekends will need to be stored at the Site. No waste treatment or processing will take place as part of this activity.

This PEA was commissioned to identify whether there are known or potential ecological receptors (nature conservation designations and protected and notable habitats and species) and/or potentially invasive non-native species that may constrain or influence the design and implementation of the Proposed Development. The approach applied when undertaking this PEA accords with the *Guidelines for Preliminary Ecological Appraisal* published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2017). The PEA addresses relevant wildlife legislation and planning policy as summarized in Section 2 of this report.

In order to prepare the PEA, a desk study, an extended Phase 1 habitat survey and an initial external assessment of suitability of buildings within the Site to support roosting bats were undertaken by two appropriately experienced AECOM ecologists in order to identify ecological features within the Site and the wider potential zone of influence. Additional details are provided in Section 3: Methods.

The purpose of the PEA was to:

- identify and categorise all habitats present within the Site and any areas immediately outside of the Site where there may be potential for direct or indirect effects (the "zone of influence");
- carry out an appraisal of the potential of the habitats recorded to support protected or notable species of fauna and flora;
- identify any potentially invasive non-native plant and/or animal species;
- provide advice on any potential ecological constraints and opportunities in the zone of influence, including the identification (where relevant) of any requirements for follow-up habitat and species surveys and/or requirements for ecological mitigation; and
- provide a map showing the location of the identified ecological receptors of relevance.

The purpose of this report is to inform the design of the Proposed Development prior to submission of a planning application. The report identifies the scope of further work (where necessary) that would be required to support a planning application.

High level recommendations are made on potential options for the avoidance, mitigation or compensation of the potential impacts of the Proposed Development (where known) on the identified ecological receptors, and of potential enhancements to the biodiversity and ecosystem services.

2. Wildlife Legislation and Planning Policy

Wildlife Legislation

The following wildlife legislation is potentially relevant to the Proposed Development:

- The Wildlife and Countryside Act (WCA) 1981 (as amended);
- The Countryside and Rights of Way (CRoW) Act 2000;
- The Natural Environment and Rural Communities (NERC) Act 2006;
- The Conservation of Habitats & Species Regulations 2017 (as amended);
- The Environment Act (2021);
- The Protection of Badgers Act 1992;
- The Wild Mammals (Protection) Act 1996; and
- The Invasive Alien Species Act. (Enforcement and Permitting) Order 2019 (as amended).

The above legislation has been considered when planning and undertaking this PEA using the methods described in Section 3, when identifying potential constraints to the Proposed Development, and when making recommendations for further survey, design options and mitigation, as discussed in Section 5. Compliance with legislation may require the attainment of relevant protected species licences prior to the implementation of the Proposed Development.

Further information on the requirements of the above legislation is provided in Appendix A.

National Planning Policy

The National Planning Policy Framework (NPPF) was originally published on 27th March 2012 and detailed the Government's planning policies for England and how these are expected to be applied. The NPPF was then revised on 24th July 2018, 19th February 2019, and 20th July 2021.

The NPPF states the commitment of the UK Government to minimising impacts on biodiversity and providing net gains in biodiversity.

It specifies the obligations that the Local Authorities and the UK Government have regarding statutory designated sites and protected species under UK and international legislation and how this is to be delivered in the planning system. Protected or notable habitats and species can be a material consideration in planning decisions and may therefore make some sites unsuitable for particular types of development, or if development is permitted, mitigation measures may be required to avoid or minimise impacts on certain habitats and species, or where impact is unavoidable, compensation may be required.

The NPPF is clear that pursuing sustainable development includes moving from a net loss of biodiversity to achieving net gains for nature, and that a core principle for planning is that it should contribute to conserving and enhancing the natural environment and reducing pollution.

Further information on the relevant parts of the NPPF is provided as Appendix A.

Local Planning Policy

Relevant local planning policies for Horsham District Council and West Sussex County Council are detailed in the following documents:

- Horsham District Planning Framework (Horsham District Council, 2015);
- West Sussex Waste Local Plan (West Sussex County Council, 2014);

In addition, the Sussex Biodiversity Partnership (2007) has created habitat and species action plans for the County. The Sussex Biodiversity Partnership focusses on landscape-scale delivery, noting the importance of habitats for

supporting protected and/or notable species. While none of the habitats within the Biodiversity Action Plan (BAP) are of relevance to the Site, priority species of relevance to the Site include bats (including soprano pipistrelle, *Pipistrellus pygmaeus*, and brown long-eared bat, *Plecotus auritus*, and great crested newt, *Triturus cristatus*)

Table 1 provides a summary of relevant planning policies. For the precise wording of each specific policy please refer back to the source document. This planning policy has been considered when assessing the potential ecological constraints and opportunities identified by the desk study and field surveys; and, when assessing requirements for further survey, design options and ecological mitigation, as described in Section 5.

Table 1. Summary of Local Planning Policy

Document	Planning Policy	Purpose
Horsham District Planning Framework	Policy 25: The Natural Environment and Landscape Character	To protect the natural environment, including protected landscapes and habitats from inappropriate development. To ensure this, the council will support proposals which <i>'Maintain and enhance the Green Infrastructure Network', 'Maintain and enhance the existing network of...biodiversity, including safeguarding existing designated sites and species...ensures no net loss of wider biodiversity and provides net gains in biodiversity where possible', and 'conserve and where possible enhance the setting of the South Downs National Park'.</i>
	Policy 26: Countryside Protection	To protect the rural character and undeveloped nature of the countryside from inappropriate development. This includes ensuring developments take in to account the ecological qualities, the patter of woodlands, fields, hedgerows, trees, and waterbodies and the landform of the area.
	Policy 30: Protected Landscapes	To conserve and enhance the natural beauty and public enjoyment of the High Weald Area of Outstanding Natural Beauty (AONB) and the South Downs National Park. Proposals within or adjacent to protected areas will need to demonstrate <i>'why the proposal is in the public interest and what alternatives to the scheme have been considered'</i>
	Policy 31: Green Infrastructure and Biodiversity	To maintain and enhance the existing network of green infrastructure by resisting proposals which result in the loss of green infrastructure, unless new opportunities can be created to mitigate or compensate any loss. The policy states <i>'Development proposals will be required to contribute to the enhancement of existing biodiversity, and should create and manage new habitats where appropriate...the Council will support development which makes a positive contribution to biodiversity through the creation of green spaces, and linkages between habitats to create local and regional ecological networks'</i> . This policy includes consideration of statutory and non-statutory protected sites and ancient woodland, and that any development that may impact the Arun Valley SPA or The Mens SAC will be subject to a HRA.
	Policy 33: Development Principles	To conserve and enhance the natural and built environment. This policy states that developments are required to <i>'Presume in favour of the retention of existing important landscape and natural features, for example trees, hedges, banks and watercourses...and justify and mitigate against any losses that may occur through the development.'</i>
	Policy 37: Sustainable Construction	To improve the sustainability of development. This policy states that proposals should <i>'incorporate measures which enhance the biodiversity value of development'</i> .
West Sussex Waste Local Plan	Policy W13: Protected Landscapes	This policy states that <i>'Proposals for waste development within protected landscapes will not be permitted'</i> , unless the Site is allocated within an adopted plan, the proposal is of a small-scale and will meet local needs without undermining the designation, or the proposal is for a major development and accords with Part C of the policy. Part C stated that proposals will not be permitted unless there is an overriding need, they cannot be met in another way outside of the designated area and any adverse impacts can be mitigated. The policy also states that waste development proposals will be permitted if they are outside of protected areas and will not undermine the objectives of the designation.
	Policy W14: Biodiversity and Geodiversity	This policy states that waste development proposals will be permitted if sites with biodiversity importance (international, national, regional and local sites) are protected, unless there are no alternative solutions, and if the development will not result in the loss of or adversely affect an important site, area or feature, or if the harm is minimised, mitigated or compensated for. The policy also states that proposals will be permitted if <i>'where appropriate, the creation, enhancement and management of habitats, ecological networks, and ecosystem services is secured consistent with wider environmental objectives, including Biodiversity Opportunity Areas and the South Downs Way Ahead Nature Improvement Area'</i>

3. Methods

Desk Study

A desk study was carried out to identify nature conservation designations and protected and notable habitats and species potentially relevant to the Proposed Development. Data were originally acquired for the adjacent proposed hydrogen plant in July 2021. However, the data remains valid for use.

A stratified approach was taken when defining the desk study area, based on the likely zone of influence of the Proposed Development on different ecological receptors; and an understanding of the maximum distances typically considered by statutory consultees. Accordingly, the desk study identified any international nature conservation designations within 10km of the Site boundary; other statutory nature conservation designations within 2km of the Site boundary; and, local non-statutory nature conservation designations, and protected and notable habitats and species and invasive non-native species within 2km of the Site boundary.

The desk study was carried out using the data sources detailed in Table 2. Protected and notable habitats and species include those listed under Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended); Schedules 2 and 5 of The Conservation of Habitats and Species Regulations 2017 (as amended); and species and habitats of Principal Importance for nature conservation in England listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Records of invasive non-native controlled species were also collated; such species are listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and species of EU concern listed in the Invasive Alien Species Act. (Enforcement and Permitting) Order 2019 (as amended).

Table 2. Desk study data sources

Data Source	Accessed	Data Obtained
Multi-Agency Geographic Information for the Countryside (MAGIC) website	29 th November 2021	<ul style="list-style-type: none"> International statutory designations within 10km Other statutory designations within 2km Ancient woodlands and notable habitats within 1km Information on habitats and habitat connections (based on aerial photography) relevant to interpretation of planning policy and assessment of potential protected and notable species constraints
Sussex Biodiversity Records Centre	11 th July 2021	<ul style="list-style-type: none"> Non-statutory designations within 2km Protected and notable species recorded and invasive species records within 2km (records for the last 10 years only)

Field Survey

The field survey comprised a Phase 1 habitat survey and an appraisal of the potential suitability of the habitats present to support protected and notable species and invasive non-native species. An external inspection from the ground of buildings within the Site to assess suitability to support roosting bats was also undertaken.

Phase 1 Habitat Survey

A Phase 1 habitat survey was undertaken in accordance with the standard survey method (Joint Nature Conservation Committee, 2010). Phase 1 habitat survey is a standard method of environmental audit. It involves categorising different habitat types and habitat features within a survey area. The information gained from the survey can be used to determine the likely ecological value of a site, and to direct any more specific survey work which may need to be carried out prior to the submission of a planning application. The standard Phase 1 habitat survey method can be “extended” to record target notes on protected, notable and invasive species.

The extended Phase 1 habitat survey was undertaken on 15th November 2021 by two suitably qualified AECOM ecologists who recorded and mapped all habitat types present within the Site and ‘survey area’, along with any associated relevant ecological receptors observed. The survey area encompassed all safely accessible parts of the Site where access permission had been granted in advance of survey, or this land was visible from within the Site boundary.

Where relevant ecological receptors were present, target notes were recorded and the position of these shown on the Phase 1 habitat map (Figure 1). Typical and notable plant species were recorded for different habitat types and reflect the conditions at the time of survey. This was not intended to be a detailed inventory of the plant species present in the survey area as this is not required for the purposes of Phase 1 habitat survey.

Assessment of Suitability to Support Roosting Bats – Buildings

An external inspection of the buildings within the Site was undertaken on the 15th November 2021 by two suitably qualified AECOM ecologists, one of whom holds a Natural England WML CL18 Bat Survey Class Licence (Level 2). The survey was conducted in line with best practice bat survey guidelines (Collins, 2016).

Close focusing binoculars and a high-powered torch (Cluson Clulite) were used to conduct an external assessment from the ground. All potential access/egress points and features with risk of supporting roosting bats (e.g. cracks, crevices) were identified and recorded along with any evidence which may have indicated the location of roosts, such as:

- Stains around entrance holes (resulting from the deposition of oil secretions in bat fur);
- Scratch marks around entrance holes (resulting from bat claw holds);
- Bat droppings;
- Feeding remains; and
- Odours or noise characteristic of bats.

On the basis of the survey, the overall suitability of each feature to support roosting bats was then classified using a scale of negligible, low, moderate, high or confirmed (see Appendix B for definition of categories of suitability). This assessment was based on both the intrinsic suitability of the feature to support roosting bats and other evidence giving an indication of the likelihood of use by bats (e.g. presence of droppings, lack of cobwebs, or exposure to elements).

Assessment of Suitability to Support Roosting Bats – Trees

An inspection from the ground of trees within the Site was undertaken on the 15th November 2021 by two suitably qualified AECOM ecologists, one of whom holds a Natural England WML CL18 Bat Survey Class Licence (Level 2). The survey was conducted in line with best practice bat survey guidelines (Collins, 2016) and BS 8596 Surveying for bats in trees and woodlands (British Standards, 2015).

Close focusing binoculars and a high-powered torch (Cluson Clulite) were used to conduct an external assessment from the ground. All potential access/egress points and features with suitability to support roosting bats (e.g. cracks, crevices) were identified and recorded along with any evidence which may have indicated the location of roosts, such as stains around entrance holes, bat droppings, scratch marks and odours or noise characteristic of bats.

On the basis of the survey, the overall suitability of each tree to support roosting bats was classified using a scale of negligible, low, moderate, high or confirmed (see Annex A for definitions of bat roost suitability categories).

Appraisal of Potential Suitability of Habitats to Support Protected and Notable Species

An appraisal was made of the potential suitability of the habitats present to support protected and notable species of plants or animals (as defined in Section 3 'Desk Study' above). Field signs, habitat features with potential to support protected species and any sightings or auditory evidence were recorded when encountered, but no detailed surveys were carried out for any particular species, with the exception of bats for which the method is detailed above.

A note was made of visible instances of invasive non-native plant and animal species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), including Japanese knotweed (*Reynoutria japonica*) and the Invasive Alien Species Act. (Enforcement and Permitting) Order 2019 (as amended). Locations of any such invasive non-native plant or animal species were recorded if found and indicated on the Phase 1 habitat plan (Figure 1).

Desk Study and Field Survey Limitations

The aim of a desk study is to help characterise the baseline context of a Proposed Development and provide valuable background information that would not be captured by a single site survey alone. Information obtained during the course of a desk study is dependent upon people and organisations having made and submitted records for the area of interest. As such, a lack of records for a particular habitat or species does not necessarily mean that the habitats or species do not occur in the study area. Likewise, the presence of records for particular habitats and species does not automatically mean that these still occur within the area of interest or are relevant in the context of the Proposed Development.

Populations of annual plant species may fluctuate markedly between years dependent on the growing conditions present in any given season. However, the survey in November 2021 recorded all habitat types within the Site to an appropriate level of botanical detail to inform this PEA.

The recording of invasive non-native plant species listed on Schedule 9 of the Wildlife and Countryside Act was potentially constrained by the time of year that the survey was undertaken. Some such species are not visible or cannot be reliably mapped outside the growing season (May to September).

Where habitat boundaries coincide with physical boundaries recorded on OS maps the resolution is as determined by the scale of mapping. Elsewhere, habitat mapping is as estimated in the field and/or recorded by hand-held GPS. Where areas of habitat are given, they are approximate and should be verified by measurement on Site where required for design or construction.

An area of the woodland / scrub within the Site could not be accessed due to dense vegetation. This area is highlighted in Figure 1. This included the two waterbodies within the Site. However, for the purpose of the PEA this is not considered to be a constraint, as habitats could be accessed to provide an appropriate level of botanical detail. Recommendations have been made to conduct additional surveys of the waterbodies at a later date to determine their suitability to support great crested newt, and to conduct presence / likely absence surveys for great crested newt.

It should be noted that ecosystems are dynamic and constantly changing, and therefore species may move, or new species may be recorded in subsequent years. For this reason, and in accordance with current guidance, the existing survey data has a 'shelf-life' of and should only be relied on for a period of, two years from the date of survey.

Quality Assurance

The AECOM ecologists who conducted the survey and authored this report are members, at the appropriate level, of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct when undertaking ecological work.

4. Results

Desk Study

Statutory Designations for Nature Conservation

Table 3 details the statutory nature conservation designations identified by the desk study, based on the method given in Section 3 of this report. The designations are listed in descending order, with those closest to the Site listed first. There are no internationally designated sites within 10km of the Site. There are two statutory designated sites within 2km of the Site; Warnham SSSI and Warnham Local Nature Reserve (LNR). No statutory sites were identified within or adjacent to the Site.

Table 3. Sites with statutory designations for nature conservation

Designation	Reason(s) for Designation	Relationship to the Site
Warnham SSSI	This is designated for geological importance.	0.5 km north-east of the Site
Warnham Local Nature Reserve (LNR)	This 92-acre site comprises a 17 acre millpond, marshes, grassland, reed beds, hedges and woodlands. The Site supports over 400 species of plant including orchids and ancient oaks (<i>Quercus</i> sp.), over 100 species of bird, and over 21 species of dragonfly.	1.1km south of the Site

Non-statutory Designations for Nature Conservation

Table 4 details the non-statutory nature conservation designations identified by the desk study based on the method given in Section 3 of this report. The designations are listed in descending order, with those closest to the Site listed first. No non-statutory sites for nature conservation were identified within or adjacent to the Site.

Table 4. Sites with non-statutory designations for nature conservation

Designation	Reason(s) for Designation	Relationship to the Site
Brockhurst Wood & Gill & Morris's Wood Local Wildlife Site (LWS)	This LWS comprises woodland situated on or adjacent to stream valley sides. The woodland is dominated by hornbeam (<i>Carpinus betulus</i>), with a sparse shrub layer and species-rich ground flora.	0.3km east of the Site
Warnham Mill Pond LWS	This LWS includes approximately 8ha of open water with marginal vegetation and freshwater marsh. The pond is bordered by plantation woodland. This site is also a Local Nature Reserve (Warnham LNR).	1.1km south of the Site
Tickfold Gill LWS	This LWS comprises a steep-sided gill with old hornbeam coppice. There is a rich ground flora, it also includes two herb-rich meadows.	2.0km north-west of the Site

Ancient Woodland

Eleven areas of ancient woodland were identified within 1km of the Site, none of which are within or adjacent to the Site. The Site is surrounded on all sides by many small areas of ancient woodland with connectivity between them by hedgerows and trees in field margins. None of them are directly connected to the Site.

- Unnamed ancient woodland 0.2km North West of the Site. No connectivity to site due to railway line and road.
- Unnamed ancient woodland 0.2km East of the Site.
- Unnamed ancient woodland 0.2km South of the Site.
- Unnamed ancient woodland 0.3km South of the Site.
- Unnamed ancient woodland 0.6km North West of the Site.
- Unnamed ancient woodland 0.6km North of the Site.
- Unnamed ancient woodland 0.6km South East of the Site.

- Unnamed ancient replanted and semi-natural woodland 0.7km North East of the Site.
- Unnamed ancient woodland 0.9km North West of the Site.
- Unnamed ancient woodland 0.9km East of the Site.
- Unnamed ancient woodland 0.9km West of the Site.

Field Survey

Phase 1 Habitat Survey

The habitats recorded, their extent and distribution are shown in Table 5 and Figure 1. The areas are approximate only. The associated target notes (TN) are provided in Appendix C. Relevant information from the desk study on particular habitats is noted in

Table 6.

Table 5. Habitats present, in descending order based on spatial area occupied within planning red line boundary

Habitat	Brief Description	Area (ha)	% of Site Area
Broadleaved woodland	Immature broadleaved woodland dominating the eastern side of the Site.	0.07	3.36
Bare ground	Unsurfaced ground used as roads and general storage space, primarily in the western side of the Site	1.36	65.28
Dense and scattered scrub	An area of buddleia dominated scrub was present in a strip from the southern boundary into the centre of the Site, on a rubble bund. There was a larger area within the woodland that dominates the east side of the Site with immature trees and scrub. Also present as thin strips on the north and south boundary on the western side of the Site.	0.13 (dense scrub)	6.23
Hardstanding and buildings	The Site had a main access road and several buildings which were mainly shipping containers and scaffolding with just one small brick building.	0.47	22.55
Cultivated/disturbed land - ephemeral/short perennial	Two small areas of stony / brick bund with ephemeral vegetation in the north west of the Site.	0.05	2.40
Other tall herb and fern - ruderal	Small area of brick/ stones with moss and tall ruderal in the centre of the Site.	0.003	0.14
Adjacent			
Standing water	Two small ponds in the south of the woodland area.	0.18	N/A

Each habitat is described in greater detail below.

Broadleaved woodland

Immature broadleaved woodland dominated the eastern side of the Site. (Plate 1). The woodland featured frequent silver birch (*Betula pendula*), and occasional hornbeam (*Carpinus betulus*). The understory was dominated by bramble (*Rubus fruticosus* agg.) with occasional nettle (*Urtica dioica*). Broadleaved woodland comprised the largest habitat recorded within the Site.

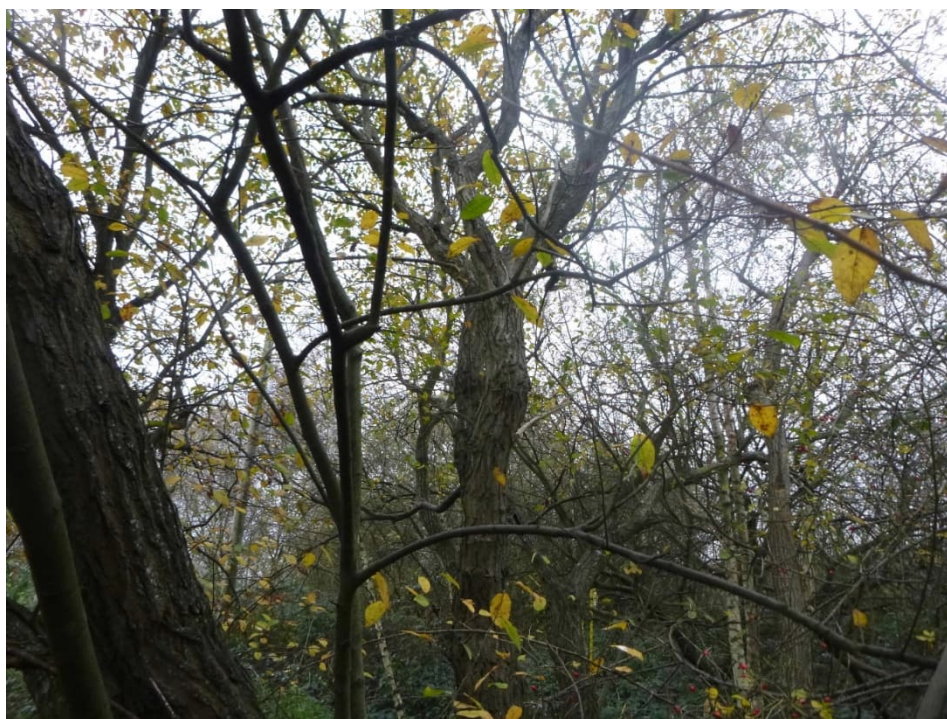


Plate 1. Broadleaved woodland.

Bare ground

Unsurfaced ground used as roads and general storage space were recorded, primarily in the western side of the Site (Plate 2).



Plate 2. Bare ground that dominates the east side of the Site.

Dense and scattered scrub

An area of buddleia (*Buddleja davidii*) dominated scrub was present in a strip from the southern boundary into the centre of the Site, on a bund comprising stone and brick. There was a larger area of scrub within the broadleaved woodland in the eastern side of the Site, comprising dense immature trees and scrub. This area was inaccessible due to the dense vegetation. Scattered scrub was present as thin strips on the northern and southern boundaries in the western side of the Site (Plate 3). Buddleia was dominant at these locations, with occasional silver birch.



Plate 3. Scrub along the southern boundary of the Site.

Hardstanding and buildings

The Site had a main access road constructed of hardstanding, and several buildings which were mainly shipping containers and scaffolding with just one small brick building. An assessment of these buildings for their suitability to support roosting bats is discussed within Section 4 'Protected and Notable Species' below.



Plate 4. Brick building at the centre of the Site.

Standing water

Two small ponds were present in the south of the woodland area offsite. There was no access to this area; however, the presence of waterbodies was determined through the use of satellite imagery and information provided by Biffa representatives present at the Site.

Ruderal vegetation

A small area of brick/stones with moss and tall ruderal vegetation was present in the centre of the Site. Species recorded included occasional buddleia, ragwort (*Jacobaea vulgaris*), St. John's wort (*Hypericum perforatum*) and birch.



Plate 5. Other tall herb and fern – ruderal area in the centre of the Site

Ephemeral/short perennial vegetation

There were two areas of ephemeral/short perennial vegetation within the Site. The larger area was in the north featuring a stony bund with buddleia, scentless mayweed (*Triplerospermum inodorum*), and bristly ox tongue (*Helminthotheca echioides*). The smaller area to the west featured frequent scentless mayweed, bristly ox tongue, occasional buddleia, creeping buttercup (*Ranunculus repens*) and common daisy (*Bellis perennis*).



Plate 6. Ephemeral vegetation in the north of the Site.

Notable Habitats

Woodland is a Priority Habitat under Section 41 of the NERC Act (2006) ('Lowland mixed deciduous woodland'). AECOM understands that woodland within the Site will be retained as shown in drawing number 21501-KP-GF-DR-S-3011.

While ponds can be a Priority Habitat under Section 41 of the NERC Act (2006), the ponds within the Site are considered unlikely to be of the quality required.

Protected and Notable Species

Table 6 provides a summary of potentially relevant species identified through a combination of desk study and field survey. The table summarises the conservation status of each species and provides comment on the likelihood of presence. Desk study data are contained within Appendix D.

Species present within the Site are those for which recent direct observation or field signs confirmed presence. Species which are possibly present are those for which there is potentially suitable habitat based on the results of the Phase 1 habitat survey, or this combined with desk study records. Species unlikely to be present are only mentioned where there are desk study records but there is no suitable habitat in the zone of influence, or there are other reasons why presence is unlikely. Brief comments are provided to support the determinations made in Table 6.

Where species are identified in Table 6 as likely or possible, they are likely to represent legal constraints or may be material to determination of a planning application. Further surveys will or may be required to determine presence or probable absence. Requirements for further survey are identified in Section 5 of this report.

Table 6. Protected and notable species relevant or potentially relevant to the Proposed Development

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Amphibians								
Common toad <i>Bufo</i>	✓	✓	✓	?	✓	✓	1.9km, south, 2017	0.2km, south, 2017
Great crested newt <i>Triturus cristatus</i>	✓	✓	✓	?	✓	✓	0.2km, south, 2017	0.2km, south, 2017
Smooth newt <i>Lissotriton vulgaris</i>	✓	✓	X	?	✓	✓	0.2km, south, 2017	0.2km, south, 2017
Palmate newt <i>Lissotriton helveticus</i>	✓	✓	X	?	✓	✓	0.2km, south, 2017	0.2km, south, 2017
Common frog <i>Rana temporaria</i>	✓	✓	X	?	✓	✓	0.2km, south, 2017	0.2km, south, 2017
Plants								
Box <i>Buxus sempervirens</i>	X	X	✓	?	✓	✓	Within 2km, 2018	Within 2km, 2018
Bladder-sedge <i>Carex vesicaria</i>	X	X	✓	?	✓	✓	Within 2km, 2012	Within 2km, 2012
Eyebright <i>Euphrasia nemorosa</i>	X	X	✓	?	✓	✓	Within 2km, 2012	Within 2km, 2012
Wild strawberry <i>Fragaria vesca</i>	X	X	✓	?	✓	✓	Within 2km, 2018	Within 2km, 2018
Dyer's greenweed <i>Genista tinctoria subsp. tinctoria</i>	X	X	✓	?	✓	✓	0.8km north east 2012	0.8km north east 2012
Bluebell <i>Hyacinthoides non-scripta</i>	X	X	✓	?	✓	✓	Within 2km, 2018	Within 2km, 2018
Bitter-vetch <i>Lathyrus linifolius</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Welsh poppy <i>Meconopsis cambrica</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2012

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Corn mint <i>Mentha arvensis</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2014	Within 2km of the Site in 2014
Wood-sorrel <i>Oxalis acetosella</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Tormentil <i>Potentilla erecta</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Sanicle <i>Sanicula europaea</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2018
Sea wormwood <i>Seriphidium maritimum</i>	X	X	✓	?	✓	✓	1.2km south 2014	1.2km south 2014
Common valerian <i>Valeriana officinalis</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Heath speedwell <i>Veronica officinalis</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Marsh speedwell <i>Veronica scutellata</i>	X	X	✓	?	✓	✓	1.5km, south, 2011	1.5km, south, 2011
Invertebrates - beetles								
Stag beetle <i>Lucanus cervus</i>	✓	✓	✓	?	✓	✓	2.0km, south-west, 2015	2.0km, south -west, 2015
Mammals								
West European hedgehog <i>Erinaceus europaeus</i>	X	X	✓	?	✓	✓	1.8km south-east, 2017	1.6km, south-east, 2016
Harvest mouse <i>Micromys minutus</i>	X	X	✓	?	✓	✓	1.9km south, 2019	1.9km, south, 2019
<i>Myotis</i> species <i>Myotis</i> sp.	✓	✓	✓	?	✓	✓	1.8km west 2019	1.8km west 2019
Pipistrelle species <i>Pipistrellus</i> sp.	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019
Common pipistrelle <i>Pipistrellus</i>	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019
Long-eared bat <i>Plecotus</i> sp.	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019
Brown long-eared bat <i>Plecotus auritus</i>	✓	✓	X	?	✓	✓	1.5m, west, 2020	1.5km, west, 2020
Reptiles								
Slow-worm <i>Anguis fragilis</i>	✓	✓	✓	?	✓	✓	1.7km, south-east, 2017	0.2km, north-east, 2009
Grass snake <i>Natrix helvetica</i>	✓	✓	✓	?	✓	✓	2.0km, south-west, 2013	0.1km, north-east, 2006
Birds								
Common nesting bird species	✓	✓	✓	?	✓	✓	Dense scrub within the Site has the potential to support common nesting bird species	
Invasive non-native species								
Marsh frog <i>Pelophylax ridibundus</i>	X	X	✓	?	✓	✓	0.8km, south-east, 2017	0.8km, south-east, 2017
Japanese knotweed <i>Reynoutria japonica</i>	X	X	✓	X	✓	✓	Within 2km of the Site in 2012	Within 2km of the Site, 2012
Giant hogweed <i>Heracleum mantegazzianum</i>	X	X	✓	X	✓	✓	0.8km, south, 2017	0.3km, north-west, 2015
Key to symbols: ✓ = yes, see Supporting Comments for further rationale								
<u>Legally protected species</u> are those listed under Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended); and, Schedules 2 and 4 of The Conservation of Habitat & Species Regulations 2017 (as amended).								
<u>Species of Principal Importance</u> as those listed under Section 41 of the NERC Act 2006. Planning Authorities have a legal duty under Section 40 of the same Act to consider such species when determining planning applications.								
<u>Other notable species</u> include native species of conservation concern listed in the LBAP (except species that are also of Principal Importance), those that are Nationally Rare, Scarce or Red Data List, and non-native controlled weed species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).								

Bats

The desk study returned six records of bat species within 2km of the Site within the last 10 years. Species recorded included *Myotis* species (*Myotis* sp.), common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus*

pygmaeus), brown long-eared bat (*Plecotus auritus*), pipistrelle species (*Pipistrellus sp.*) and long-eared bat species (*Plecotus sp.*).




An initial inspection of buildings within the Site undertaken on the 15th November 2021 found all buildings within the site to have negligible suitability to support roosting bats as they lack suitable features.

The results of the initial assessment of buildings for their suitability to support roosting bats is contained in Table 7.

One tree (Tree 1) was found to have moderate bat roosting potential and one (Tree 2) with low potential. All other trees have negligible suitability to support roosting bats.

The results of the initial assessment of trees for their suitability to support roosting bats is contained in Table 8.

Table 7. Initial assessment of buildings for suitability to support roosting bats

Building	Description of Building and Suitable Roost Features	Overall Assessment of Suitability to Support Roosting Bats	Photograph
1 Target Note 3	Shipping containers and covered area (scaffolding and metal corrugated roof). No features present suitable to support roosting bats.	Negligible	
2 Target Note 4	Series of open topped metal containers. No features present suitable to support roosting bats.	Negligible	
3 Target Note 5	Single storey brick with a flat roof (assume felt) and metal flashing. No features present suitable to support roosting bats.	Negligible	




Building	Description of Building and Suitable Roost Features	Overall Assessment of Suitability to Support Roosting Bats	Photograph
4	Scaffolding with metal corrugated roof used for storage & two metal shipping containers. No features present suitable to support roosting bats.	Negligible	

Table 8 Initial assessment of trees for suitability to support roosting bats

Tree	Description of tree and Suitable Roost Features	Overall Assessment of Suitability to Support Roosting Bats	Photograph
<p>Tree 1 Target Note 6</p>	<p>Multi-stemmed hornbeam.</p> <p>Large split in trunk at 0.5 - 3m height, with gaps where the wood is rotting away creating access into the trunk. Some sections of large gap have a cluttered drop zone, and some sections remain uncluttered. Faces north-east.</p> <p>Also, a small hole at base of tree at ground level with a cluttered drop zone. Faces east.</p>	<p>Moderate</p>	
<p>Tree 2 Target Note 7</p>	<p>Multi-stemmed hornbeam.</p> <p>Cavity at approximately 3m height that goes up into branch. Quite exposed and narrow, faces up. Uncluttered drop zone. Feature faces west</p>	<p>Low</p>	

Nesting birds

The desk study returned 32 records of protected and/or notable bird species within 2km of the Site in the last 10 years that are relevant to the Site, not necessarily all of which would be breeding within the Site. Twelve of the bird species included within the desk study are listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and/or the Birds Directive Annex 1.

Woodland and scrub habitats within and adjacent to the Site have potential to support common nesting bird species.

Reptiles

Limited areas of habitat that are potentially suitable to support reptiles were present within the Site; the ephemeral/short perennial vegetation in the north of the Site, the tall ruderal in the centre of the Site and the scrub-covered bund comprising brick and stone in the centre of the Site that could provide good basking habitat (TNs 1 and 2). These areas have the potential to support reptiles.

Great crested newt

The desk study returned records of great crested newt within 2km of the Site in the last 10 years. Great crested newts have previously been present within the wider Brookhurst Wood landfill site and were previously translocated to a fenced receptor site to the north east of the Site by AECOM (formerly URS).

There are two ponds present within the Site which may be suitable for great crested newts, that could not be accessed at the time of the survey. There are also vegetated bunds comprising disused bricks and other rubble which may provide suitable terrestrial habitat for newts (TNs 1 and 2).

Badger

The desk study returned no records of badger (*Meles meles*) and there were no signs of badger found within the Site. It is therefore considered that badgers are not present on the Site.

Other protected/notable species

The Site is not considered to be suitable to support other protected or otherwise notable species such as hazel dormouse (*Muscardinus avellanarius*).

No invasive non-native plant or animal species were recorded within the Site.

5. Identification of Ecological Constraints and Recommendations

Approach to the Identification of Ecological Constraints

Relevant ecological receptors that may represent constraints to the Proposed Development, or that provide opportunities to deliver ecological enhancement in accordance with planning policy, are identified in Section 5 of this report. These constraints have been identified based on the plans that have been received to date.

The NPPF and local planning policy (summarised in Section 2 of this report) specify requirements for the protection of features of importance for biodiversity. Planning policy is a material consideration when determining planning applications. Compliance with planning policy requires that the Proposed Development considers and engages the following mitigation hierarchy where there is potential for impacts on relevant ecological receptors:

1. avoid features where possible;
2. minimise impact by design, method of working or other measures (mitigation) e.g. by enhancing existing features; and
3. compensate for significant residual impacts, e.g. by providing suitable habitats elsewhere (whether in the control of the client or otherwise legally enforceable through planning condition or Section 106 agreement).

This hierarchy requires the highest level to be applied where possible. Only where this cannot reasonably be adopted should lower levels be considered. The rationale for the proposed mitigation and/or compensation should be provided with planning applications, including sufficient detail to show that these measures are feasible and would be provided.

In pursuance of the objective within the NPPF of providing net gains in biodiversity, consideration should be given to the scope for enhancement as part of the Proposed Development. This should represent biodiversity gain over and above that achieved through mitigation and compensation. Enhancement could be achieved on and/or off the Site.

The likelihood of relevant ecological receptors constraining the Proposed Development has been assessed with reference to the scale described in Table 9. The higher the importance of the ecological receptor for the conservation of biodiversity at national and local scales, the more likely it is to be a material consideration during determination of the planning application for the Proposed Development.

Opportunities for ecological enhancement are identified in Section 5 of this report. There may be scope for ecological enhancement where existing habitat features could be improved or enhanced within the Proposed Development as designed, or with only minor amendment to the design of the Proposed Development. Ecological enhancement may not be possible where there is little scope to accommodate enhancement within the Proposed Development, e.g. due to a lack of utilisable space, or where land is required for essential mitigation. In such cases consideration could be given to enhancing biodiversity in the vicinity of the Site.

Table 9. Scale of Constraint to Proposed Development

Likelihood	Definition
High	An actual or potential constraint that is subject to relevant legal protection and is likely to be a material consideration in determining the planning application (e.g. statutory nature conservation designations and European/nationally protected species). Further survey likely to be required (as detailed in this report) to support a planning application.
Medium	An actual or potential constraint that is covered by national or local planning policy and, depending on the level of the potential impact as a result of the Proposed Development, may be a material consideration in determining the planning application. Further survey may be required (as detailed in this report) to support a planning application.
Low	Unlikely to be a constraint to development or require further survey prior to submission of a planning application. Mitigation is likely to be covered under Construction Environmental Management Plan (CEMP) or precautionary working method statement (e.g. generic requirements for the management of nesting bird risks).

Constraints and Requirements for Further Survey: Designations

Statutorily Designated Sites

There are no internationally statutory designated sites for nature conservation within a 10km radius of the Site. The closest other statutorily designated site is Warnham SSSI located 0.5km from the Site. Given the distance of the statutory site from the Proposed Development, it is considered that there is no link between the Proposed Development and statutorily designated sites.

Non-statutorily Designated Sites

There are three Local Wildlife Sites within 2km of the Site, namely Brockhurst Wood & Gill & Morris's Wood LWS, Warnham Mill Pond LWS and Tickfold Gill LWS. The closest is Brockhurst Wood & Gill & Morris's Wood LWS, located 0.3km east of the Site.

However, due to the separation of the Proposed Development from this LWS by landfill, tree lines and a road, it is considered that there is no link between the Proposed Development and non-statutorily designated sites.

There are eleven ancient woodlands within 1km of the Site, with the closest 0.2km from the Site. Given the scale of the proposed works, assuming that standard best practice construction methods are implemented as part of a Construction Environmental Management Plan (CEMP) it is unlikely to be affected either directly or indirectly by either of the proposed pipeline options. The standard best practice measures that should be included in a CEMP will comprise measures to control noise, dust and pollution as a consequence of site clearance and development works, which may include (but are not limited to) the following measures where appropriate to the nature of the works:

- All vehicles and mechanical plant will be fitted with exhaust silencers;
- Acoustic covers used over generators and other plant;
- Plant and machinery will be turned off when not in use;
- Enclosure and sheeting of material stockpiles;
- Sheltered location for material storage;
- The use of wheel washes to reduce the trafficking of soil onto adjacent highways with prompt clearance as a remedial action;
- The use of a bowser on-site during extended periods of dry weather to damp down dust;
- Sheeting of vehicles carrying spoil;
- Dust suppression measures for any on-site crushers; and
- Bunding of fuel stores and material stockpiles to prevent pollution.

Constraints and Requirements for Further Survey: Habitats

No further survey work is recommended with regards to the habitats present within or directly adjacent to the Site as the Phase 1 habitat survey undertaken to inform this PEA is sufficient to record the species present in these habitats. Further surveys for the ponds within the Site have been recommended; however, these are with regards to the presence or likely absence of great crested newt, and not for ponds as a habitat in their own right.

Broadleaved Woodland

It is strongly recommended that any woodland clearance is avoided. If woodland clearance is unavoidable replacement planting may be required. It is recommended that lighting of woodland is avoided, and CEMP is in place during construction to reduce dust deposition.

Constraints and Requirements for Further Survey: Species

Bats

All UK native bat species and their roosts are protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and under the Wildlife and Countryside Act 1981 (as amended). A bat roost is defined as any structure showing evidence of use by bats, whereby a roost is afforded protection even when bats are absent. Under this legislation it is an offence to deliberately, intentionally or recklessly kill, injure or disturb a bat in any structure which the bat uses for shelter or protection or obstruct or modify a roost.

Two trees are potentially suitable to support roosting bats. Tree 1 is of moderate suitability, and Tree 2 has a low suitability to support roosting bats. However, these trees will both be retained within the Proposed Development.

In the unlikely event that Tree 1 requires removal, or there will be works within 10m required during the active bat season (April – October), emergence surveys will be required. If Tree 2 requires felling, no further survey is required; however, felling must occur in accordance with a precautionary working method. To prevent disturbance of bats, directional lighting of trees and woodland during construction & operation should be avoided.

The precautionary working method is as follows:

- The felling contractors will be notified that the trees have been assessed for bats by way of a toolbox talk, and that although no signs of roosts have been identified, potential for bat occupancy was identified;
- Trees will be subject to an inspection of features by an ecologist who holds a Natural England WML-CL18 (Bat Survey Level 2) licence where possible;
- Where inspection is not possible, trees will be soft felled (sections of the tree will be carefully lowered to the ground for inspection by an ecologist) under an ecological watching brief;
- Trees will be felled using hand tools; and
- The removal of the trees should be undertaken at a time of year least likely to impact on bats. As the trees identified as being suitable to support roosting bats do not have any suitability for hibernating bats, works should be undertaken between late October and early March inclusive.

Should bats be discovered, clearance should stop immediately, and a Natural England licence should be obtained before works continue.

All other buildings or trees within or adjacent to the Site are of negligible suitability to support roosting bats; therefore, there are no further recommendations with regards to bats.

Nesting birds

Under the Wildlife and Countryside Act (1981 as amended) it is an offence to kill, injure or take a wild bird, or to intentionally take, destroy or damage the nest or eggs of a wild bird. Special protection is also afforded to species listed in Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). These birds are rare, endangered, declining or vulnerable species. In addition to the protection afforded to all bird species, it is an offence to cause reckless or intentional disturbance to the specially protected Schedule 1 listed species when they are building nests. Specially protected birds are listed in Annex 1 of the EU Directive on the Conservation of Wild Birds (2009).

Trees and scrub within and immediately adjacent to the Site have the potential to support common nesting bird species. Therefore, it is recommended that where vegetation clearance within these habitats is required, this takes place during the winter months (October – February inclusive) in order to avoid impacts on nesting birds. If site clearance is required between March and September inclusive, absence of nesting birds must be confirmed by a suitably qualified ecologist immediately prior to works commencing.

Reptiles

The four common and widespread reptile species grass snake, slow worm common lizard (*Zootoca vivipara*) and adder (*Vipera berus*) are all protected under the Wildlife and Countryside Act 1981 (as amended). Under this legislation it is an offence to intentionally kill or injure these species. All four common reptile species are listed as Species of Principal importance within Section 41 of the NERC Act (2006).

Habitats utilised by reptiles tend to include open, sunny and undisturbed land. Therefore, only small areas of habitat that are potentially suitable to support reptiles were present within the Site; the ephemeral/short perennial vegetation in the north of the Site, the tall ruderal in the centre of the Site and the scrub-covered bund comprising brick and stone in the centre of the Site that could provide good basking and hibernating habitat for reptiles.

As the suitable areas are small and there have been reptiles recorded within the wider site, no further surveys for reptiles are recommended. However, works should be carried out under a precautionary working method, and absence of reptiles must be confirmed by a suitably qualified ecologist immediately prior to works commencing.

Great Crested Newt

Great crested newts are afforded full protection under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017 (as amended). Under this legislation it is an offence to deliberately capture, injure, disturb or kill a great crested newt, or to deliberately take or destroy its eggs. It is also an offence to deliberately or recklessly damage, destroy or obstruct access to any structure which a great crested newt uses for shelter or protection. This protection includes both the breeding pond itself and terrestrial habitat utilised for foraging and hibernation which may be distant from the breeding pond.

The great crested newt is listed as a species of principal importance within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Great crested newt habitat is widely considered to extend up to 500m (the accepted maximum roaming distance¹) from a breeding pond where areas of connective suitable habitat exist. Habitats within 50m of a breeding pond are considered to constitute 'core' habitat, within 50m to 250m 'intermediate' habitat and over 250m 'distant' habitat.

There are two ponds present within the Site which may be suitable for great crested newts. There are also vegetated bunds of disused bricks and other rubble which may provide suitable terrestrial habitat for newts. Further surveys to confirm presence or absence of great crested newt must take place prior to works commencing. The recommended survey will involve four presence/likely absence surveys between mid-March and mid-June, with three of these undertaken between mid-April and mid-May. Further surveys will be required if the presence of great crested newts is confirmed. Three additional ponds are present within 250m of the Site. While these are separated from the Site by haul roads and car parks, or are within permanent newt fencing with extensive excellent terrestrial habitat in the vicinity, it is recommended that these are also subject to presence/absence survey.

Badgers

No signs of badger were recorded within the Site. However, suitable habitat for badgers is present in the form of woodland. It is recommended that a pre-construction check for badgers is undertaken due to their mobile nature, prior to works within 30m of the woodland habitat.

Other Protected or Otherwise Notable Species

There are no further recommendations for other protected or otherwise notable species, or invasive non-native species.

¹ Great crested newt habitat is widely considered to extend up to 500m (the accepted maximum roaming distance) from a breeding pond where areas of connective suitable habitat exist. Natural England's method statement template states that 'In keeping with a proportionate and risk-based approach, surveys need reasonable boundaries. The Great crested newt mitigation guidelines explains that survey of ponds up to around 500m from the development might need to be surveyed. The decision on whether to survey depends primarily on how likely it is that the development would affect newts using these ponds. For developments resulting in permanent or temporary habitat loss at distances over 250m from the nearest pond, carefully consider whether a survey is appropriate. Surveys of land at this distance from ponds are normally appropriate when all of the following conditions are met: (a) maps, aerial photos, walk-over surveys or other data indicate that the pond(s) has potential to support a large great crested newt population, (b) the footprint contains particularly favourable habitat, especially if it constitutes the majority available locally, (c) the development would have a substantial negative effect on that habitat, and (d) there is an absence of dispersal barriers.'

Table 10. Summary Appraisal of Ecological Constraints and Recommended Further Action

Receptor	Scale of Constraint	Further Requirements, Including Potential Mitigation Requirements	Driver	When is Action Likely to be Required?		
				To Inform Design	Before Planning Application	Pre-construction Onwards
Bats	High	All buildings within the site were confirmed as having negligible suitability for bats, therefore no further survey is required. Tree 1 was found to have moderate suitability and tree 2 was of low suitability. These trees will be retained.	Legislation	x	x	✓
Nesting birds	Low	Vegetation clearance and building demolition should be undertaken during winter (October – February). A nesting bird check may be required prior to building demolition or vegetation removal at other times of year.	Legislation	x	x	✓
Great crested newts	High	Suitable habitat for great crested newt is present within the Site. Further survey to assess the presence/absence of great crested newt is required before works can commence.	Legislation	x	x	✓
Reptiles	High	The Site comprises some suitable habitat for reptiles, and they are present within the wider site. Given the limited land take compared to the amount of suitable habitat it is unlikely the Proposed Development would involve significant impacts on reptiles providing care is taken to avoid killing and injury (such as undertaking vegetation removal during March) through the use of a precautionary working method.	Legislation	x	x	✓
Badger	Low	Badgers are not considered to be present on the site, but it is recommended that a pre-construction walkover is completed due to the mobile nature of badgers.	Legislation	x	x	✓

Table 11. Requirements for Further Survey

Survey	Season	Method	Why Required?	When is Action Likely to be Required?		
				To Inform Design	Before Planning Application	Pre-construction Onwards
Great crested newt	Mid-March to mid-June	Presence/absence survey in line with the Great Crested Newt Mitigation Guidelines (English Nature, 2001)	Legislation	x	✓	✓

Opportunities for Ecological Enhancement

There are opportunities for ecological enhancements within or in close proximity to the Site.

It is recommended that if any landscape planting is included in the design, this should comprise native species, or those on the Royal Horticultural Society's 'Plants for Pollinators' list².

Bird and bat boxes have previously been installed within the wider Brookhurst Wood site.

² <https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/plants-for-pollinators>

6. Conclusions

The Site predominantly comprises broadleaved woodland and bare ground with some buildings and hardstanding and small areas of dense and scattered scrub, standing water, ephemeral/short perennial on disturbed ground and tall ruderal vegetation.

It is understood that woodland habitat will be retained. Loss of woodland habitat may require replacement planting. Lighting of woodland should be avoided, and CEMP should be in place during construction to reduce dust deposition.

Tree 1 was found to have moderate suitability for roosting bats and Tree 2 had a low suitability for roosting bats. Both trees will be retained. However, if Tree 1 is to be removed or there will be works within 10m required during active bat season (April – October), emergence surveys will be required. No further survey is required for Tree 2; however, this tree would need to be felled in accordance with a precautionary working method. To prevent disturbance of bats, avoid directional lighting of trees and woodland during construction & operation.

Trees and scrub within the Site have the potential to support common nesting bird species. Therefore, it is recommended that all vegetation clearance takes place during the winter months (October – February inclusive) in order to avoid impacts on nesting birds. If site clearance is required between March and September, absence of nesting birds must be confirmed by a suitably qualified ecologist immediately prior to works commencing.

Suitable habitat for great crested newt is present within the Site. Presence/likely absence surveys between mid-March and mid-June, with three of these undertaken between mid-April and mid-May will be required to determine presence or absence before works can commence.

Suitable habitat for reptiles is present within the Site. However, given the limited land take compared to the amount of suitable habitat it is unlikely the Proposed Development would involve significant impacts on reptiles, provided care is taken to avoid killing and injury through a precautionary working method with an ecologist present during clearance of the limited areas of suitable habitat.

Badgers are not considered to be present on the Site, but it is recommended that a pre-construction walkover is completed due to the mobile nature of badgers where works are anticipated within 30m of the woodland.

Recommendations have been made for ecological enhancements in the form of selection of native plant species suitable for pollinators.

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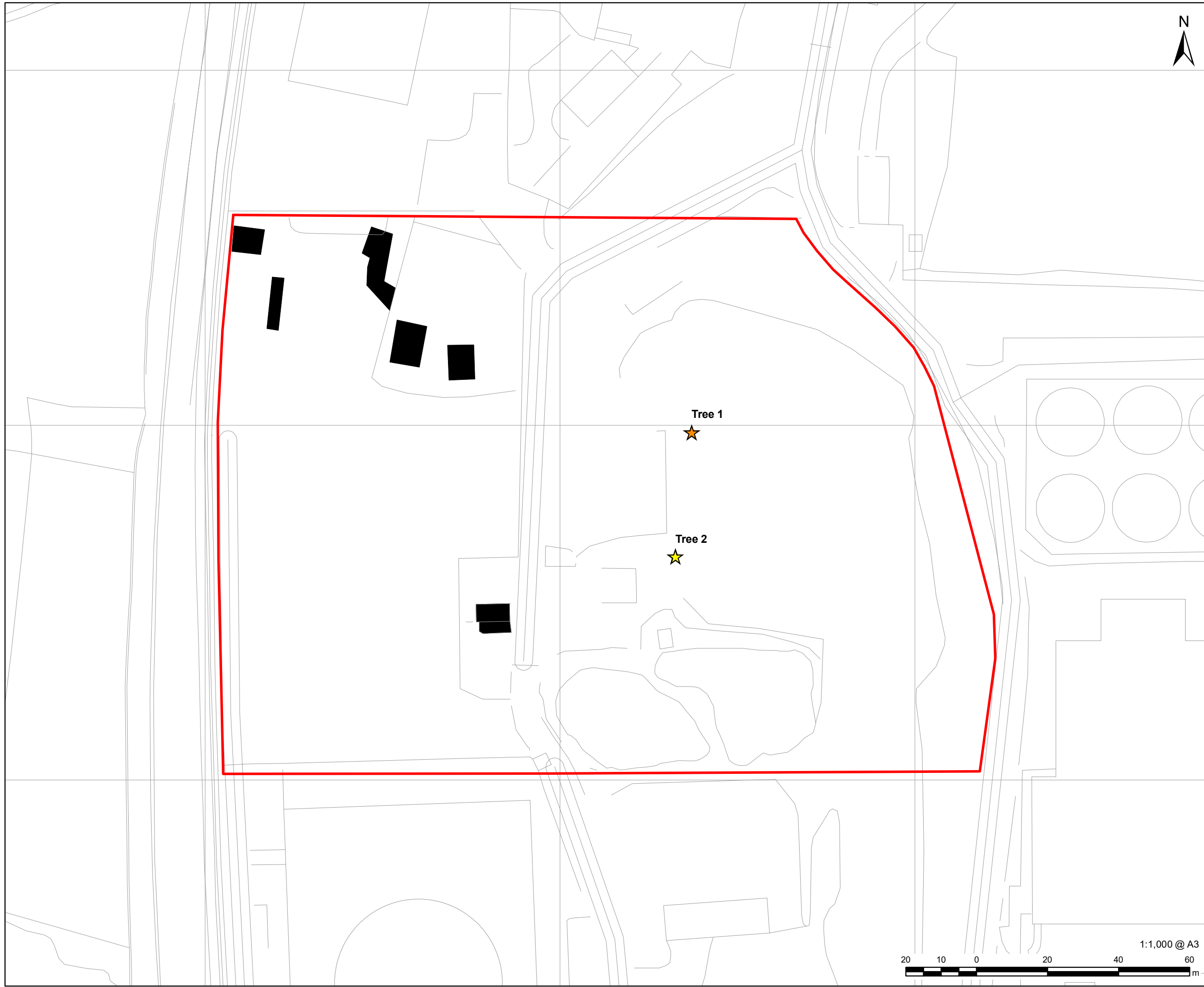
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LEGEND

- Site Boundary
- Suitability**
- Buildings with **negligible** suitability for roosting bats
- ★ Tree with **low** suitability for roosting bats
- ★ Tree with **moderate** suitability for roosting bats

NOTES

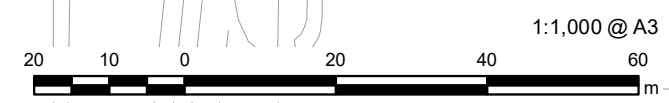
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ISSUE PURPOSE
FINAL

PROJECT NUMBER
60586541

FIGURE TITLE
Bat Roost Suitability

FIGURE NUMBER
Figure 2



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Appendix A – Legislation and Planning Policy

The Wildlife and Countryside Act, 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) is the major domestic legal instrument for wildlife protection in the UK, and is the primary means by which the following are implemented:

- The Convention on the Conservation of European Wildlife and Natural Habitats ('the Bern Convention'); and
- The Council Directive 79/409/EEC on the Conservation of Wild birds (the 'Bird Directive')

The main relevant provisions of the Act are: allowance for the protection of the most important habitats and species by designating SSSI's, a level of protection to all nesting wild birds and specific bird species under Schedule 1.

The Environment Act, 2021

The Environment Act 2021, published by the UK Government as the Environment Bill in October 2019 (Environment Bill, 2019), includes proposals to make biodiversity net gain (BNG) a mandatory requirement within the planning system in England. The Bill was given Royal Assent on 10th November 2021 and the biodiversity elements of the Act include:

- Strengthened biodiversity duty;
- Biodiversity net gain to ensure developments deliver at least 10% increase in biodiversity;
- Local Nature Recovery Strategies to support a Nature Recovery Network;
- Duty upon Local Authorities to consult on street tree felling;
- Strengthen woodland protection enforcement measures;
- Conservation Covenants;
- Protected Site Strategies and Species Conservation Strategies to support the design and delivery of strategic approaches to deliver better outcomes for nature;
- Prohibit larger UK businesses from using commodities associated with wide-scale deforestation; and
- Requires regulated businesses to establish a system of due diligence for each regulated commodity used in their supply chain, requires regulated businesses to report on their due diligence, introduces a due diligence enforcement system.

The Countryside and Rights of Way (CroW) Act, 2000

Part III of this Act deals specifically with wildlife protection and nature conservation in England and Wales. The CroW Act strengthened the safeguards afforded to SSSIs.

Conservation of Habitats & Species Regulations, 2017 (as amended)

The original Regulations transposed the EU Directive on Natural Habitats, and Wild Fauna and Flora 9/43/EEC) into domestic legislation. The regulations were consolidated in 2017 and amended in 2018 to include:

- Amendments in 2007 and 2009 that addressed a number of gaps and inconsistencies in the original legislation and provided a greater legal certainty and clarity in a number of areas;
- Amendments in April 2010 that brought up to date to consolidate changes made since 1994. The Regulations afford a high level of protection to a variety of species that are considered important at a European scale. The Regulations identify European Protected Species and various habitats of importance within the European Union, with important Sites for these habitats/species or both being designated as special Areas of Conservation (SAC). Any Proposed Development that may have a significant effect on a SAC or Special Protection Area (SPA) should be assessed in relation to the Site's 'conservation objectives', i.e. the reasons for which the Site is designated.

- Amendments in 2012 to place new duties on public bodies to take measures to preserve, maintain and re-establish habitat for wild birds. They were also amended to ensure certain provision of the Habitats Directive and the Birds Directive were transposed clearly and Section 15 was amended to make clear that Local Nature Reserves can be designated for re-establishing bird habitat.

The new Regulations simplified the species protection regime to better reflect the Habitats Directive, providing a clear legal basis for surveillance and monitoring of European Protected Species (EPS). The Regulations also amended the WCA, updating Schedules 5 and 8 to consider provisions made by the Habitat Regulations 1994 in relation to the protection of EPS. They also offered further clarification to Part 4 of Section 9 considering “reckless” offences on wild animals, which was previously amended by the CROW Act 2000.

Natural Environment and Rural Communities (NERC) Act, 2006

Section 41 of the NERC Act requires the listing of habitats and species that are considered to be of Principal Importance for the conservation of biodiversity in England, including habitats and species in England that have been identified as priorities within the UK Biodiversity Action Plan (UKBAP).

The NERC Act requires that the section 41 list be used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act 2006 ‘to have regard’ to the conservation of biodiversity in England, when carrying out their normal functions.

The Protection of Badgers Act, 1992

Badgers and their setts are protected under the Protection of Badgers Act 1992. In England and Wales this makes it an offence to:

- Wilfully kill, injure or take a badger (or attempt to do so);
- Cruelly ill-treat a badger;
- Dig for a badger, intentionally or recklessly damage or destroy a badger sett, or obstruct access to it; cause a dog to enter a badger sett; and
- Disturb a badger while it is occupying a sett.

The Wild Mammals (Protection) Act 1996

The Wild Mammals (Protection) Act states it is an offence to intentionally cause all wild mammals unnecessary suffering by certain methods, including crushing and asphyxiation (suffocation). This includes common mammals such as red fox (*Vulpes vulpes*).

The Invasive Alien Species Act. (Enforcement and Permitting) Order 2019

The Invasive Alien Species Regulations (Ref 6-7) sets out to address the problems concerned with invasive alien species (IASs) in order to protect native biodiversity and ecosystem services and minimize and mitigate the human health and/or economic impacts that IASs can have. It sets out rules to prevent and manage the introduction and spread of IASs through prevention, early detection and rapid eradication, and management.

National Planning Policy Framework

The latest version of the NPPF came into being in July 2021, relevant sections are as follows:

Section 15 of the NPPF relates specifically to ‘Conserving and Enhancing the Natural Environment’. Paragraph 170 states that ‘*Planning policies and decision should contribute to and enhance the natural and local environment by:*

- a. protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- b. recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
- c. maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*

- d. *minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- e. *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
- f. *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'*

Paragraph 171 states that '*Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.*'

Paragraph 174 states that '*To protect and enhance biodiversity and geodiversity, plans should:*

- a. *Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and*
- b. *promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.*'

Paragraph 175 states that '*When determining planning application, local planning authorities should apply the following principles:*

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

Paragraph 176 states that '*The following should be given the same protection as habitats sites:*

- a. *potential Special Protection Areas and possible Special Areas of Conservation;*
- b. *listed or proposed Ramsar sites; and*
- c. *sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.*'

Paragraph 177 states that '*The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.*'

Appendix B – Grading of suitability of features to support roosting bats

Suitability to Support Roosting Bats	Description
Confirmed	A feature within which bats are seen to be present (either live bats, or bat carcasses) or heard 'chattering' inside will be classified as a confirmed roost. In addition any feature/structure found to contain droppings during inspections will in the first instance be considered as a confirmed roost. N.B. In some cases it may be appropriate to revise this assessment following further survey (e.g. for buildings containing low numbers or old droppings and showing no evidence of use during emergence surveys).
High	<p>A feature which, due to its size, depth, shape, orientation or other physical properties (such as ability to maintain a constant temperature, accessibility for bats) is considered to be ideal for use by bats. Potential feeding remains, urine staining or scratch marks (in the absence of droppings) within or around the feature are likely to indicate presence of a bat occupation and therefore suggest high risk that a roost is present. In the absence of such signs, assigning a feature high risk will also be informed by the surveyor's knowledge of bat ecology and preferred roost types (relative to the feature being assessed). The quality of the surrounding habitat for bats will also be considered. For example. A building within an area of woodland is more likely to be occupied by bats than one adjacent to large areas of hard standing (as the bats would use the woodland for feeding, and potentially roosting).</p> <p>Potential examples of high risk features are:</p> <ul style="list-style-type: none"> • A south facing opening on a trunk that appears to form a significant wound within the tree, with uncluttered drop zone and good connectivity to other areas of suitable habitat; or • Gap below a ridge tile that provides potential point of access to a pitched roof, with marked cleaner tile below indicating potential use by bats.
Moderate	A feature which would be considered ideal for use by bats were it not for one or more key factors which limit its potential. For example, an ideal feature in sub-optimal surrounding habitat (e.g. within an area of predominately hard standing) may be considered to have moderate risk.
Low	A tree / structure containing features where use by bats cannot be ruled out but is considered unlikely based on size, depth, construction aspect, habitat location etc. For example often metal warehouse structures with suitable access/egress points will be classed as having low risk of supporting roosting bats.
Negligible	A tree / structure with no features suitable to support roosting bat species.

Appendix C - Target Notes

Target note 1

Vegetated bund with bricks / rocks providing potential suitable habitat for great crested newts and reptiles.

Target note 2

Vegetated bund with bricks / rocks and an excavated area with exposed rubble providing potential suitable habitat for great crested newts and reptiles.

Target note 3

Shipping containers with negligible bat roost suitability.

Target note 4

Series of open topped metal containers with negligible bat roost suitability.

Target note 5

A single storey, brick building with a flat felt roof. No features and no signs of bats. Negligible suitability to support roosting bats.

Target note 6

Multi-stemmed hornbeam (*Carpinus betulus*). Split in trunk at 0.5 - 3m height with gaps where wood is rotting away, creating access into trunk. Sections have a cluttered drop zone, some areas have an uncluttered drop zone. Feature faces north-east. Additionally, a small hole is present at the base of the tree at ground level with a cluttered drop zone. Faces east. Overall, this tree has moderate suitability to support roosting bats.

Target note 7

Multi-stemmed hornbeam. Cavity approximately 3m in height present, goes up into branch. Quite exposed and narrow, faces up. Uncluttered drop zone. Feature faces west. Overall low bat roost suitability.

Appendix D - Desk study data

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Amphibians								
Common toad <i>Bufo bufo</i>	✓	✓	✓	?	✓	✓	1.8km, south, 2017	0.1km, south, 2017
Great crested newt <i>Triturus cristatus</i>	✓	✓	✓	?	✓	✓	0.1km, South, 2017	0.1km, south, 2017
Smooth newt <i>Lissotriton vulgaris</i>	✓	✓	X	?	✓	✓	0.1km, south, 2017	0.1km, south, 2017
Palmate newt <i>Lissotriton helveticus</i>	✓	✓	X	?	✓	✓	0.1km, south, 2017	0.1km, south, 2017
Common frog <i>Rana temporaria</i>	✓	✓	X	?	✓	✓	0.1km, south, 2017	0.1km, south, 2017
Plants								
Box <i>Buxus sempervirens</i>	X	X	✓	?	✓	✓	Within 2km, 2018	Within 2km, 2018
Bladder-sedge <i>Carex vesicaria</i>	X	X	✓	?	✓	✓	Within 2km, 2012	Within 2km, 2012
Euphrasia nemorosa <i>Eyebright</i>	X	X	✓	?	✓	✓	Within 2km, 2012	Within 2km, 2012
Wild strawberry <i>Fragaria vesca</i>	X	X	✓	?	✓	✓	Within 2km, 2018	Within 2km, 2018
Dyer's greenweed <i>Genista tinctoria subsp. tinctoria</i>	X	X	✓	?	✓	✓	0.9km north east 2012	0.9km north east 2012
Bluebell <i>Hyacinthoides non-scripta</i>	X	X	✓	?	✓	✓	Within 2km, 2018	Within 2km, 2018
Bitter-vetch <i>Lathyrus linifolius</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Welsh poppy <i>Meconopsis cambrica</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2012
Corn mint <i>Mentha arvensis</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2014	Within 2km of the Site in 2014
Wood-sorrel <i>Oxalis acetosella</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Tormentil <i>Potentilla erecta</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Sanicle <i>Sanicula europaea</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2018
Sea wormwood <i>Seriphidium maritimum</i>	X	X	✓	?	✓	✓	1.1km south 2014	1.1km south 2014
Common valerian <i>Valeriana officinalis</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Heath speedwell <i>Veronica officinalis</i>	X	X	✓	?	✓	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Marsh speedwell <i>Veronica scutellata</i>	X	X	✓	?	✓	✓	1.4km, south, 2011	1.4km, south, 2011
Invertebrates - Ants, Bees, Sawflies & Wasps								
Lobe-spurred furrow Bee <i>Lasioglossum pauxillum</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Ridge-cheeked Furrow Bee <i>Lasioglossum puncticolle</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Brown tree ant <i>Lasius brunneus</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Invertebrates - beetles								
A beetle <i>Acupalpus exiguus</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Agabus bipustulatus</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Ground beetle <i>Amara strenua</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Chaetocnema confusa</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Dacne rufifrons</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Diaperis boleti</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Eledona agricola</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Green dock beetle <i>Gastrophysa viridula</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Ischnomera cyanea</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Stag beetle <i>Lucanus cervus</i>	✓	✓	✓	?	✓	✓	2.0km, south west, 2015	2.0km, south west, 2015
A beetle <i>Notaris scirpi</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Orthoperus nigrescens</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Protapion difforme</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
A beetle <i>Pycnomerus fuliginosus</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Black-headed cardinal beetle <i>Pyrochroa coccinea</i>	✓	✓	X	?	✓	✓	1.7km, south, 2015	1.7km, south, 2015
A beetle <i>Variimorda villosa</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Invertebrates - butterflies								
Purple emperor <i>Apatura iris</i>	✓	✓	✓	?	✓	✓	Within 2km of the Site in 2016	Within 2km of the Site in 2016
Small heath <i>Coenonympha pamphilus</i>	✓	✓	✓	?	✓	✓	1.8km south west 2020	1.8km south west 2020
Dingy skipper <i>Erynnis tages</i>	✓	✓	✓	?	✓	✓	1.8km south west 2016	1.8km south west 2016
Wall <i>Lasiommata megera</i>	✓	✓	X	?	✓	✓	0.9km, south, 2014	0.9km, south, 2014
White admiral <i>Limenitis camilla</i>	✓	✓	X	?	✓	✓	1.8km, south, 2017	1.8km, south, 2017
Chalk hill blue <i>Polyommatus coridon</i>	✓	✓	X	?	✓	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Grizzled skipper <i>Pyrgus malvae</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
White-letter hairstreak <i>Satyrrium w-album</i>	✓	✓	X	?	✓	✓	0.9km, south, 2013	0.9km, south, 2013
Brown hairstreak <i>Thecla betulae</i>	✓	✓	X	?	✓	✓	2.0km, south-west, 2012	0.9km, south, 2011
Invertebrates - Dragonflies & Damselflies								
Common darter <i>Sympetrum striolatum</i>	✓	✓	X	?	✓	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Invertebrates - Grasshoppers & Crickets								
Long-winged cone-head <i>Conocephalus fuscus</i>	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Metrioptera roeselii Roesel's Bush-cricket	✓	✓	X	?	✓	✓	1.4km, south, 2020	1.4km, south, 2020
Invertebrates - Moths								
Knot grass <i>Acronicta rumicis</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Sallow <i>Cirrhia icteritia</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Mocha <i>Cyclophora annularia</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Small phoenix <i>Ecliptopera silaceata</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
September thorn <i>Ennomos erosaria</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Dusky thorn <i>Ennomos fuscantaria</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
August thorn <i>Ennomos quercinaria</i>	✓	✓	X	?	✓	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Garden dart <i>Euxoa nigricans</i>	✓	✓	X	?	✓	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Alder kitten <i>Furcula bicuspis</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Rustic <i>Hoplodrina blanda</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Great oak beauty <i>Hypomecis roboraria</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Brindled beauty <i>Lycia hirtaria</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
White ermine <i>Spilosoma lubricipeda</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Buff ermine <i>Spilosoma lutea</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Blood-vein <i>Timandra comae</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Pale eggar <i>Trichiura crataegi</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Cinnabar <i>Tyria jacobaeae</i>	✓	✓	X	?	✓	✓	1.7km south west 2019	1.7km south west 2019
Oak hook-tip <i>Watsonalla binaria</i>	✓	✓	X	?	✓	✓	1.7km south west 2020	1.7km south west 2020
Mammals								

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
West European hedgehog <i>Erinaceus europaeus</i>	X	X	✓	?	✓	✓	1.8km south-east, 2017	1.6km, south-east, 2016
Harvest Mouse <i>Micromys minutus</i>	X	X	✓	?	✓	✓	1.8km south, 2019	1.8km, south, 2019
<i>Myotis</i> species <i>Myotis</i> sp.	✓	✓	✓	?	✓	✓	1.8km west 2019	1.8km west 2019
Pipistrelle species <i>Pipistrellus</i> sp.	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019
Common pipistrelle <i>Pipistrellus pipistrellus</i>	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019
Long-eared bat <i>Plecotus</i> sp.	✓	✓	X	?	✓	✓	1.8km west 2019	1.8km west 2019
Brown long-eared bat <i>Plecotus auritus</i>	✓	✓	X	?	✓	✓	1.5m, west, 2020	1.5km, west, 2020
Reptiles								
Slow-worm <i>Anguis fragilis</i>	✓	✓	✓	?	✓	✓	1.7km, south-east, 2017	0.2km, north-east, 2009
Grass snake <i>Natrix helvetica</i>	✓	✓	✓	?	✓	✓	2.0km, south-west, 2013	0.1km, north-east, 2006
Birds								
Common nesting bird species	✓	✓	✓	?	✓	✓	Dense scrub within the Site has the potential to support common nesting bird species	
Teal <i>Anas crecca</i>	X	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Tundra Bean Goose <i>Anser serrirostris</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Goldeneye <i>Bucephala clangula</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2014	Within 2km of the Site in 2014
Mute Swan <i>Cygnus olor</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Wigeon <i>Mareca penelope</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Swift <i>Apus apus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2018
Lapwing <i>Vanellus vanellus</i>	X	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Black Tern <i>Chlidonias niger</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Black-headed Gull <i>Chroicocephalus ridibundus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Little Gull <i>Hydrocoloeus minutus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2014	Within 2km of the Site in 2014
Mediterranean Gull <i>Ichthyaeetus melanocephalus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2016	Within 2km of the Site in 2016
European Herring Gull <i>Larus argentatus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Common Gull <i>Larus canus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Lesser Black-backed Gull <i>Larus fuscus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Iceland Gull <i>Larus glaucooides</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Great Black-backed Gull <i>Larus marinus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Roseate Tern <i>Sterna dougallii</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2013	Within 2km of the Site in 2013
Common Tern <i>Sterna hirundo</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Common Sandpiper <i>Actitis hypoleucos</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Snipe <i>Gallinago gallinago</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Whimbrel <i>Numenius phaeopus</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Woodcock <i>Scolopax rusticola</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Greenshank <i>Tringa nebularia</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2014	Within 2km of the Site in 2014
Green Sandpiper <i>Tringa ochropus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2013	Within 2km of the Site in 2013
Great White Egret <i>Ardea alba</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2018
Grey Heron <i>Ardea cinerea</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Little Egret <i>Egretta garzetta</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
White Stork <i>Ciconia ciconia</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Stock Dove <i>Columba oenas</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Woodpigeon <i>Columba palumbus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Collared Dove <i>Streptopelia decaocto</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Kingfisher <i>Alcedo atthis</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Cuckoo <i>Cuculus canorus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Sparrowhawk <i>Accipiter nisus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Buzzard <i>Buteo buteo</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Hen Harrier <i>Circus cyaneus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Red kite <i>Milvus milvus</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Western Osprey <i>Pandion haliaetus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Honey buzzard <i>Pernis apivorus</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2013	Within 2km of the Site in 2013
Hobby <i>Falco subbuteo</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Peregrine <i>Falco peregrinus</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Kestrel <i>Falco tinnunculus</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Red-legged Partridge <i>Alectoris rufa</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Pheasant <i>Phasianus colchicus</i>	x	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Long-tailed Tit <i>Aegithalos caudatus</i>	x	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Skylark <i>Alauda arvensis</i>	X	✓	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Treecreeper <i>Certhia familiaris</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Crane <i>Grus grus</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2011	Within 2km of the Site in 2011
Cetti's Warbler <i>Cettia cetti</i>	X	✓	✓	X	X	✓	Within 2km of the Site in 2016	Within 2km of the Site in 2016
Jackdaw <i>Coloeus monedula</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Northern Raven <i>Corvus corax</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2018
Carrion Crow <i>Corvus corone</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Rook <i>Corvus frugilegus</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Jay <i>Garrulus glandarius</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Barn owl <i>Tyto alba</i>	✓	X	✓	X	X	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Lesser spotted woodpecker <i>Dendrocopos minor</i>	X	✓	✓	X	X	✓	Within 2km of the Site in 2016	Within 2km of the Site in 2016
Tree pipit <i>Anthus trivialis</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Yellow wagtail <i>Motacilla flava</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Dunnock <i>Prunella modularis</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Ring ouzel <i>Turdus torquatus</i>	X	✓	✓	X	X	✓	Within 2km of the Site in 2016	Within 2km of the Site in 2016
Fieldfare <i>Turdus pilaris</i>	✓	X	✓	?	✓	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Song thrush <i>Turdus philomelos</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Redwing <i>Turdus iliacus</i>	✓	X	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
Firecrest <i>Regulus ignicapilla</i>	✓	X	✓	?	✓	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Willow tit <i>Poecile montana</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Marsh tit <i>Poecile palustris</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2015	Within 2km of the Site in 2015
Starling <i>Sturnus vulgaris</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
House sparrow <i>Passer domesticus</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Tree sparrow <i>Passer montanus</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2013	Within 2km of the Site in 2013
Linnet <i>Linaria cannabina</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Brambling <i>Fringilla montifringilla</i>	✓	X	X	?	✓	✓	Within 2km of the Site in 2017	Within 2km of the Site in 2017
Bullfinch <i>Pyrrhula pyrrhula</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2020	Within 2km of the Site in 2020
Hawfinch <i>Coccothraustes coccothraustes</i>)	X	✓	✓	?	✓	✓	Within 2km of the Site in 2018	Within 2km of the Site in 2018
Yellowhammer <i>Emberiza citrinella</i>	X	✓	✓	?	✓	✓	Within 2km of the Site in 2019	Within 2km of the Site in 2019
Invasive non-native species								
Marsh frog <i>Pelophylax ridibundus</i>	X	X	✓	X	X	✓	0.8km, south-east, 2017	0.8km, south-east, 2017
Golden pheasant <i>Chrysolophus pictus</i>	X	X	✓	X	X	✓	Within 2km of the Site in 2009	Within 2km of the Site, 2009
Ring-necked parakeet <i>Psittacula krameri</i>	X	X	✓	X	X	✓	Within 2km of the Site in 2015	1.9km, south-east, 2013
Few flowered leek <i>Alium paradoxium</i>	X	X	✓	X	X	✓	2.0km, south-west, 2013	2.0km, south-west, 2013
Japanese knotweed <i>Reynoutria japonica</i>	X	X	✓	X	X	✓	Within 2km of the Site in 2012	Within 2km of the Site, 2012
Giant hogweed <i>Heracleum mantegazzianum</i>	X	X	✓	X	X	✓	0.7km, south, 2017	0.3km, north-west, 2015
Indian balsam <i>Impatiens glandulifera</i>	X	X	✓	X	X	✓	0.9km, south, 2012	0.9km, south, 2012
Yellow archangel <i>Lamium galeobdolon subsp. argentatum</i>	X	X	✓	X	X	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
False acacia <i>Robinia pseudoacacia</i>	X	X	✓	X	X	✓	Within 2km of the Site in 2012	Within 2km of the Site in 2012
Duck-potato <i>Sagittaria latifolia</i>	X	X	✓	X	X	✓	Within 2km of the Site in 2016	Within 2km of the Site, 2016
Key to symbols: ✓ = yes, see Supporting Comments for further rationale								
<u>Legally protected species</u> are those listed under Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended); and, Schedules 2 and 4 of The Conservation of Habitat & Species Regulations 2017 (as amended).								
<u>Species of Principal Importance</u> as those listed under Section 41 of the NERC Act 2006. Planning Authorities have a legal duty under Section 40 of the same Act to consider such species when determining planning applications.								

Species	Legally Protected Species?	Species of Principal Importance?	Other Notable Species?	Present on Site?	Possibly Present on Site?	Present / Potentially Present in Wider Zone of Influence?	Most recent record (distance, bearing and date)	Closest record (distance, bearing and date)
<p><u>Other notable species</u> include native species of conservation concern listed in the LBAP (except species that are also of Principal Importance), those that are Nationally Rare, Scarce or Red Data List, and non-native controlled weed species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).</p>								

Appendix E Assessment of trees for their suitability to support roosting bats

Tree no.	Tree species	Diameter at breast height (DBH) (m)	Description of feature							Height of cavity (m)	Direction of cavity	Uncluttered zone (Y/N)	Signs	Position in landscape	Summary potential				Roost suitability	Recommendations/ additional comments
			Split	Loose bark	Trunk cavity	Branch cavity	Ivy	Callus rolls	Other						Confirmed	High	Moderate	Low		
1	Hornbeam	Multi-stem			x				0.5 – 3	North-east	Y	N	Woodland					x	Transitional	
					x				Ground-level	East	N	N	Woodland							
2	Hornbeam	Multi-stem				x			3	West	N	N	Woodland					x	Transitional	

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Appendix C – GCN Survey

Brookhurst Wood MBT Facility

Great Crested Newt Survey Report

Biffa Waste Services Ltd.

May 2022

Quality information

Prepared by	Checked by	Verified by	Approved by
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
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The methodology adopted and the sources of information used by AECOM in providing its services are outlined in this Report. The work described in this Report was undertaken between March and May 2022 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances. AECOM disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to AECOM’s attention after the date of the Report.

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Executive Summary

AECOM was instructed by Biffa Waste Services Ltd. (hereafter 'Biffa') to carry out great crested newt surveys for the Proposed Development of an extension to the existing Mechanical Biological Treatment (MBT) facility (hereafter the 'Proposed Development') at Brookhurst Wood landfill site, near Horsham (hereafter 'the Site'). These surveys were commissioned following the results of a Preliminary Ecological Appraisal (PEA) undertaken by AECOM in November 2021.

The following report is intended to provide a summary of the methods used and survey results collected in 2022 with regards to great crested newts (*Triturus cristatus*).

Great crested newts are fully protected under the Wildlife & Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). Under this legislation it is an offence to deliberately capture, disturb, injure or kill a great crested newt, or damage or destroy a breeding site or habitat used for sheltering or foraging.

Considering the suitability of habitats within the Site, the presence of waterbodies within the Site and within 250m of the Site, and the known occurrence of great crested newt previously within and near to the Site, AECOM was commissioned to undertake surveys to determine the use of the Site and surrounding area by great crested newt.

An initial desk-based assessment identified five ponds located within 250m of the Site boundary. Two of these ponds could not be safely accessed due to dense vegetation at the pond banks and steep pond edges. The other three ponds were subject to a Habitat Suitability Index assessment and conventional presence/absence survey which included egg searching, netting and torching. No evidence of great crested newt was found in any of the ponds.

Therefore, it is considered unlikely that great crested newts are present within the Site and are considered unlikely to be present within the small areas of terrestrial habitat where works are proposed.

1. Introduction

Background

Biffa Waste Services Ltd. (hereafter 'Biffa') proposes to construct an extension to the existing Mechanical Biological Treatment (MBT) facility at Brookhurst Wood landfill site, near Horsham (hereafter 'the Site'). The extension of the existing MBT facility will include an area of land known as Site Ha, which will be used as a waste storage and transfer area for Refuse Derived Fuel (RDF). The area will be operated as a trailer park whereby up to 36 empty transport trailers may be delivered to the Site empty and subsequently filled with RDF (hereafter 'the Proposed Development').

AECOM undertook a Preliminary Ecological Appraisal (PEA) of the Site in November 2021. The PEA identified two waterbodies within the Site that could be suitable to support great crested newt (*Triturus cristatus*). Three additional waterbodies were present within 250m of the Site. Therefore, AECOM proposed to undertake great crested newt presence/absence surveys of the five waterbodies. As access could not be made to the waters' edge to take water samples and conduct environmental DNA (eDNA) surveys for at least three of the waterbodies, alternative survey methods were undertaken.

Scope

The Site boundary is shown in Figure 1. This report aims to determine the use of the Site by great crested newts; specifically, if any populations are present within waterbodies within the Site or within 250m of the Site, and the size of these populations. This information is used to provide recommendations for ecological best practice as required, to ensure there are no negative impacts on great crested newts as a result of the Proposed Development.

2. Relevant Wildlife Legislation

Great crested newt

Great crested newts are afforded full protection under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017 (as amended). Under this legislation it is an offence to deliberately capture, injure, disturb or kill a great crested newt, or to deliberately take or destroy its eggs. It is also an offence to deliberately or recklessly damage, destroy or obstruct access to any structure which a great crested newt uses for shelter or protection. This protection includes both the breeding pond itself and terrestrial habitat utilised for foraging and hibernation which may be distant from the breeding pond.

The great crested newt is listed as a species of principal importance within Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

Great crested newt habitat is widely considered to extend up to 500m (the accepted maximum roaming distance¹) from a breeding pond where areas of connective suitable habitat exist. Habitats within 50m of a breeding pond are considered to constitute 'core' habitat, within 50m to 250m 'intermediate' habitat and over 250m 'distant' habitat.

Common amphibians

The four common amphibians, common frog (*Rana temporaria*), common toad (*Bufo bufo*), palmate newt (*Lissotriton helveticus*) and smooth newt (*Lissotriton vulgaris*), have no legal protection other than that provided by subsection 9.5 of the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to sell them. However, general animal welfare guidelines do apply (i.e. causing an animal to suffer unnecessarily).

Common toad is listed as a species of principal importance within Section 41 of the NERC Act (2006) due to its rapid decline over the last 25 years.

¹ Great crested newt habitat is widely considered to extend up to 500m (the accepted maximum roaming distance) from a breeding pond where areas of connective suitable habitat exist. Natural England's method statement template states that '*In keeping with a proportionate and risk-based approach, surveys need reasonable boundaries. The Great crested newt mitigation guidelines explains that survey of ponds up to around 500m from the development might need to be surveyed. The decision on whether to survey depends primarily on how likely it is that the development would affect newts using these ponds. For developments resulting in permanent or temporary habitat loss at distances over 250m from the nearest pond, carefully consider whether a survey is appropriate. Surveys of land at this distance from ponds are normally appropriate when all of the following conditions are met: (a) maps, aerial photos, walk-over surveys or other data indicate that the pond(s) has potential to support a large great crested newt population, (b) the footprint contains particularly favourable habitat, especially if it constitutes the majority available locally, (c) the development would have a substantial negative effect on that habitat, and (d) there is an absence of dispersal barriers.*'

3. Methodology

Initial desk- based assessment

A desk study was undertaken in February 2022, with use of records obtained from Sussex Biodiversity Records Centre in July 2021. This included records of great crested newts within a 2km radius of the Site from within the last ten years.

A review of the Phase 1 habitat survey report, aerial imagery and Ordnance Survey (OS) mapping was undertaken to identify waterbodies within 250m of the Site. Waterbodies separated from the Site by a major barrier were not subject to further survey. Major barriers included wide or heavily-used roads and large areas of unsuitable habitat such as hardstanding or bare ground. The distances from the Site were taken into account when considering the potential impacts of barriers to movement; for example, waterbodies close to the Site but with a barrier were still subject to survey.

Habitat Suitability Index assessment

The Habitat Suitability Index (HSI) is a method of quantifying the suitability of a waterbody to support great crested newts (Oldham et al, 2000). Waterbodies situated within the Site or within 250m of the Site were subject to HSI assessment by an Ecologist who holds a Natural England WML-CL08 Class 1 licence for survey of great crested newt. All waterbodies identified in the initial desk-based assessment that could be accessed were subject to HSI assessment in 2022.

The calculation of the HSI score of a waterbody requires that the following ten key variables are recorded and assigned a numerical value:

- Location within Britain;
- Pond area;
- Pond drying (based on both local knowledge and field evidence);
- Water quality;
- Percentage perimeter shaded;
- Presence or absence of waterfowl;
- Presence or absence of fish;
- Number of ponds situated within 1km;
- Suitability of terrestrial habitat; and
- Percentage of macrophyte cover.

The results of the HSI assessment are scored in accordance with the criteria specified in Table 1 below.

Table 1 Habitat Suitability Index score and interpretation (based on methodology of NARRS, undated)

HSI Score	Pond suitability for great crested newt
>0.8	Excellent
0.7	Good
0.6	Average
0.5	Below average
<0.5	Poor

Presence/ Absence Survey: Conventional Survey

The surveys were undertaken following the approach recommended within the Great Crested Newt Mitigation Guidelines (English Nature, 2001).

A total of four survey visits were undertaken at each waterbody between March and May 2022 inclusive. Each visit was undertaken by two AECOM Ecologists, one of whom who holds a Natural England WML-CL08 Class 1 licence for survey of great crested newt. Following the approach recommended within the Great Crested Newt Mitigation Guidelines, at least three survey techniques (bottle trapping, egg searches, torch surveys) were used during each survey visit. As it was not possible to complete bottle trapping surveys, netting was used as an alternative technique.

Egg searches were conducted in daylight. Egg searching was targeted at all areas of accessible submerged vegetation suitable for egg-laying such as water mint (*Mentha aquatica*). In the event that a great crested newt egg was found that waterbody was not subject to further egg searching.

Torch surveys ('torching') were undertaken using 1,000,000 candle power torches, commencing at least an hour after sunset.

Netting was conducted during daylight hours. Netting with a 2mm mesh professional dipping net was targeted at both open water and areas of suitable egg-laying vegetation. Time spent netting was dependent on waterbody size, averaging 10 minutes in total.

Where possible the abundance, sex and life stage of all amphibians encountered was recorded.

The conditions during presence/ absence surveys are shown in Table 2.

Table 2 Environmental survey conditions for presence/absence survey of ponds 3, 4 and 5.

Visit number	Date	Air temperature (°C)	Cloud cover (%)	Conditions
Pond 3				
1	24/03/2022	10	5	Cool, dry, clear. Warm and sunny during the day.
2	07/04/2022	7	95	Sunny spells with heavy rain/hail and strong wind in the day-time. Evening cool and dry
3	25/04/2022	14	10	Warm and sunny day.
4	28/04/2022	12	90	Cool, calm, overcast, dry
Pond 4 and Pond 5				
1	07/04/2022	7	95	Sunny spells with heavy rain/hail and strong wind in the day-time. Evening cool and dry
2	25/04/2022	14	10	Warm and sunny day.
3	28/04/2022	12	90	Cool, calm, overcast, dry
4	03/05/2022	12	80	Warm, overcast day. Warm evening.

Limitations

All surveys were undertaken at a suitable time of year and under suitable weather conditions.

Ponds 1 and 2 could not be accessed or viewed due to dense vegetation surrounding the edges and a steep drop into the ponds, making vegetation clearance and survey unsafe. Due to the vegetation present, the ponds are likely to be heavily shaded, and are steep sided reducing their suitability to support great crested newts. As all other waterbodies in the wider Brookhurst Wood site were surveyed, and as these ponds are isolated to the north, south and west by large areas of hardstanding, and partially isolated to the east by a heavily used internal haul road, this is not considered to be a significant constraint.

No safe access to the edge of Pond 3 was possible, due to steep drops present at retaining walls. Therefore, this waterbody was only subject to torch light survey. However, as this waterbody comprises a large ornamental lagoon with waterfowl present, the waterbody was considered to be less suitable to support great crested newts. Pond 3 is also isolated from the Site by areas of heavily used hardstanding, including car parks and frequently used haulage roads. Therefore, this is not considered to be a significant constraint.

It should be noted that ecosystems are dynamic and constantly changing, and therefore species may move or new species may be recorded in subsequent years. For this reason, and in accordance with current guidance, the existing survey data has a 'shelf-life' and should only be relied on for a period of two years from the date of survey. After this date, update surveys are likely to be required and advice sought from an appropriately qualified ecologist to determine survey scope and methods.

Quality Assurance

AECOM Ecologists are members, at the appropriate level, of the Chartered Institute of Ecology and Environmental Management (CIEEM) and follow their code of professional conduct when undertaking ecological work.

AECOM is BS EN ISO 9001:2015, BS EN ISO 14001:2015 and OHSAS 18001:2007 Health and Safety accredited.

4. Results

Initial Desk Based Assessment

The desk study completed by Sussex Biodiversity Records Centre (SBRC) returned 12 records of great crested newt within 2km of the site boundary in the last 10 years. Great crested newts have previously been present within the wider Brookhurst Wood landfill site and were previously translocated to a fenced receptor site to the north-east of the Site by AECOM (formerly URS).

A total of five potentially suitable waterbodies not separated by a significant barrier to movement were identified within the Site or within 250m of the Site, of which two were located entirely or partially within the Site. The location of these waterbodies is shown in Figure 1.

Habitat Suitability Index Assessment

A total of three waterbodies were subject to HSI assessment. The results of the HSI assessments are summarised in Table 3 below. Full HSI assessment data are provided in Appendix A.

Table 3. Summary of Habitat Suitability Index scores for all waterbodies surveyed

Waterbody reference	HSI score	Habitat suitability
3	0.61	Average
4	0.62	Average
5	0.73	Good

Presence/absence: Conventional Survey

Three waterbodies (Ponds 3, 4 and 5) were subject to conventional presence/ absence surveys in 2022. The results of this survey are summarised in Table 4 below. Full results from this survey are provided in Appendix B. No great crested newts were recorded.

Table 4. Summary of the results of conventional presence/absence surveys

Waterbody reference	Survey visit			
	1	2	3	4
3	Torching: none	Torching: none	Torching: none	Torching: none
4	Torching: 3 x male smooth newt	Torching: none	Torching: 6x female smooth newt	Torching: 3x male smooth newt 3x female smooth newt
	Egg searching: none	Egg searching: none	Egg search: Smooth newt egg present	Egg search: none
	Netting: none	Netting: none	Netting: none	Netting: none
5	Torching: 1 x smooth newt	Torching: none	Torching: none	Torching: none

Egg searching: none

Egg searching: none

Egg search: none

Egg search: none

Netting: none

Netting: none

Netting: none

Netting: none

5. Discussion

Great crested newts are fully protected under the Wildlife & Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended). Under this legislation it is an offence to deliberately capture, disturb, injure or kill a great crested newt, or damage or destroy a breeding site or habitat used for sheltering or foraging.

Together, the HSI assessments and presence/absence via conventional surveys confirmed that of three waterbodies within the Site or within 250m of the Site surveyed, none support great crested newt. Although ponds 1 and 2 could not be accessed, these ponds are thought to be less suitable for great crested newt due to dense vegetation, and as great crested newt were not confirmed within the wider Brookhurst Wood site, it can be reasonably assumed that great crested newt are absent from these ponds.

Therefore, it can be concluded that great crested newts are unlikely to be present on or within 250m of the Site.

6. References

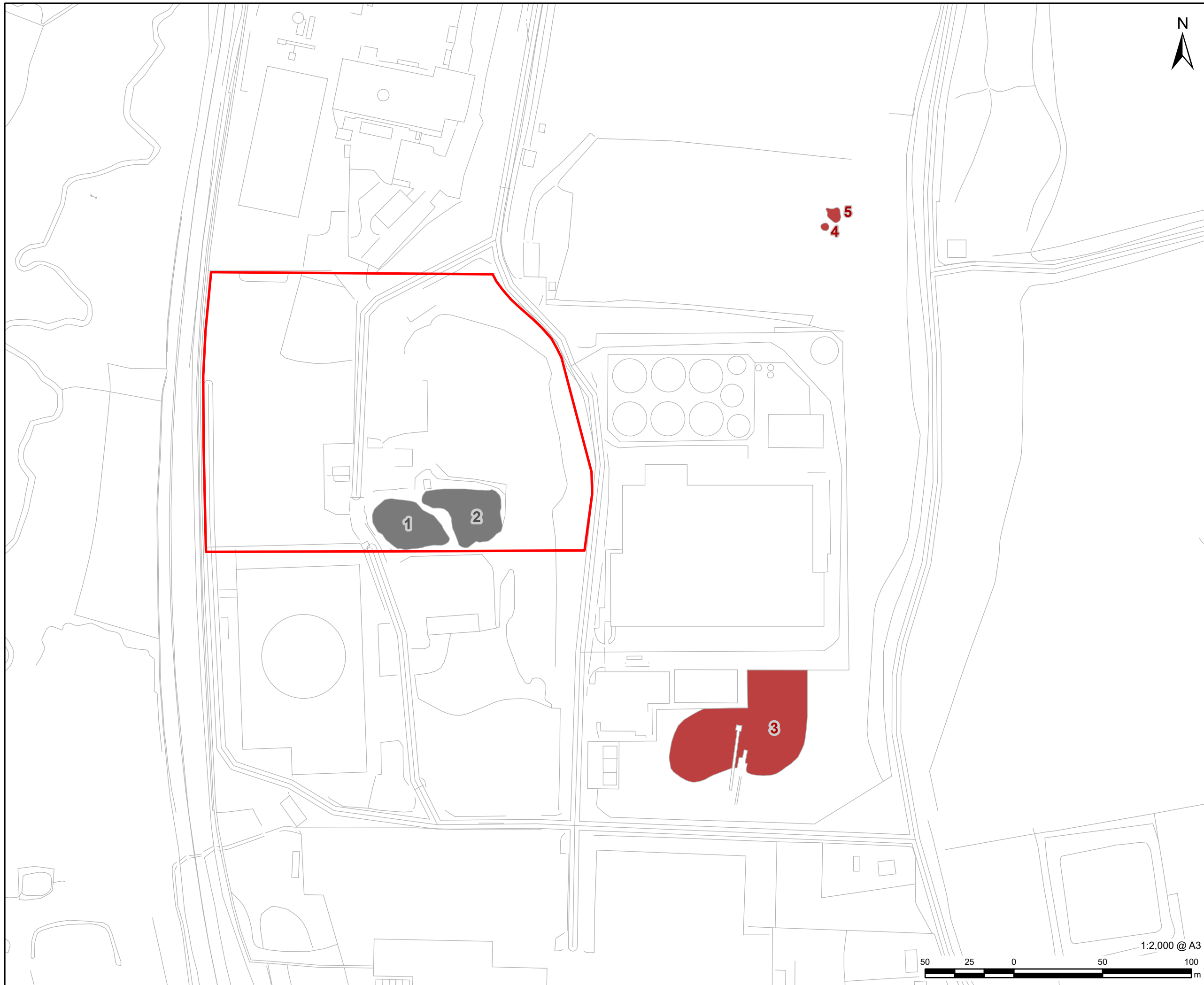
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Wildlife and Countryside Act (as amended) 1981. London: HMSO.



LEGEND

	Site Boundary
	GCN absent
	No access – GCN assumed absent

NOTES
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ISSUE PURPOSE
DRAFT
PROJECT NUMBER
60586541
FIGURE TITLE
Pond Locations

FIGURE NUMBER
Figure 1



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Appendix A Full Habitat Suitability Index Assessment Data

HSI criteria/ score definition		Waterbody reference/ Suitability Index score				
		1	2	3	4	5
SI - Location	Ponds are scored according to their geographic location: A = optimal (north, central and southern England); B = marginal; C = unsuitable	No Access	No Access	1	1	1
SI2 - Pond area	Calculated based on pond area			>2000 m ² (excluded)	0.1	0.5
SI3 - Pond drying	Never dries = 0.9; Rarely dries 1.0; sometimes dries = 0.5; dries annually 0.1			0.9	0.5	0.5
SI4 - Water quality	Good = 1.0; Moderate = 0.67; Poor 0.33; Bad = 0.01			0.33	0.67	0.67
SI5 - Shade	Calculated as a percentage; shading in excess of 60% progressively reduces pond value for great crested newt			1	1	1
SI6 - Fowl	Absent = 1; Minor = 0.67; Major = 0.01			0.67	1	1
SI7 - Fish	Absent = 1; Possible = 0.67; Minor = 0.33; Major = 0.01			0.67	1	1
SI8 - Ponds	Number of ponds occurring within 1km of survey pond, divided by Pi (3.14). Exclude ponds where major barriers such as roads exist			0.9	0.9	0.9
SI9 - Terrestrial habitat	Good = 1; Moderate = 0.67; Poor 0.33; Bad = 0.01			0.33	1	1
SI10 - Macrophytes	Estimated percentage value of macrophyte cover (sum of emergent, floating, submerged plants reaching the surface except duckweed)			0.3	0.3	0.3
HSI score		N/A	N/A	0.61 Average	0.62 Average	0.73 Good

Appendix B Conventional Presence/ Absence Survey Results

Pond Reference	Survey visit (date)	Egg searching	Torching	Netting
3	1 (24/03/2022)	Not completed	1x Frog	Not completed
	2 (07/04/2022)	Not completed	None	Not completed
	3 (25/04/2022)	Not completed	None	Not completed
	4 (28/04/2022)	Not completed	None	Not completed
4	1 (07/04/2022)	Smooth newt egg present	3 x male smooth newt	None
	2 (25/04/2022)	None	None	None
	3 (28/04/2022)	None	6x female smooth newt	None
	4 (03/05/2022)	None	3x male smooth newt 3x female smooth newt	None
5	1 (07/04/2022)	None	1 x smooth newt	None
	2 (25/04/2022)	None	None	None
	3 (28/04/2022)	None	None	None
	4 (03/05/2022)	None	None	None

Appendix D - Fugitive Releases Risk Assessment

Hazardous Event			Risk Assessment			Controls and Mitigations	Mitigation	Residual
Event	Pathway	Receptor	Probability	Consequence	Risk		Factor	Risk
1. Releases To Air								
Dust, particulates and litter during loading and unloading of vehicles	▪ Air	▪ Staff ▪ Public ▪ Local Environment	6	2	12	<ul style="list-style-type: none"> Loose RDF is loaded into bulk wagon inside the MBT building and covered prior to transfer to the external storage area. Baled RDF is loaded into a curtain sider inside the MBT building and curtain secured prior to transfer to the external storage area. CLO materials will be loaded into skips/containers within the MBT building and will be covered prior to transfer to the external storage area. Site is equipped with equipment which can be used to suppress levels of dust and particulates. All loads leaving the site are fully covered to minimise the potential for material becoming airborne. Site operators and drivers are fully trained. <p>Material clean-up via road sweeping is utilised in the event of a spillage.</p>	5	2.4
Windblown dust from external roads, pathways and other surfaces	▪ Air	▪ Public ▪ Staff	5	2	10	<ul style="list-style-type: none"> A hard surfaced access road is provided from the site entrance on Langhurstwood Road. Speed restrictions of 10mph will be imposed for all vehicles driving on the site, in order to minimise emissions of dust from internal road surfaces All vehicles using the installation will be required to ensure that all loads are adequately sheeted or otherwise contained prior to exiting the site onto the public highway. Road and yard surfacing are subject to routine inspection and maintenance – any accumulation of materials is removed promptly. Water suppression to abate dust emissions is available for use during dry periods. 	5	2
Windblown emissions from storage of RDF and	▪ Air	▪ Public ▪ Staff ▪ Local environment	5	2	10	<ul style="list-style-type: none"> RDF will be stored baled in curtain-sided trailers with curtain secure or as loose RDF in covered bulk wagons; CLO will be stored in enclosed containers or skips; 	5	2

Hazardous Event			Risk Assessment			Controls and Mitigations	Mitigation Factor	Residual Risk
Event	Pathway	Receptor	Probability	Consequence	Risk			
CLO in newly proposed area.						<ul style="list-style-type: none"> Good housekeeping standards will ensure that the site areas are kept clean to prevent build-up of spillage waste Use of appropriate dust suppression systems to maintain the condition of the stockpiles during dry, windy conditions. 		
2. Releases to Land and Water								
Spillage of waste and materials during the operation	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Surface water Ground water Sewer system 	4	3	12	<ul style="list-style-type: none"> Operator checks daily for signs of leak and repairs are dealt with promptly if identified. High standards of housekeeping are maintained across the site. Spill kits are available to deal with any leaks. 	5	2.4
Contaminated surface run-off	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Surface water Groundwater Sewer system 	4	4	16	<ul style="list-style-type: none"> Site surfacing for all areas accessed by vehicles are concrete designed to an appropriate standard and contains anti-crack mesh to improve surface durability. 	5	3.2
Groundwater Contamination	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Ground water 	4	4	16	<ul style="list-style-type: none"> RDF storage area will be equipped with drainage which will direct surface run-off to the new lagoon. Water will be tested to ensure it can be discharged to the wider site surface water management system. If water quality prevents release to the surface water management system then water will be removed from the lagoon by tanker or similar for recycling or processing at the MBT plant. The CLO storage area will include a separate engineered site drainage system which allows the collection of potentially contaminated runoff, which will be directed for recycling or processing at the MBT plant. Drainage systems will be subject to routine inspection along with a preventative maintenance regime. Emergency spills kits used in conjunction with a site emergency response plan (GF17-01) is available to help mitigate the effects of any contamination. 	5	3.2
3. Nuisance Issues								
Mud/litter carried onto highway	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Public 	5	2	10	<ul style="list-style-type: none"> The site will implement the Litter Management Plan (BWS LMP [WS212]). All incoming loads from the MBT plant and outgoing loads will be contained or sheeted. 	5	2

Hazardous Event			Risk Assessment			Controls and Mitigations	Mitigation Factor	Residual Risk
Event	Pathway	Receptor	Probability	Consequence	Risk			
						<ul style="list-style-type: none"> All internal roads and storage areas are hard-surfaced with concrete or tarmac and swept regularly. A wheel wash is provided adjacent to the weighbridge. This mechanical wheel wash will be maintained in accordance with the manufacturer's instructions and the water will be recirculated where possible. When deemed necessary by the Plant Manager, MBT vehicles exiting the installation will use the wheel wash in order to prevent materials being deposited on the highway 		
Pest, vermin and scavengers	<ul style="list-style-type: none"> land 	<ul style="list-style-type: none"> Staff Public 	4	1	4	<ul style="list-style-type: none"> Use of registered pest control contractors and rodenticide will be considered if required. Implementation of a site Pest Management Plan (BSW PMP [WS213]). 	6	0.67
4. Odour								
Odour from loading, and storage RDF	<ul style="list-style-type: none"> Air 	<ul style="list-style-type: none"> Staff Public 	6	3	18	<ul style="list-style-type: none"> Loose RDF is loaded into enclosed containers inside the MBT building prior to transfer to the external storage area. Baled and plastic-wrapped RDF is loaded into a curtain sider inside or adjacent to the MBT building and curtain secured prior to transfer to the external storage area. RDF will be stored baled in curtain-sided trailers with curtain secure or as loose RDF in enclosed containers; Staff training includes raising employee awareness with respect to normal plant operational odour levels and actions to be taken to rectify any faults. Dust suppression available when required. Mist sprays can be supplemented with de-odourising agents if required. Rejection of highly odorous materials at acceptance stage screening for the MBT will minimise the risk of highly odorous materials being transferred to the new RDF transfer and storage area. Material to be stored for a maximum of 3 days in the waste storage and transfer area. Implement odour management plan (60586541-ACM-XX-00-RP-MBT-OMP-R01). 	5	3.8

Hazardous Event			Risk Assessment			Controls and Mitigations	Mitigation	Residual
Event	Pathway	Receptor	Probability	Consequence	Risk		Factor	Risk
Odour release from storage of CLO	<ul style="list-style-type: none"> Air 	<ul style="list-style-type: none"> Staff Public 	6	3	18	<ul style="list-style-type: none"> CLO materials will be loaded into enclosed containers within the MBT building prior to transfer to the external storage area. CLO will be stored in enclosed containers; Staff training includes raising employee awareness with respect to normal plant operational odour levels and actions to be taken to rectify any faults. Material to be stored for a maximum of 3 days. Implement odour management plan (60586541-ACM-XX-00-RP-MBT-OMP-R01). 	5	3.8
5. Noise and Vibration								
Noise from vehicles delivering/collecting waste	<ul style="list-style-type: none"> Air 	<ul style="list-style-type: none"> Staff Public 	6	3	18	<ul style="list-style-type: none"> Reversing is minimised where possible Engines are switched off when not in use. Vehicles will arrive/depart from the site in accordance with the current hours permitted by planning. Implement Noise and Vibration Management Plan (60586541-ACM-XX-00-RP-MBT-NVMP-R01) and associated Noise Management Procedure (BWS 214 NMP) and Vibration Management Procedure (BSW VMP). 	5	3.6
Noise from on-site mobile plant movements	<ul style="list-style-type: none"> Air 	<ul style="list-style-type: none"> Staff Public 	6	3	18	<ul style="list-style-type: none"> Mobile plant is maintained in accordance with manufacturer's recommendations to ensure potential vehicle noise is minimised. Plant operator training includes using the plant effectively to minimise noise emissions, switching off when not in use, ensuring daily vehicle checks are completed to identify defects as early as possible and ensuring vehicle inspection hatches are kept closed when vehicle in use. Implement Noise and Vibration Management Plan (60586541-ACM-XX-00-RP-MBT-NVMP-R01) and associated Noise Management Procedure (BWS 214 NMP) and Vibration Management Procedure (BSW VMP). 	5	3.6

Appendix E – Noise Assessment

Biffa Brookhurst Wood

Mechanical Biological Treatment Storage Variation
Noise Impact Assessment

Biffa Waste Services Limited

Project number: 60586541

2 February 2022

Quality information

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1. Introduction

1.1 Context

AECOM has been appointed by Biffa Waste Services Ltd to undertake an environmental noise impact assessment for their Brookhurst Wood site to support a planning application for a new storage area for refuse-derived fuel (RDF) associated with the Mechanical Biological Treatment (MBT) facility on the site, alongside associated rerouting of heavy goods vehicles (HGVs) within the site.

There is no proposed change to existing plant, processing methods on site, or the numbers or timings of vehicles entering and exiting the site. As such, there is not anticipated to be any change to the traffic on surrounding public roads as a result of the development. The proposed storage area is anticipated to comprise of 12 walled parking bays, each bay containing space for three HGVs. The total hardstanding area for HGV parking and manoeuvring will occupy a footprint of approximately 160m x 50m on the western side of the site.

This report provides an assessment of the noise impacts arising from the RDF storage area. Sound emissions from vehicle movements associated with the proposed development have the potential to cause impacts beyond the application site boundary. As fixed plant and other associated sound from the MBT facility are unchanged and will be accommodated within the existing restrictions for the whole site, these have not been assessed.

A brief summary of acoustic theory and terms used within this report is provided in Appendix A. Plans showing the application site redline boundary and existing and proposed site layouts are provided in Appendix B.

1.2 Site Description and Nearest Receptors

The site is located in the northern part of West Sussex, approximately 1 km to the north of Horsham and approximately 7 km to the west of Crawley. The village of Warnham is also approximately 1 km to the southwest. In the immediate surroundings of the proposed development site are:

- An existing landfill site to the north, with residential properties beyond;
- Langhurst Wood Road, beyond the existing MBT to the east, with woodland, agricultural land, and a few residential properties beyond;
- An industrial unit with external storage to the south, with a few residential properties nearby; and
- The Mole Valley Line railway to the west, with woodland, agricultural land, and a few residential properties beyond.

The nearest noise-sensitive receptors are detailed below in Table 1. A location plan of the local area showing receptor and noise monitoring positions is provided in Appendix B.

Table 1. Environmental Noise Receptors

Receptor ID	Description	Approx. Grid Coordinates	Approx. Distance from Site (m)	Direction from Planning Application Site Boundary
R1	South Lodge	517470, 134924	600	Northeast
R2	Graylands Lodge	517422, 134572	350	East
R3	Bramblehurst	517388, 134230	400	Southeast
R4	Cox Farm	516692, 134685	350	West
R5	Gunbarn / The Nowhere House	516855, 135411	900	Northwest

2. Planning Policy Context and Guidance

2.1 National Planning Policy Framework

Section 15 of the National Planning Policy Framework (NPPF)¹ explains the national planning policy with regard to conserving and enhancing the natural environment and how local planning authorities should determine planning applications with regard to noise and vibration.

Paragraph 174 states that:

“Planning policies and decisions should contribute to and enhance the natural and local environment by:... e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.”

Paragraph 185 states that:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

2.2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE)² seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

The statement sets out the long-term vision of the government’s noise policy, which is to “*promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development*”.

This long-term vision is supported by three aims:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- a) avoid significant adverse impacts on health and quality of life;*
- b) mitigate and minimise adverse impacts on health and quality of life; and*
- c) where possible, contribute to the improvements of health and quality of life.’*

The Explanatory Note within the NPSE provides further guidance on defining ‘significant adverse effects’ and ‘adverse effects’ using the following concepts:

- No Observed Effect Level (NOEL) – the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) – the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) – the level above which significant adverse effects on health and quality of life occur.

¹ Ministry of Housing, Communities and Local Government (MHCLG) (2021) National Planning Policy Framework

² Department of Environmental Food and Rural Affairs (Defra) (2010); Noise Policy Statement for England (NPSE)

With reference to the SOAEL, the NPSE states:

“It is recognised that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.”

For situations where noise levels are between the LOAEL and SOAEL, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur.

2.3 Planning Practice Guidance: Noise

The Planning Practice Guidance (PPG)³ for noise advises that: *“Noise needs to be considered when development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced)”*.

It also provides guidelines that are designed to assist with the implementation of the NPPF. The PPG states that local planning authorities should take account of the acoustic environment and in doing so consider:

- *“whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur; and*
- *whether or not a good standard of amenity can be achieved.”*

Factors to be considered in determining whether noise is a concern are identified including the absolute sound level of the source, the existing ambient sound climate, time of day, frequency of occurrence, duration, character of the sound and cumulative effects.

Further details on the hierarchy of noise effects are presented in Table 2, which has been reproduced from PPG.

³ MHCLG (2019); Planning Practice Guidance: Noise <https://www.gov.uk/guidance/noise--2>

Table 2. Planning Practice Guidance Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

2.4 British Standard 4142:2014+A1:2019

British Standard (BS) 4142:2014+A1:2019⁴ 'Methods for rating and assessing industrial and commercial sound' describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from fork-lift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The determination of noise amounting to a nuisance is beyond the scope of BS 4142.

A key aspect of the BS 4142 assessment method is a comparison between the background sound level in the vicinity of receptor locations and the rating level of the sound source under consideration. The relevant parameters in this instance are as follows:

- Background sound level – $L_{A90,T}$ – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels;

⁴ British Standards Institute (2014 with 2019 amendments) BS 4142 – Methods for rating and assessing industrial and commercial sound, BSI, London.

- Specific sound level – $L_{Aeq,Tr}$ – the equivalent continuous ‘A’ weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r ; and
- Rating level – $L_{Ar,Tr}$ – the specific sound level plus any adjustment made for the characteristic features of the noise.

The standard recognises that certain acoustic features of a sound source can increase the impact over that expected based purely on the sound level. The standard identifies the following features to be considered:

- Tonality - a penalty of 2 dB is applied for a tone which is just perceptible at the receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible;
- Impulsivity - a penalty of 3 dB is applied for impulsivity which is just perceptible at the receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible. An impulse is defined as the sudden onset of a sound;
- Intermittency - a penalty of 3 dB can be applied if the intermittency of the specific sound is readily identifiable against the residual acoustic environment at the receptor i.e. it has identifiable on/off conditions;
- Other sound characteristics - a penalty of 3 dB can be applied where the specific sound features characteristics that are neither tonal nor impulsive but are readily distinctive against the residual acoustic environment.

Once any adjustments have been made, the background level and the rating levels are compared. BS4142 advises the following:

- a. *“Typically, the greater the difference, the greater the magnitude of impact.”*
- b. *“A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.”*
- c. *“A difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context.”*
- d. *“The lower the rating level is to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon the context.”*

For indicative assessment purposes and with reference to NPSE, the LOAEL is set at a rating level equal to the background sound level and the SOAEL is set at a rating level of +10 dB above background, although it should be remembered that the context assessment can vary the overall significance of effects.

It should be noted that the assessment method described in BS 4142 does not require the assessment of worst-case predictions and is generally applicable to a typical situation. However, some worst-case assumptions may be applied to improve robustness of conclusions and should be discussed as part of the assessment uncertainty.

3. Baseline Conditions

3.1 Overview

Baseline sound monitoring was carried out to establish the existing sound climate in the area. The monitoring procedures followed guidance from BS 7445-1:2003⁵ and BS 4142.

Baseline sound measurements were undertaken from 26th February to 4th March 2019 at locations representative of the surrounding residential receptors closest to the application site boundary. The measurement locations were considered to provide the optimal secure position to capture representative background sound levels at receptors.

- Location 1 (Long-term) – Located on the junction with Langhurst Wood Road and the entrance to the site. This location is considered representative of receptors R1, R2 and R3.
- Location 2 (Long-term) – Located along Dorking Road on a green area outside Sussex Healthcare Headquarters. This location is considered representative of receptors R4 and R5.

These locations are illustrated in Appendix B.

Sound monitoring was undertaken with meters mounted on a tripod 1.5 m above ground level, under free-field conditions (i.e. greater than 3.5 m away from any reflective surface other than the ground).

Details of the instrumentation used during the surveys are given in Appendix C.

The equipment was set to measure the L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} values, with the long-term monitors logging at contiguous periods of 15-minutes throughout the monitoring period. The equipment was checked prior to and after the monitoring periods; no significant changes (± 0.1 dB) were noted.

Background sound measurements were undertaken in early 2019 and, as such, were prior to any lockdown measures or other effects of the COVID-19 pandemic (restrictions first implemented from March 2020), which may have temporarily changed the local ambient sound environment. Therefore, this data is considered still valid for the purpose of determining present-day sound impacts.

Additional industrial sound sources from recent or committed developments at the site may increase background sound levels and thus reduce the impact of new or modified sound sources. The use of the 2019 background sound levels provides a robust assessment of the sound impact from the development.

3.2 Meteorological Conditions

Weather conditions over the measurement period were conducive to sound measurements and generally within the recommended limits in BS 4142 (i.e. wind speeds less than 5 ms^{-1} and no precipitation).

3.3 Observations

At Location 1, the sound climate was dominated by road traffic along Langhurst Road as well as HGVs entering and leaving the site entrance. Plant noise was also heard coming from the existing Biffa Brookhurst Wood site at this location.

At Location 2, the sound climate was dominated by road traffic from Dorking Road. No plant noise was audible at this location.

3.4 Measurement Data

A summary of the long-term measured ambient (L_{Aeq}) and background (L_{A90}) noise levels is given in Table 3 (Location 1, representative of R1, R2 and R3) and Table 4 (Location 2, representative of R4 and R5) over daytime, evening and night-time periods. Time history charts of the long-term sound monitoring data are provided in Appendix D.

⁵ British Standards Institute (2003) BS 7445 – Description and measurement of environmental noise – Part 1: Guide to quantities and procedures, BSi, London.

Table 3. Summary of Long-term Baseline Noise Measurement Results – Location 1

Date	Daytime 07:00-19:00		Evening 19:00-22:00		Night-time 22:00-07:00	
	L _{Aeq,12h} (dB)	L _{A90,12h} (dB)	L _{Aeq,3h} (dB)	L _{A90,3h} (dB)	L _{Aeq,9h} (dB)	L _{A90,9h} (dB)
26/02/2019 ^(note 1)	61	54	57	55	56	52
27/02/2019	61	55	57	54	56	52
28/02/2019	61	55	56	53	54	49
01/03/2019	61	54	56	53	53	51
02/03/2019	57	54	55	53	52	50
03/03/2019	58	54	55	51	56	51
04/03/2019 ^(note 2)	63	56	N/A	N/A	N/A	N/A
<i>Average</i>	<i>60</i>	<i>55</i>	<i>56</i>	<i>53</i>	<i>55</i>	<i>51</i>

Note 1: Start time 11:00 hours. Note 2: End time 14:15 hours

Table 4. Summary of Long-term Baseline Noise Measurement Results – Location 2

Date	Daytime 07:00-19:00		Evening 19:00-22:00		Night-time 22:00-07:00	
	L _{Aeq,12h} (dB)	L _{A90,12h} (dB)	L _{Aeq,3h} (dB)	L _{A90,3h} (dB)	L _{Aeq,9h} (dB)	L _{A90,9h} (dB)
26/02/2019 ^(note 1)	67	54	65	54	63	45
27/02/2019	67	54	64	49	62	41
28/02/2019	67	55	64	47	61	34
01/03/2019	67	54	64	47	59	40
02/03/2019	67	54	63	49	58	41
03/03/2019	67	56	64	50	62	45
04/03/2019 ^(note 2)	67	55	N/A	N/A	N/A	N/A
<i>Average</i>	<i>67</i>	<i>54</i>	<i>64</i>	<i>49</i>	<i>61</i>	<i>41</i>

Note 1: Start time 11:45 hours. Note 2: End time 14:00 hours

4. Operational Plant Noise Assessment

4.1 Acoustic Modelling Methodology

SoundPLAN acoustic modelling software (version 8.2) implementing the calculation procedures of ISO 9613⁶ has been employed to predict the propagation of noise from the site in all directions and to quantify resultant sound levels at the identified noise-sensitive receptor locations.

The following assumptions and parameters were used to prepare the acoustic model:

- The ground absorption has been set to 0.5 (i.e. assumed mixed hard/soft absorptive ground conditions);
- Air temperature was assumed to be 10 degrees and humidity 70%;
- Building footprints and land topography in the surrounding area has been sourced from Ordnance Survey Open Map data;
- Building heights outside of the site boundary have been modelled with a standard height of 8 m;
- HGV sound emissions have been modelled as an area source with a height of 1 m;
- Receiver points have been modelled as 1.5m above local ground level (representative of ground-floor windows during the day and evening);
- The maximum order of reflections was 3;
- No fences/walls at the site boundary have been included in the noise model, although the 4.8 m parking walls associated with the parking bays have been modelled; and

The main sound sources associated with the proposed development are the HGV movements. As source sound level data is not available for the proposed HGV movements, sound power levels have been obtained from BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites – Noise' Appendix C (Ref C.11.11).

The sound power levels included in the model are set out in Table 5.

Table 5. Sound Power Levels

Source	Source Type (Sound Power Descriptor)	Sound Power Levels at Octave Band Centre Frequency (Hz), dB L _w								Total A- Weighted, dB L _w
		63	125	250	500	1000	2000	4000	8000	
Single Vehicle Pass-by	Area source (dB L _w per unit)	96	79	75	79	82	80	72	67	114

The model calculates the sound level for one vehicle movement. The total sound level for a given hour can be determined by applying corrections for the typical number of vehicle movements in one hour, and for the duration of a single vehicle movement.

In total, 196 daily vehicle movements are understood to occur during each 11-hour day (07:00-18:00). An hourly average of 17.8 vehicle movements has been assumed to be typical. Each vehicle movement duration is assumed to last for approximately 5 minutes. These assumptions are discussed in Uncertainty (4.4).

The number of events and on-time corrections have been calculated based on the below formulae:

Number of events correction, N = 10×log(Number of vehicle movements in one hour)

On-time correction, T = 10×log(Duration of a single event in minutes ÷ 60)

Total sound level = Sound level for one vehicle movement + N + T

⁶ ISO 9613, Acoustics – Attenuation of Sound During Propagation Outdoors. Part 1: Calculation of the absorption of sound by the atmosphere (1993) and Part 2: General Method of Calculation (1996).

4.2 Modelling Results

Appendix E presents a sound contour plot of the operational acoustic model at a reference height of 1.5 m, with a 10 m x 10 m grid resolution. This illustrates the relative locations of sound sources; the site location; and locations of noise-sensitive receptors.

Table 6 summarises the predicted daytime sound levels at the nearest noise-sensitive receptors relative to the operational site. Predictions are daytime only, and as such first-floor predictions are not considered applicable. All predictions are for ground floor, at a height of 1.5 m. No evening or night-time activity is anticipated.

Table 6. Predicted Noise Levels at Sensitive Receptors

Receptor	Predicted Noise Level (Free-field), dB L _{Aeq,T}
R1 South Lodge (day/evening)	33
R2 Graylands Lodge (day/evening)	39
R3 Bramblehurst (day/evening)	26
R4 Cox Farm (day/evening)	35
R5 Gunbarn / The Nowhere House (day/evening)	31

4.3 Assessment

In the determination of rating levels (per guidance from BS4142 section 9.2 'Subjective method'), a +9 dB acoustic feature correction has been applied to the predicted levels set out in Table 6 as a worst-case estimate, comprising +3 dB for intermittency and +6 dB to account for the possibility of tonal reversing alarms. This is a robust estimate that assumes there are periods of lulls in vehicle movements and background sound such that individual movements may be distinctly identifiable, and assumes that there are tonal reversing alarms which are highly perceptibly tonal at the receptors, which may not be the case.

Predicted rating levels have been compared against representative background levels (as established in Table 3 and Table 4) at each receptor to assess impacts per BS 4142 guidance and the NPSE LOAEL/SOAEL thresholds. These results are found in Table 7.

Table 7. BS4142 Assessment – Daytime (07:00-18:00)

Receptor	Predicted Rating Level, dB L _{Ar,Tr}	Background Level, dB L _{A90,T}	Difference between Rating and Background Level, dB	BS4142 Guidance	Effect Level
R1 South Lodge	42	55	-13	'Low impact'	Below LOAEL
R2 Graylands Lodge	48	55	-7	'Low impact'	Below LOAEL
R3 Bramblehurst	35	55	-20	'Low impact'	Below LOAEL
R4 Cox Farm	44	54	-10	'Low impact'	Below LOAEL
R5 Gunbarn / The Nowhere House	40	54	-14	'Low impact'	Below LOAEL

Predicted rating levels are below the LOAEL for all assessment time periods and are sufficiently below background sound levels such that BS 4142 advises this is a 'low impact' depending on context.

4.3.1 Context

It should be noted that the development does not result in additional HGV movements, only a change in location of the movements on site. The residual acoustic environment must also be considered, comprising substantial proportion of anthropogenic sources, including the existing industrial and commercial sounds from the facility operations nearby, as well as road traffic noise from the A24 and A264 to the west and south respectively, and occasional railway noise. As such, the nature of the area will not be changed due to the development. The context is considered to be neutral to marginally favourable towards the site, and thus the predicted impact will not be changed due to these contextual factors.

4.4 Uncertainty

Uncertainty considerations include those associated with measurements, modelling predictions, and assessment assumptions.

Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a sample of the ambient levels. Every effort has been made such that measurements were undertaken in such a way as to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions, and school holiday periods (which are often considered to result in atypical sound levels). However, a small degree of uncertainty will always remain in the values taken from such a measurement survey. The measurement equipment used for the survey has a defined inherent uncertainty of ± 0.5 dB associated with the recorded values.

Modelling predictions provide a single-number prediction based on a single set of parameters using simplified calculation methods to determine the sound propagation. The calculation method in ISO 9613-2 has a defined inherent uncertainty of ± 3 dB. Modelling assumptions are also subject to uncertainty, such as the assumed ambient temperature and humidity, ground absorption, and the precise geometry of objects and topography in the model. Efforts have been made to reduce these uncertainties and to make predictions based on typical parameters and using the most appropriate available data. The model also makes some worst-case assumptions, including assuming downwind sound propagation in all directions and using the sound power emissions from a medium-speed vehicle pass-by, whereas movements on site are likely to be slow, especially during parking manoeuvres.

Assessment assumptions include estimates of the duration of a single vehicle movement and the hourly number of vehicle movements. The 5-minute duration of a single vehicle movement is a robust worst-case assumption with vehicle movements predicted to ordinarily be substantially shorter in duration. The number of vehicle movements in a given hour assumes a typical value by taking the average of 196 movements over an 11-hour working day. There may be periods of higher numbers of vehicle movements at certain times of day, but this data is not available.

The above sources of uncertainty are not considered sufficient to materially alter the conclusions of this assessment.

4.5 Mitigation

PPG advises the following for sound levels below the LOAEL threshold: *“Noise may be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.”* With regards to the mitigation of sound levels below the LOAEL threshold, PPG advises the following: *“No specific measures required”*.

No adverse noise effects have been identified at any of the noise-sensitive receptors, and as such no further noise-specific mitigation measures are considered to be required.

5. Conclusions

AECOM has undertaken an environmental noise impact assessment of the proposed HGV delivery area at the Biffa Brookhurst Wood site.

A baseline survey was carried out in February and March 2019 to establish background sound levels at surrounding noise-sensitive receptors.

Sound levels as a result of operation of the proposed changes to the site have been predicted using acoustic modelling software. Operational sound levels have been assessed as below the LOAEL, and sufficiently below existing background sound levels such that there is a low likelihood of adverse effects on surrounding receptors or any increase to the local sound environment.

Based on the predicted sound levels and comparison with the existing sound climate, no specific noise mitigation measures are considered necessary or proposed.

Appendix A Glossary of Acoustic Terminology

Table A1. Glossary of Acoustic Terminology

Term	Definition
A" Weighting (dB(A))	The human ear does not respond uniformly to different frequencies. "A" weighting is commonly used to simulate the frequency response of the ear. It is used in the assessment of risk of damage of hearing due to noise.
Ambient Sound	Totally encompassing sound in a given situation at a given time usually composed of sound from many sources near and far (<i>The ambient sound comprises the residual sound and the specific sound when present</i>).
Background Sound Level $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Decibel (dB)	The range of audible sound pressures is approximately 2×10^{-5} Pa to 200 Pa. Using decibel notation presents this range in a more manageable form, 0dB to 140dB. Mathematically Sound Pressure level = $20 \log \{p(t)/p_0\}$ Where $P_0 = 2 \times 10^{-5}$ Pa.
Equivalent Continuous A-weighted Sound Pressure Level $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation: $L_{Aeq,T} = 10 \lg_{10} \left\{ \left(\frac{1}{T} \right) \int_{t_1}^{t_2} \left[p_A \frac{(t)^2}{p_0^2} \right] dt \right\}$ Where p_0 is the reference sound pressure (20μPA); and $P_A(t)$ is the instantaneous A-weighted sound pressure level at time t
Frequency (Hz)	The number of cycles per second, for sound this is subjectively perceived as pitch.
Frequency Spectrum	Analysis of the relative contributions of different frequencies that make up a noise.
Measurement Time Interval T	Total time over which measurements are taken (<i>This may consist of the sum of a number of non-contiguous, short-term measurement time intervals</i>)
Noise	Unwanted or unexpected sound. Note that national legislation definitions for noise include vibration.
Rating level $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound
Reference Time Interval, T_r	Specified interval over which the specific sound level is determined (<i>This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h</i>)
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound
Residual sound level $L_r = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound in a given situation at the assessment location over a given time interval, T.
Sound pressure level L_p	Equal to 20 times the logarithm to the base 10 of the ratio of the root mean squared (RMS) sound pressure to the reference sound pressure. In air the reference sound pressure is 2×10^{-5} Pa.
Sound power level L_w	Equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power. In air the reference sound power is 1×10^{-12} Pa.
Specific sound level $L_s = L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T.
Specific Sound Source	Sound source being assessed
$L_{A10,T}$	The A-weighted sound pressure level of the residual noise in decibels exceeded for 10% for a given time interval. This is the parameter defined by the government to describe road traffic noise
L_{Amax}	The maximum RMS A-weighted sound pressure level occurring within a specified time period. Fast time weighting indicates sound pressure level measurements undertaken using a 125-millisecond moving average time weighting period

Appendix B Figures

Figure 1. Environmental Noise-Sensitive Receptors and Sound Monitoring Locations

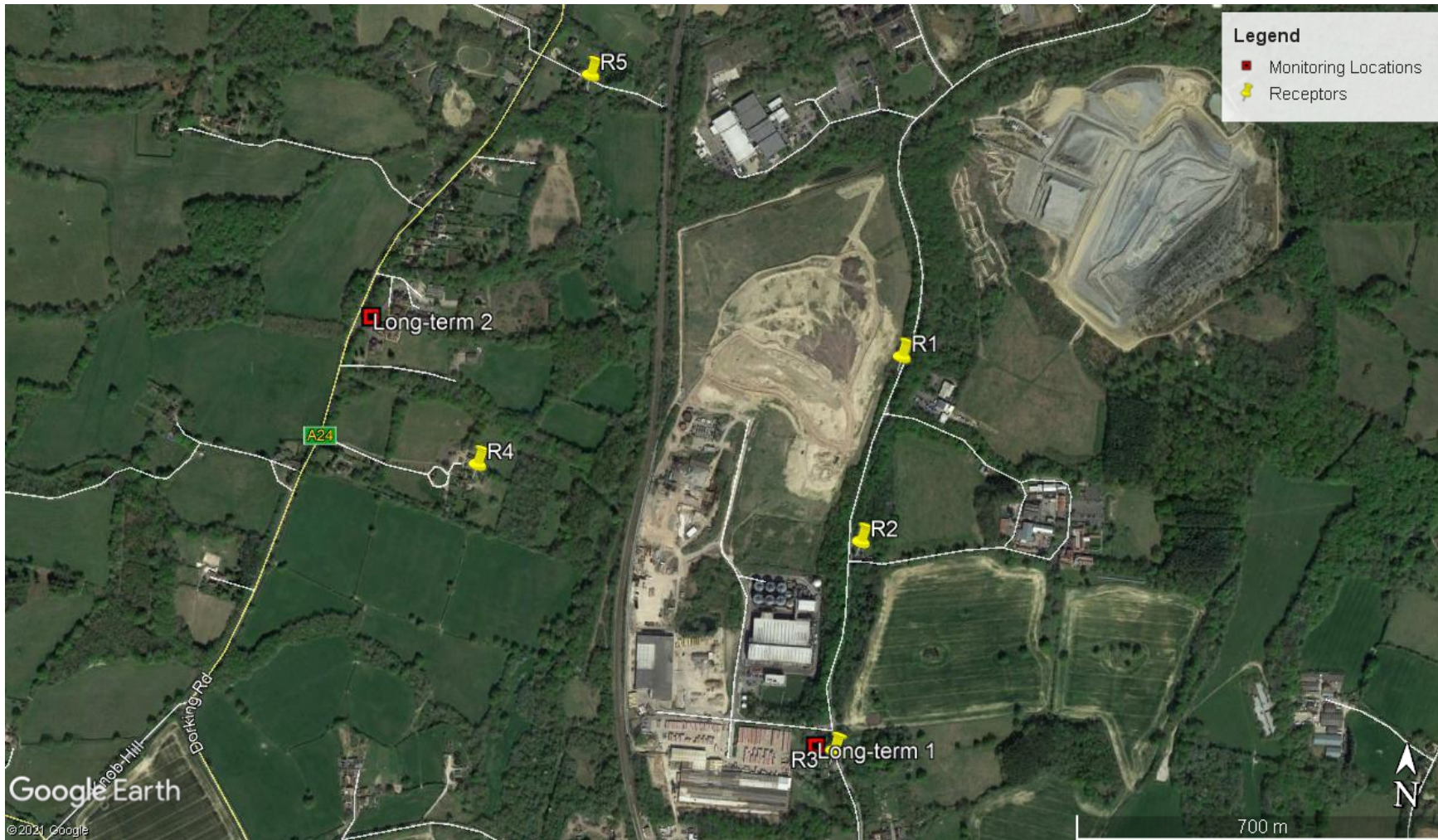


Figure 2. Site Location Plan

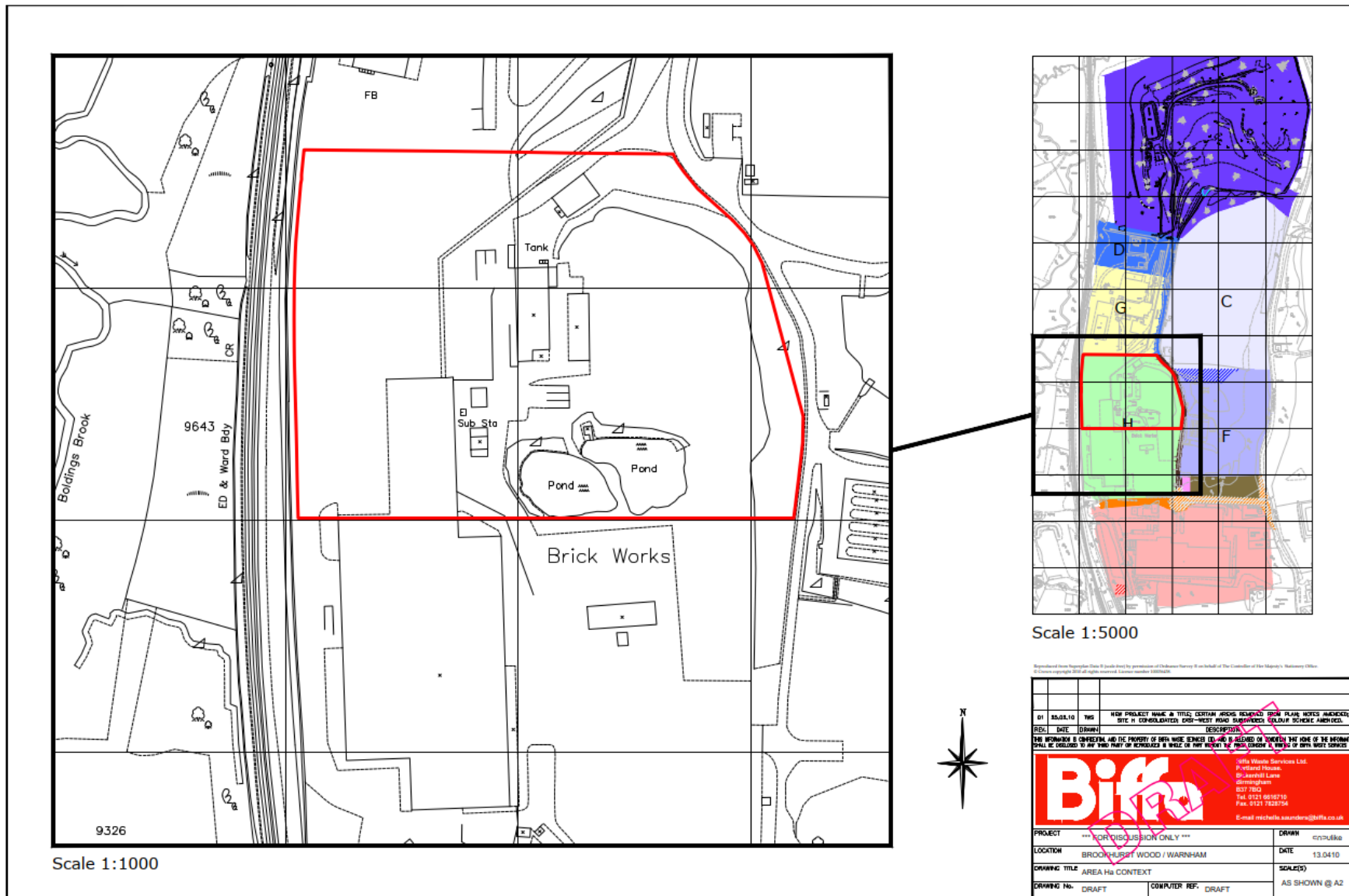
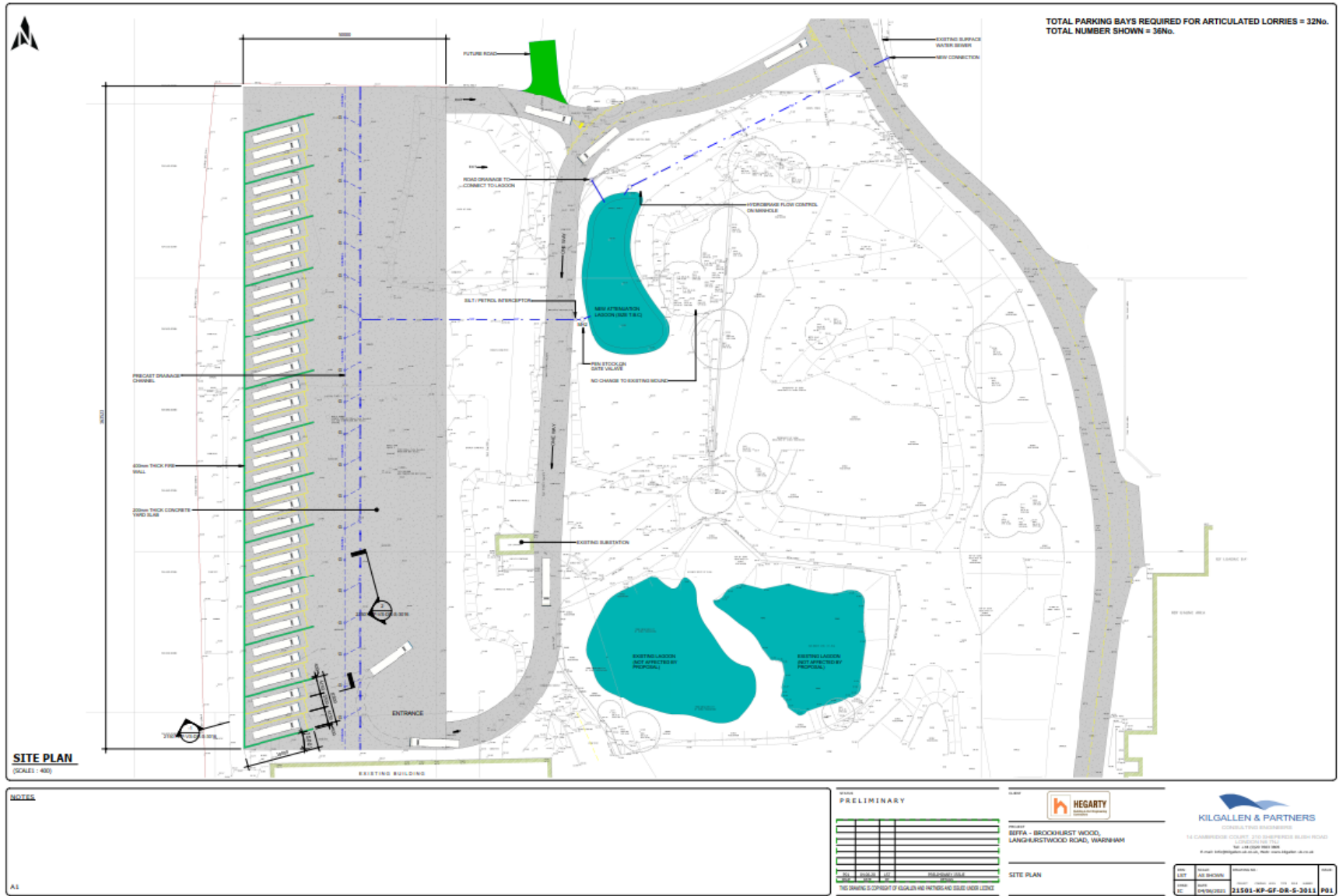



Figure 3. Proposed Site Layout Plan



Appendix C Instrumentation

Survey Location	Type	Make	Model	Serial Number
1	Class 1 sound level meter	01dB	DUO	12051
2	Class 1 sound level meter	01dB	DUO	12085
3	Class 1 sound level meter	01dB	DUO	12051
4	Class 1 sound level meter	01dB	DUO	12049
5	Class 1 sound level meter	01dB	DUO	12051
All	Class 1 acoustical field calibrator	Rion	NC-74	50541127

<h2 style="margin: 0;">Certificate of Calibration</h2> <p style="margin: 0;">Issued by University of Salford (Acoustics Calibration Laboratory) UKAS ACCREDITED CALIBRATION LABORATORY NO. 0801</p>		
Page 1 of 3		
APPROVED SIGNATORIES Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i> Gary Phillips [] Danny McCaul []		University of Salford MANCHESTER
acoustic calibration laboratory The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk		

Certificate Number: 03475/3

Date of Issue: 27 November 2017

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Aecom St George's House 5 St George's Road Wimbledon London SW19 4DR
FOR THE ATTENTION OF:	Matt Light
PERIODIC TEST DATE:	24/11/2017
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details

Manufacturer	01dB	
Model	DUO	
Serial number	12051	
Class	1	
Hardware version	LIS1005G	Application FW: 2.34. Metrology FW: 2.10

Associated Items	Microphone	Integral Preamplifier
Manu	GRAS	-
Model	40CD	-
Serial Number	233681	-



Test Engineer (initial):

GP

Name:

Gary Phillips

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<p>Page 1 of 3</p>		
<p>APPROVED SIGNATORIES</p> <p>Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i></p> <p>Gary Phillips [] Danny McCaul []</p>		
<p>acoustic calibration laboratory</p> <p>The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk</p>		

Certificate Number: 03639/2

Date of Issue: 13 March 2018

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Aecom St George's House 5 St George's Road Wimbledon London SW19 4DR
FOR THE ATTENTION OF:	Thomas Citrine
PERIODIC TEST DATE:	12/03/2018
TEST PROCEDURE:	CTP12 (Laboratory Manual)



Sound Level Meter Details

Manufacturer	01dB	
Model	DUO	
Serial number	12085	
Class	1	
Hardware version	LIS006E	Application FW: 2.35. Metrology FW: 2.12

Associated Items	Microphone
Manu	GRAS
Model	40CD
Serial Number	233520

Test Engineer (initial): GP Name: Gary Phillips

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<p>Page 1 of 3</p>		
<p>APPROVED SIGNATORIES</p> <p>Claire Lomax [x] Andy Moorhouse [] <i>C. Lomax</i></p> <p>Gary Phillips [] Danny McCaul []</p>		
<p>acoustic calibration laboratory</p> <p>The University of Salford, Salford, Greater Manchester, M5 4WT, UK http://www.acoustics.salford.ac.uk t 0161 295 3030/0161 295 3319 f 0161 295 4456 e c.lomax1@salford.ac.uk</p>		

Certificate Number: 03475/1

Date of Issue: 24 November 2017

PERIODIC TEST OF A SOUND LEVEL METER to IEC 61672-3:2006

FOR:	Aecom St George's House 5 St George's Road Wimbledon London SW19 4DR
FOR THE ATTENTION OF:	Matt Light
PERIODIC TEST DATE:	23 rd and 24 th November 2017
TEST PROCEDURE:	CTP12 (Laboratory Manual)

Sound Level Meter Details

Manufacturer	01dB	
Model	DUO	
Serial number	12049	
Class	1	
Hardware version	LIS1005G	Application FW: 2.34. Metrology FW: 2.12

Associated Items	Microphone	Integral Preamplifier
Manu	GRAS	-
Model	40CD	-
Serial Number	224175	-

Test Engineer (initial): GP Name: Gary Phillips

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CERTIFICATE OF CALIBRATION



0653

Date of Issue: 30 November 2018**Certificate Number: UCRT18/2191**

Issued by:

ANV Measurement Systems

Beaufort Court

17 Roebuck Way

Milton Keynes MK5 8HL

Telephone 01908 642846 Fax 01908 642814

E-Mail: info@noise-and-vibration.co.uk

Web: www.noise-and-vibration.co.uk

Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Page 1 of 2 Pages

Approved Signatory

K. Mistry

Customer AECOM Ltd
 St George's House
 5 St George's Road
 Wimbledon
 London
 SW19 4DR

Order No. 08215735 - GEN_GEN

Test Procedure Procedure TP 1 Calibration of Sound Calibrators

Description Acoustic Calibrator

Identification	Manufacturer	Instrument	Model	Serial No.
	Rion	Calibrator	NC-74	50541127

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No. UKAS18/11736

Date Received 29 November 2018

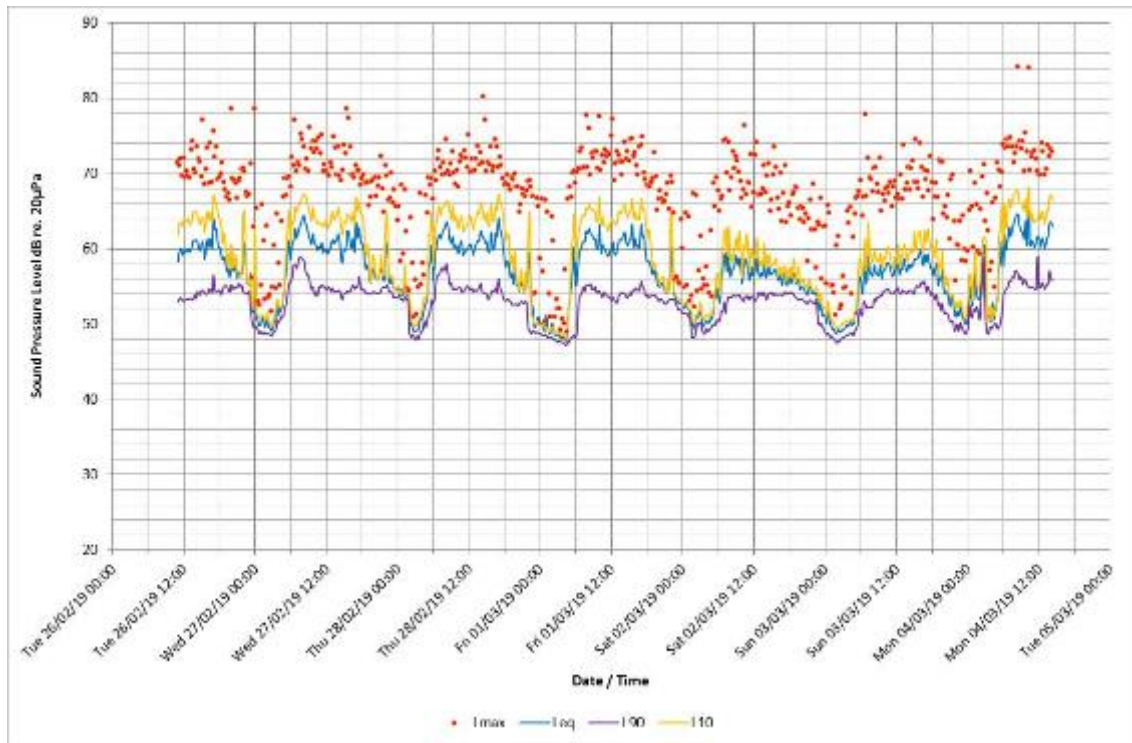
Date Calibrated 30 November 2018

Previous Certificate	<i>Dated</i>	20 November 2017
	<i>Certificate No.</i>	UCRT17/2044
	<i>Laboratory</i>	0653

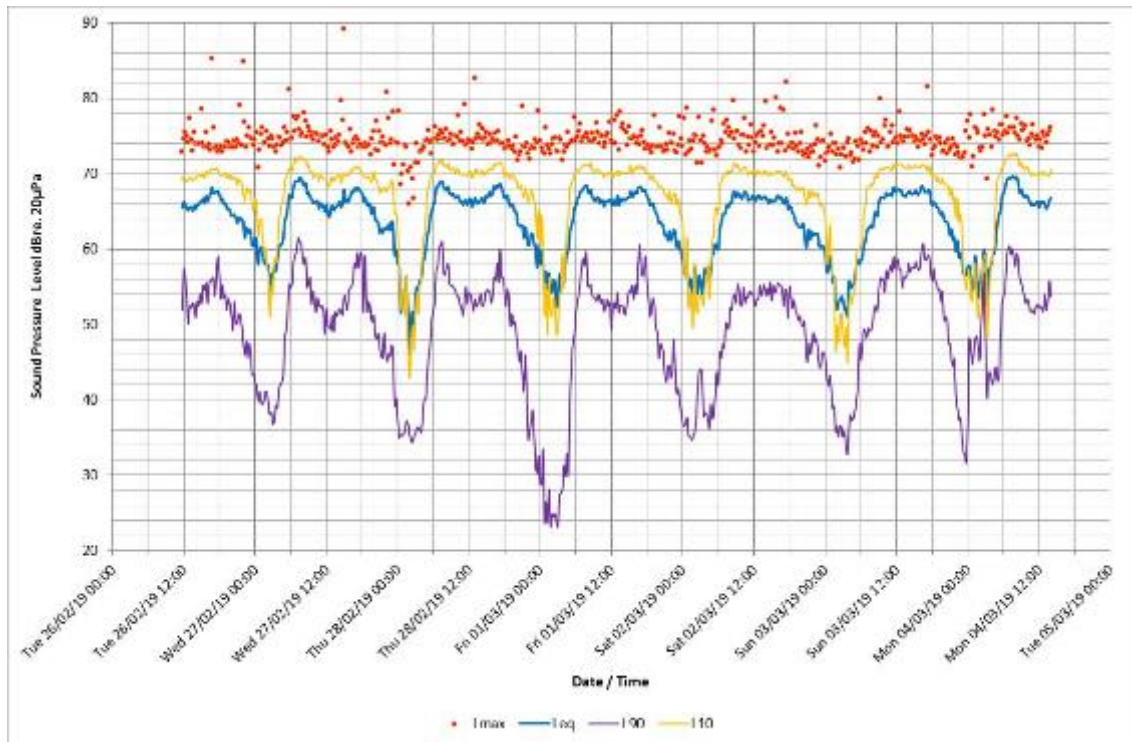
This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Appendix D Noise Monitoring Data

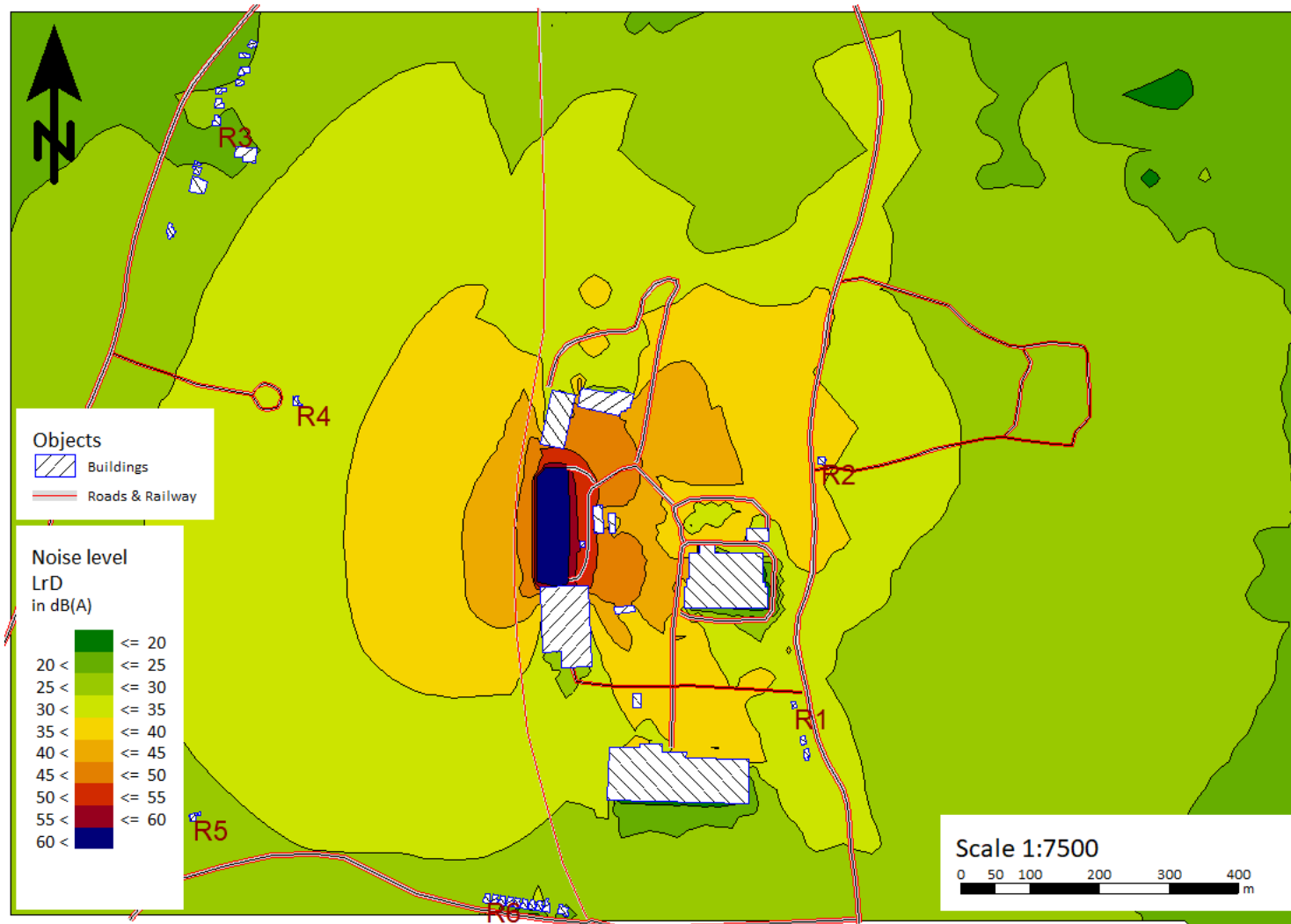
Time History Chart, Location 1



Time History Chart, Location 2



Appendix E Acoustic Modelling Contour Plot



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Appendix F – Abnormal Operations, Accident and Fire Risk Assessment

Hazardous Event			Risk Assessment			Controls and Mitigations	Mitigation Factor	Residual Risk
Event	Pathway	Receptor	Probability	Consequence	Risk			
Flooding	<ul style="list-style-type: none"> Water 	<ul style="list-style-type: none"> Surface or ground water 	2	4	8	<ul style="list-style-type: none"> Site is not located in a floodplain and no history of flooding Site drainage has been designed taking 1:30 year and 1:100 year flood events 	6	1.33
Main services failure	<ul style="list-style-type: none"> Air Water 	<ul style="list-style-type: none"> Staff Public 	4	1	4	<ul style="list-style-type: none"> Failure of mains services from the local grid will result in an emergency generator being utilised 	5	0.8
Operator Error	<ul style="list-style-type: none"> Air Water Land 	<ul style="list-style-type: none"> Staff Public 	5	3	15	<ul style="list-style-type: none"> Provision of appropriate operator training Technically competent person available at site Internal operational control procedures Strict compliance with site integrated management system 	5	3
Site Security Breach: <ul style="list-style-type: none"> entry by intruders damage to equipment theft fly-tipping arson 	<ul style="list-style-type: none"> Air Water Land 	<ul style="list-style-type: none"> Staff Public Surface or ground water 	4	3	12	<ul style="list-style-type: none"> Site secured by a perimeter fence and lockable gates Site monitored by CCTV All external waste storage areas utilise secure lockable containers Vehicle number recording system is utilised 	5	2.4
Major vehicle accident – leading to a significant loss of waste	<ul style="list-style-type: none"> Air Water Land 	<ul style="list-style-type: none"> Staff Public 	3	4	12	<ul style="list-style-type: none"> Site speed restrictions in place and compliance with highway speed restrictions Approved carriers (i.e. trained hauliers employed by WCA) Material clean-up arrangements in place. Road vehicles are robust and designed to withstand high speed collisions that may occur on public highways Suitable barriers to prevent moving vehicles damaging equipment 	5	2.4
Inappropriate waste storage (including incoming waste	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Staff Public 	5	1	5	<ul style="list-style-type: none"> RDF is stored baled on a curtain sided trailer or loose in an enclosed container . Storage of loaded vehicles takes place in the RDF designated trailer park area in the allocated bay. CLO is stored in enclosed containers in the dedicated CLO storage area with its separate drainage system. 	5	1

Hazardous Event			Risk Assessment			Controls and Mitigations	Mitigation Factor	Residual Risk
Event	Pathway	Receptor	Probability	Consequence	Risk			
and recycling plant outputs)						<ul style="list-style-type: none"> Storage of the RDF vehicles or the CLO containers allows for easy inspection. All handling of loose RDF and CLO materials takes place in the MBT building – only preloaded containers or vehicles will be stored in the new waste transfer and storage area and handling will be restricted to the movement of full or empty vehicles. Waste transfer and storage area will be away from watercourses and sensitive perimeters and within a secure area of the facility to prevent unauthorised access and vandalism. 		
Failure of containment on CLO Wastewater Sump	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Surface or ground water 	4	2	8	<ul style="list-style-type: none"> CLO drainage system and sump is designed in line with industry standards. Storage area will be inspected daily for accumulation of material in the drainage system or damage to integrity – repairs will be completed as a priority. Drainage sump will be emptied in the event that a leak is detected and repairs will be completed. 	5	1.6
Overflow of CLO Wastewater Sump	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Surface or ground water 	4	2	8	<ul style="list-style-type: none"> The sump will be equipped with a level alarm and level will be checked at daily intervals and following any significant period of heavy rain. Any material overflow will be directed to the lagoon – the material can then be sampled for testing prior to transfer to the MBT plant for processing. 	5	1.6
Contamination Detected in Surface Water Lagoon from RDF Storage Area	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Surface or ground water 	4	2	8	<ul style="list-style-type: none"> Surface water runoff from the RDF storage area will be tested to confirm it is suitable for discharge to the site-wide surface water management system. In the event that testing shows elevated levels of potential pollutants, the lagoon will be manually isolated, and water within the lagoon will be transferred via tanker or similar to the MBT plant for processing. 	5	1.6
Failure of mobile plant and equipment	<ul style="list-style-type: none"> Air Water Land 	<ul style="list-style-type: none"> Staff Public Surface or groundwater 	3	4	12	<ul style="list-style-type: none"> Mobile plant/equipment is designed in accordance with relevant design and fabrication standards. Preventative maintenance includes regulator inspection and maintenance regimes. Plant is subject to a first use check on a daily basis to facilitate defect detection and reporting. 	5	2.4
Wrong connections in drains or other systems	<ul style="list-style-type: none"> Water Land 	<ul style="list-style-type: none"> Surface or ground water 	3	4	12	<ul style="list-style-type: none"> Drainage design undertaken by suitably qualified engineers Drainage design has been completed using appropriate modelling software 	5	2.4

Hazardous Event			Risk Assessment			Controls and Mitigations	Mitigation Factor	Residual Risk
Event	Pathway	Receptor	Probability	Consequence	Risk			
						<ul style="list-style-type: none"> Construction of drainage will be undertaken in accordance with the specified designs 		
Incompatible substances coming into contact with each other	<ul style="list-style-type: none"> Air Water Land 	<ul style="list-style-type: none"> Staff Public Surface or groundwater 	2	4	8	<ul style="list-style-type: none"> Only RDF and CLO from the MBT plant will be handled in the new waste storage and transfer area. 	5	1.6
Very high winds	<ul style="list-style-type: none"> Air 	<ul style="list-style-type: none"> Staff Public 	3	4	12	<ul style="list-style-type: none"> Dust suppression and other controls as stipulated in the Dust Management Plan will be implemented. In conditions where winds exceed 25 mph, waste acceptance to the site will cease. 	5	2.4
Accessibility of control equipment in emergency situations	<ul style="list-style-type: none"> Air Water Land 	<ul style="list-style-type: none"> Staff Public Surface or groundwater 	3	4	12	<ul style="list-style-type: none"> Emergency spill kits, fire extinguishers and access to water supplies in the event of an emergency are available from various locations both on the MBT, MWRF and in the wider Brookhurst Wood site. 	5	2.4

