PCML Site, Selby

Energy From Waste
Commercial Noise Assessment

PCML Site, Selby

Energy From Waste
Commercial Noise Assessment

Revision	Date	Notes	Author	Checked	Approved
Ver.1-0	02-05-25	E3940	SB	ND	ND
Ver.1-1	15-07-25	Amended Plant Assumptions	SB	-	ND
Ver.1-2	30-07-25	Revised Building Dimensions	SB	-	ND
Ver.1-3	16-01-26	Amended Plant Assumptions	SB	-	ND

Entran Limited
2nd & 3rd Floors
Northgate House
Upper Borough Walls
Bath
BA1 1RG

T: 0117 937 4077
www.entranltd.co.uk

CONTENTS **PAGE**

1 INTRODUCTION

1.1 Entran Ltd has been commissioned to undertake an assessment pertaining to commercial activities associated with a proposed Energy from Waste site in Selby.

1.2 The assessment has been undertaken to support a permit application and considers sound arising from site activities at the nearest residential receptors in the context of the existing sound levels in the area.

1.3 Details of the site, including plant quantities and expected usage, have been compiled based on information provided by the applicant and are understood to be representative of the proposed site activities.

1.4 This report is necessarily technical in nature and contains terminology relating to acoustics and noise. Therefore, a glossary together with a brief introduction to the subject of noise has been provided in Appendix A.

1.5 Additionally, BS 4142:2014 recognises that the context of a sound is important when defining the potential for subjective nuisance. The word “sound” is therefore used as opposed to “noise” to describe any sound assessed in the context of the BS 4142 assessment.

1.6 The assessment was undertaken by Stuart Berry, who is a Principal Consultant with over 10 years’ experience in conducting environmental noise and vibration impact assessments for a range of project types. Stuart holds an MSc in Environmental and Architectural Acoustics and is a Member of the Institute of Acoustics.

2 SITE DESCRIPTION

2.1 The site is located on Aviation Road, within the Sherburn Industrial Area, and south of the B1222. The surrounding area is industrial, with the nearest residential receptors situated at least 400m away, beyond existing industrial units and adjacent to the B1222.

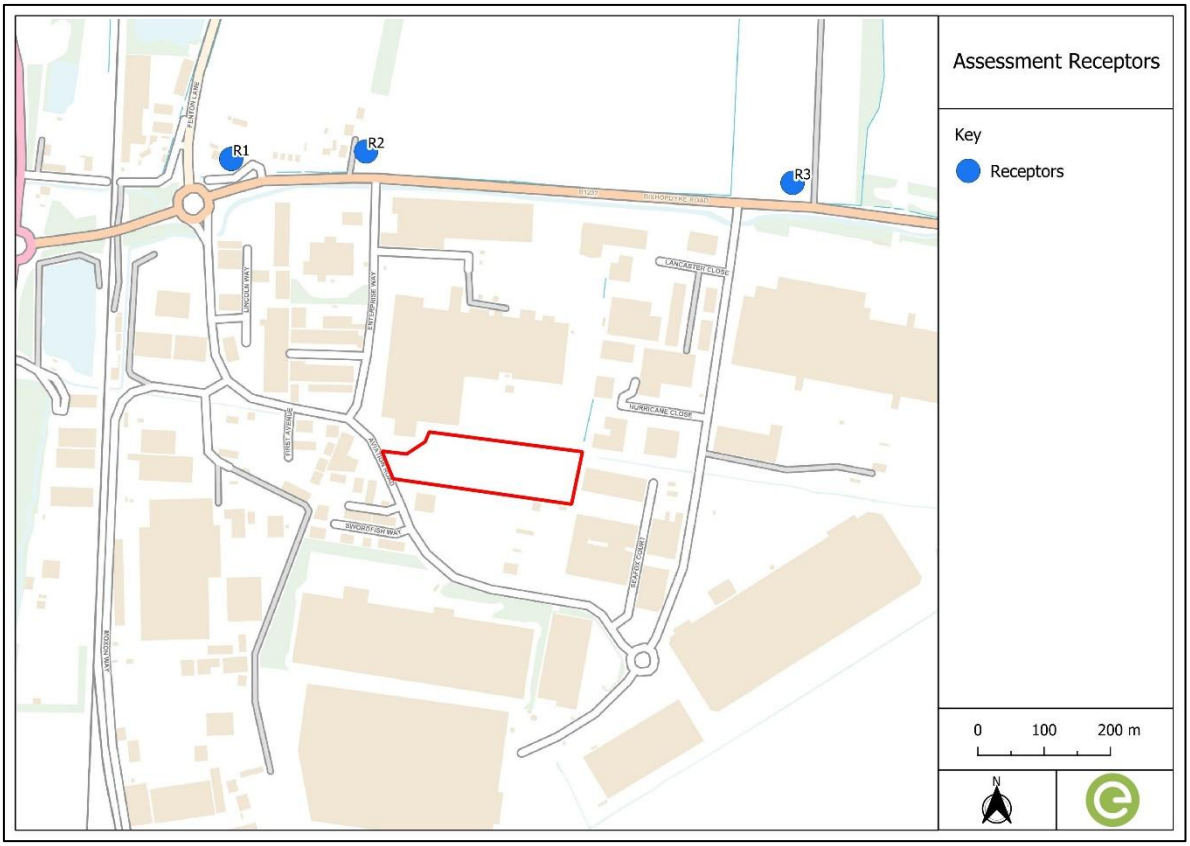
2.2 The nearest receptors and their respective distance from the nearest boundary are detailed in Table 1.

Table 1: Residential Receptors

ID	Distance from nearest boundary, m
R1	500
R2	430
R3	515

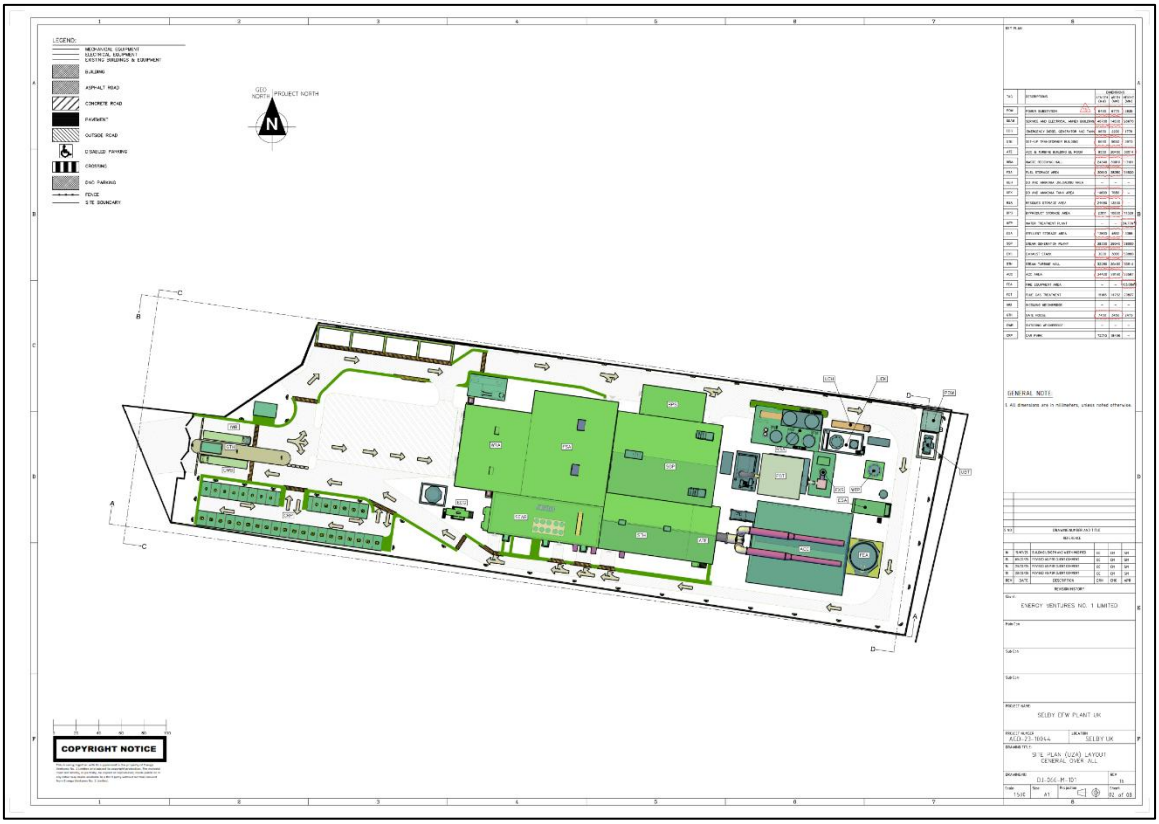
2.3 The residential receptors and site location are presented in Figure 1.

Figure 1: Site Location and Nearby Identified Receptors



2.4 The proposed activities are understood to be contained within the proposed buildings. External activities include HGVs and telehandler movements. HGVs would access and leave the site via the west boundary. The site layout is presented in Figure 2.

Figure 2: Site Layout



3 ASSESSMENT METHODOLOGY

National Policy: National Planning Policy Framework 2024

3.1 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

3.2 Under Section 15; Conserving and enhancing the natural environment, the following is stated in paragraph 187:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: …

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…"

3.3 The NPPF goes on to state in paragraph 198 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 potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

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;

identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"

British Standard BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

3.4 British Standard BS 4142:2014+A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound* is intended to be used for the assessment of whether sound of industrial

and/or commercial nature is likely to give rise to complaints from people residing in nearby dwellings. BS 4142 states that such sound can include:

- 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 forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

3.5 The procedure contained in BS 4142 for assessing the likelihood of complaints is to compare the measured or calculated sound level from the source in question, the *'specific sound level'*, at the assessment position with the background sound level. Where sound contains acoustic features, such as tonality, impulsivity or other noticeable characteristics then a correction is added to the specific sound to obtain the '*rating level*' that reflects the contextual setting of the site.

3.6 To assess the likelihood of complaints, the measured background sound level is subtracted from the rating level. BS 4142 states:

'Typically, the greater this difference, the greater the magnitude of the impact;

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source 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 on the context.'*

The Institute of Environmental Management & Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (2014)

3.7 The Institute of Environmental Management and Assessment (IEMA) have published the '*Guidelines for Environmental Noise Impact Assessment*'. The guidelines are applicable to

noise impact assessment for any scale of development proposal, including core principles to achieve effectively integration with the EIA, and provide advice on the issues that need to be considered in a noise impact assessment and whether the appropriate conclusions are being reached. The factors include:

- The appropriateness of the noise parameters used for the situation;
- The reference time period used in making the assessment;
- The level, character and frequency content of the noise sources under investigation; and,
- How the predicted noise levels relate to relevant Standards and guidelines.

3.8 The guidelines also recommend that the assessor should determine the degree of impact based on evidence derived from the assessment.

The Professional Practice Guidance on Planning and Noise (2017)

3.9 The '*Professional Practice Guidance on Planning and Noise'* (ProPG) was produced by a Working Group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH) to provide acoustical practitioners with guidance on the management of noise within the planning system in England.

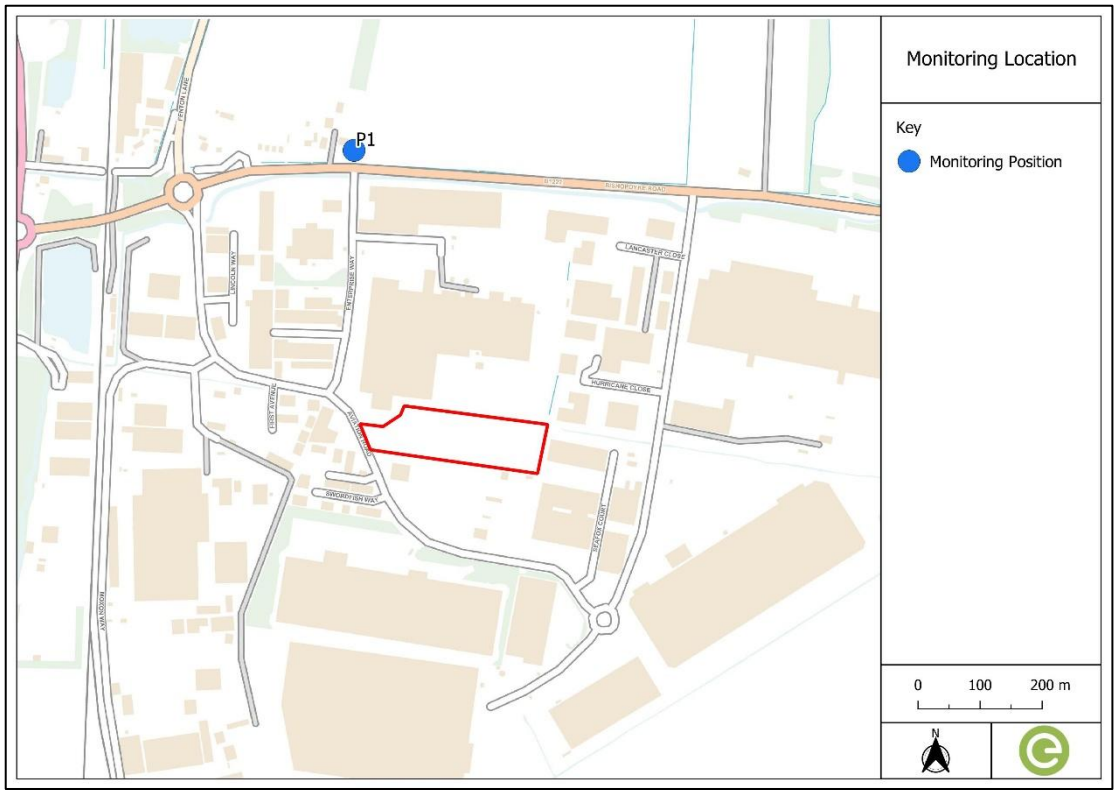
3.10 The reparation of the ProPG acknowledges and reflects the Government's overarching NPSE, the NPPF and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance. It provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

- advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- encourage the process of good acoustic design in and around new residential developments;
- outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- promote appropriate noise exposure standards; and
- assist the delivery of sustainable development.

4 ENVIRONMENTAL SOUND MEASUREMENTS

4.1 Background sound conditions at nearby receptors have been determined by an environmental survey conducted between 27th February and 6th March 2025. Measurements were obtained between 15:45 on the 27th and 11:00 on the 6th. The monitoring position is presented in Figure 3.

Figure 3: Unattended Monitoring Position



4.2 The dominant source at the monitoring positions was noted to be road traffic on the B1222 and the surrounding road network.

4.3 The unattended monitoring was undertaken to allow assessment in accordance with BS 4142 and to determine the likelihood of adverse effects relating to the proposed plant items.

4.4 Background sound levels have been obtained by statistical analysis during daytime (07:00 – 23:00) and night-time (23:00 – 07:00) periods. The distribution of background sound levels is presented graphically in Appendix B.

4.5 The distribution of background sound levels indicates that the most frequently occurring day and night-time values are 54/55 and 42 dB $L_{A90,T}$, respectively. However, lower values have

been adopted following consideration of the statistical. The adopted background sound levels are presented in Table 2.

Table 2: Background Sound Levels

Position	Period	Background Sound Level, $L_{A90,T}$, dB re. $2x10^{-5}$ Pa.
P1	Day	52
	Night	41

4.6 All measurements were undertaken by competent individuals with experience in environmental monitoring. Measurements were obtained in accordance with the principles of BS 7445: 2003: '*Description and measurement of environmental noise'* and following the guidance given in BS 4142.

4.7 All acoustic measurement equipment used during the surveys conformed to Type 1 specification of British Standard 61672: 2003: *Electroacoustics. Sound level meters. Part 1 Specifications*. The measurement equipment used during the survey was calibrated at the start and end of the measurement period. There was no significant drift in calibration measurements observed during the survey period.

4.8 The microphone was positioned at approximately 1.8 m above local ground level and in free-field conditions. The microphone was fitted with a protective windshield and situated in a weatherproof case. Details of the monitoring equipment are presented in Table 3.

Table 3: Equipment Details

Item	Model	Serial No
Sound Level meter	LD820	1170029

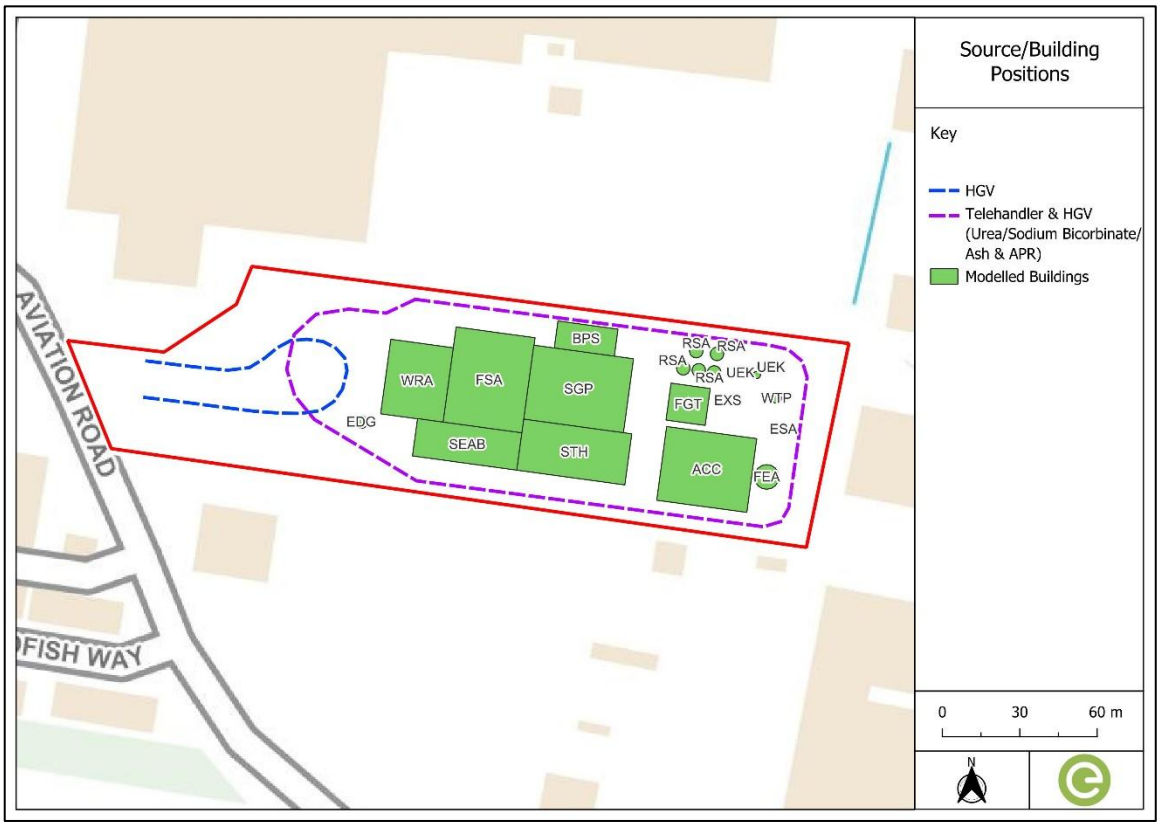
5 ASSESSMENT

5.1 The potential impacts due to on-site activities have been determined by calculation of $L_{Aeq,T}$ sound levels during the operation of the proposed facility. Sources have been modelled based on information provided by the applicant. Calculated sound levels at nearby receptors have been assessed against the identified background sound levels with consideration to any possible corrections for acoustic features,

5.2 Sound emission levels from the site have been calculated using predictive computer noise modelling. The noise modelling software (CadnaA) uses algorithms based on ISO 9613 'Attenuation of sound during outdoor propagation' to calculate noise levels generated by potentially noisy sources at receiver locations.

5.3 Proposed activities have been assessed to ensure compliance with the relevant design standards contained within BS 4142:2014+A1:2019. The operation of the proposed facility is assessed for the BS 4142 reference time periods, which are given as 07:00 – 23:00 for the daytime and 23:00 – 07:00 for night-time periods. Daytime specific levels are considered over a 1-hour period. Night-time specific levels are assessed over 15-minute periods. The locations of modelled sources are presented in Figure 4.

Figure 4: Modelled Activity Locations



5.4 Broadband data for the proposed sound generating items are presented in Table C1 of Appendix C. Details of plant items, including quantities, locations, and expected use times, are presented in Table 4

Table 4: Plant List

Plant Item	Quantity	Location	% On-Time
Boiler Startup Vent	1	SGP Building	1
LPPH vent	1	ACC Building	100
Dearator Vent	1	SPG Building	100
ACC fan	6	ACC Building	100
Auxiliary Cooler	1	SEAB Building	100
Steam Ejector	1	ACC Building	100
Condensate Pump	1	ACC Building	100
Turbine Bypass Valve	1	ACC Building	100
ID fan Stack Outlet	1	EXS Building	100
ID fan Motor	1	EXS Building	100
Ash Blower	1	SGP Building	100
Screw Conveyor	1	SGP Building	100
Lime Blower	1	FGT Building	100
Recirc Blower	1	FGT Building	100
PAC blower	1	FGT Building	100
Steam Ejector Typical	1	ACC Building	100
Vacuum Unit	1	ACC Building	100
HGV (WRA)	4	External	10
HGV unloading (WRA)	4	WRA Building	100
Mobile Telehandler	1	External	10
Gantry Crane	1	WRA Building	100
Feed Chute	1	WRA Building	100
MHPS fin-fan cooler	1	SEAB Building	100
Boiler (HRSG)	1	SGP Building	100
Boiler Feed Pumps	1	SGP Building	100
Grate Cooling system pumps	1	SGP Building	100
FD Fan, Primary, Case and Motor	1	SGP Building	100
FD Fan, Primary, Intake	1	SGP Building	100
FD Fan, Secondary, Intake	1	SGP Building	100
FD Fan Burner	1	SGP Building	100
Spray attemperators/Spray Control Valves	1	SGP Building	100
Bottom Ash/Slag Conveyor	1	SGP Building	100
Boiler Fly Ash Conveyor	1	SGP Building	100
Economiser Ash Conveyor	1	SGP Building	100
Bottom Ash Bucket Loader	1	BPS Building	100
Knocking/Rapping System	1	SGP Building	100
Compressor	3	SEAB Building	100
Turbine	1	STH Building	100
HGV (Urea/Sodium Bicorbinate/Ash & APCR)	1	External	10

5.5 It is understood that building cladding will be Kingspan KS1000 cladding system or similar. Adopted octave band data for the roof and façade construction is presented in Appendix C2. Details of on-site buildings are presented in Appendix C3. The modelled octave band noise levels are presented in Appendix C4.

5.6 The calculated specific sound levels at the nearest residential receptors are presented in Table 4.

Table 4: Calculated Specific Sound Levels

Receptor ID	Specific Sound Level, dB
R1	31
R2	29
R4	37

5.7 BS 4142 requires that an acoustic feature correction is applied, where applicable, to the specific sound level in order to obtain a rating level $L_{Ar,Tr}$ at the identified receptor. Any correction is applied in order to consider the effect of additional acoustic characteristics present in the source of interest. The correction is applied based on tonality, impulsivity and intermittency that may be perceptible at the receptor location. A correction may also be applied where these features may not be present but the sound may still be distinctive at the receptor.

5.8 Calculated specific levels do not exceed the adopted background sound levels and are therefore unlikely to be perceptible at the receptor locations. Accordingly, no feature correction is required.

5.9 The calculated specific sound levels at the assessment receptors, resultant rating levels, and excess over the identified background sound levels are presented in Table 5.

Table 5: Calculated Specific Sound Levels

Receptor No.	Specific Level, $L_{Aeq,T}$ dB	Acoustic Feature Correction	Rating Level, $L_{Ar,Tr}$ dB	Excess of Rating Over Background, dB
Daytime				
R1	31	0	31	-21
R2	29	0	29	-23
R3	37	0	37	-15
Night-time				
R1	31	0	31	-10
R2	29	0	29	-12
R3	37	0	37	-4

5.10 The resultant rating levels do not exceed the identified background sound levels at all assessment locations during typical on-site operations. BS 4142 indicates that where the rating level does not exceed the background sound level the impact of the specific sound level is likely to be low.

5.11 The calculated rating levels are unlikely to result in impacts at the nearby residential receptors.

Uncertainty

5.12 The assessment scenarios as considered within this report are based on the information and assumptions as provided by the applicant and presented within this assessment. Any changes to these assumptions, such as revised design, changes in activities, plant items, or processes would require assessment based on the specific plant items and site details.

5.13 No consideration has been made to any existing or possible fencing/barriers that may be present or introduced at or around the site.

5.14 The calculation of the specific level is based on available source data and representative information as detailed within this report and is understood to be representative of the activities and sources that would be installed at the proposed site.

6 MITIGATION

6.1 The calculated specific sound levels fall below the existing background and ambient sound levels and no specific mitigation requirements are identified.

6.2 The assessment has been undertaken based on information provided by the applicant and the calculations as detailed within this report. The calculated rating levels indicate that sound levels will fall below the identified background sound levels. According to BS 4142, this is an indication that adverse effects are unlikely. Accordingly, there is no identified requirement for the incorporation of further mitigation measures.

6.3 Whilst no further specific mitigation is identified as required, good practice mitigation should be employed. Vehicles/plant on-site should be suitably maintained and on-site operatives trained in considerate use of on-site machinery and good practice. Additionally, it would be prudent to mitigate external plant items as far as practicable (e.g. exhaust silencers, white noise reversing alarms) to ensure the likelihood of adverse effects remains low.

7 CONCLUSIONS

7.1 An assessment has been undertaken for the potential impacts attributable to sound emitted from the proposed Energy from Waste site in Selby.

7.2 Information and source data provided by the applicant has been used to calculate the likely specific and rating sound level at the nearest receptors.

7.3 Based on the information as detailed within this assessment the rating levels are calculated to fall below the background sound levels. BS 4142 indicates that where there is no excess of the rating over the background sound level there is a low likelihood of adverse impact.

7.4 The assessment has been undertaken based on the information provided and the associated calculations as detailed within this report. The calculations indicate that significant impacts are unlikely.

APPENDIX A – INTRODUCTION TO NOISE

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB.

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs. For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest.

In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}. This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

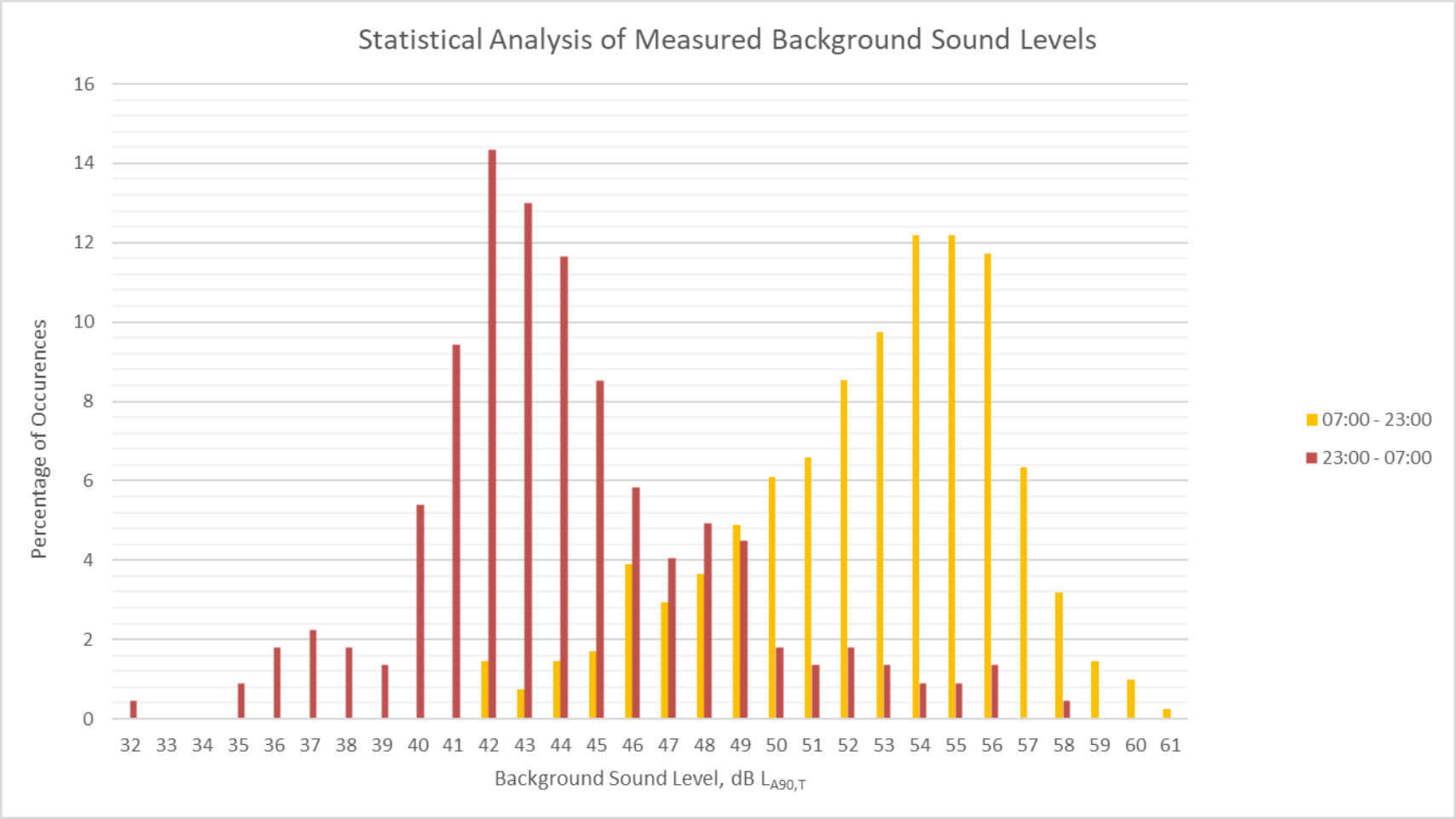
Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies specific sound is assessed over periods of 1 hour during the day and 15 minutes during the night. The noise measurement should be recorded using a ‘FAST’ time response equivalent to 0.125 ms.

Table A1: Glossary of Terms

Term	Definition
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,F}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the 'average minimum' noise level and is often used to describe the background noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Residual Noise Level	The ambient noise remaining at a given position in a given situation when specified sources are suppressed to a degree such that they do not contribute to the ambient noise level ($L_{Aeq,T}$)
Specific Noise Level	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (the noise source under investigation) over a given time interval ($L_{Aeq,T}$)
Rating Noise Level	The specific noise level plus any adjustment for the characteristic features of the noise ($L_{Ar,Tr}$).

APPENDIX B – GRAPHICAL REPRESENTATION OF MEASUREMENT RESULTS

Figure B1: Statistical Analysis of Background Sound Levels, P1



APPENDIX C – TABLES

Appendix C1: Octave Band Source Sound Power Levels

Plant/Item	Sound Power Level, dB L_{WA} per Octave Band, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Boiler Startup Vent	120.9	125.9	126.9	119.9	118.9	115.9	115.9	114.9	109.9
LPPH vent	110.9	115.9	116.9	109.9	108.9	105.9	105.9	104.9	99.9
Dearator Vent	105.9	110.9	111.9	104.9	103.9	100.9	100.9	99.9	94.9
ACC fan	114.7	109.7	104.7	110.7	94.7	89.7	84.7	78.7	75.7
Auxiliary Cooler	97.4	97.4	98.4	99.4	95.4	92.4	89.4	84.4	78.4
Steam Ejector	91.8	90.7	95.4	94.7	94.2	90.6	95.5	96.1	99.6
Condensate Pump	81.8	80.7	85.4	84.7	84.2	80.6	85.5	86.1	89.6
Turbine Bypass Valve	106.8	105.7	110.4	109.7	109.2	105.6	110.5	111.1	114.6
ID fan Stack Outlet	134.4	134.4	124.4	116.4	98.4	79.4	88.4	71.4	67.4
ID fan Motor	91.8	90.7	95.4	94.7	94.2	90.6	95.5	96.1	99.6
Ash Blower	108.8	106.3	106.3	103.1	101.2	96.6	94.4	89.6	84.0
Screw Conveyor	97.4	100.9	95.6	92.7	90.7	87.9	83.9	79.2	74.1
Lime Blower	108.8	106.3	106.3	103.1	101.2	96.6	94.4	89.6	84.0
Recirc Blower	103.8	101.3	101.3	98.1	96.2	91.6	89.4	84.6	79.0
PAC blower	103.8	101.3	101.3	98.1	96.2	91.6	89.4	84.6	79.0
Steam Ejector Typical	91.8	90.7	95.4	94.7	94.2	90.6	95.5	96.1	99.6
Vacuum Unit	86.8	85.7	90.4	89.7	89.2	85.6	90.5	91.1	94.6
HGV	88.9	88.9	93.9	93.9	93.9	89.9	88.9	83.9	81.9
HGV unloading	109.0	109.0	103.0	95.0	95.0	95.0	94.0	91.0	88.0
Mobile Telehandler	105.0	105.0	95.0	86.0	88.0	90.0	87.0	79.0	72.0
Gantry Crane	98.0	98.0	94.0	89.0	81.0	82.0	81.0	74.0	68.0
Feed Chute	92.0	92.0	91.0	90.0	86.0	89.0	86.0	80.0	63.0
MHPS fin-fan cooler	115.0	110.0	105.0	101.0	101.5	98.5	93.0	86.5	78.5
Boiler (HRSG)	110.0	109.0	105.0	101.0	106.0	102.0	101.0	98.0	92.0

Plant/Item	Sound Power Level, dB L_{WA} per Octave Band, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Boiler Feed Pumps	93.1	91.1	94.8	87.3	88.7	93.0	95.9	87.0	101.7
Grate Cooling system pumps	88.1	86.1	89.8	82.3	83.7	88.0	90.9	82.0	96.7
FD Fan, Primary, Case and Motor	108.9	108.9	108.9	108.9	105.9	102.9	98.9	90.9	82.9
FD Fan, Primary, Intake	103.9	103.9	103.9	103.9	100.9	97.9	93.9	85.9	77.9
FD Fan, Secondary, Intake	103.9	103.9	103.9	103.9	100.9	97.9	93.9	85.9	77.9
FD Fan Burner	98.9	98.9	98.9	98.9	95.9	92.9	88.9	80.9	72.9
Spray attemperators/Spray Control Valves	103.0	103.0	99.0	95.0	93.0	90.0	90.0	92.0	87.0
Bottom Ash/Slag Conveyor	100.4	103.9	98.6	95.7	93.7	90.9	86.9	82.2	77.1
Boiler Fly Ash Conveyor	100.4	103.9	98.6	95.7	93.7	90.9	86.9	82.2	77.1
Economiser Ash Conveyor	100.4	103.9	98.6	95.7	93.7	90.9	86.9	82.2	77.1
Bottom Ash Bucket Loader	91.0	91.0	97.0	105.0	89.0	89.0	86.0	79.0	73.0
Knocking/Rapping System	113.0	113.0	109.0	105.0	103.0	100.0	100.0	102.0	97.0
Compressor	91.8	90.7	95.4	94.7	94.2	90.6	95.5	96.1	99.6
Turbine	113.0	108.0	105.0	106.0	103.0	101.0	105.0	109.0	105.0

Appendix C2: Façade Material Details

Element	Item	Octave Band Centre Frequency								
		31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
SRI										
Kingspan Cladding	Kingspan 1000Rw	20	20	18	20	24	20	29	39	47
Absorption Coefficient, α										
Kingspan Cladding	Kingspan 1000Rw	0.15	0.15	0.45	0.7	0.85	0.9	0.9	0.75	0.6
Concrete	Rough Concrete	0.01	0.01	0.02	0.03	0.03	0.03	0.04	0.07	0.07

Appendix C3: On-site Sound Emitting Building Details

Building	Building Dimensions		
	Length	Width	Height
WRA	29	24.4	16
SEAB	40.8	14.5	25.6
BPS	10.6	23.4	10
SGP	38.9	28.9	36
STH	19.5	42.4	28.5
ACC	35.1	28.8	20

Appendix C4: Modelled Octave Band Sound Power Levels

Source	Octave Band Sound Level Power Level, dB L_{WA}								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
WRA_N	94.8	94.8	84.8	71.7	65.2	68.6	58.4	47.4	38.4
WRA_E	95.6	95.6	85.6	72.5	66.0	69.3	59.2	48.2	39.1
WRA_S	94.8	94.8	84.8	71.7	65.2	68.6	58.4	47.4	38.4
WRA_W	95.6	95.6	85.6	72.5	66.0	69.3	59.2	48.2	39.1
WRA_R	97.4	97.4	87.4	74.3	67.8	71.2	61.0	50.0	41.0
SEAB_N	93.1	88.3	80.6	72.7	65.4	65.3	56.7	49.1	46.7
SEAB_E	97.6	92.8	85.1	77.2	69.9	69.8	61.2	53.6	51.2
SEAB_S	93.1	88.3	80.6	72.7	65.4	65.3	56.7	49.1	46.7
SEAB_W	97.6	92.8	85.1	77.2	69.9	69.8	61.2	53.6	51.2
SEAB_R	95.1	90.4	82.6	74.7	67.5	67.3	58.7	51.1	48.7
BPS_N	72.6	72.6	74.5	77.0	54.8	58.0	45.9	31.1	19.2
BPS_E	69.2	69.2	71.1	73.5	51.4	54.5	42.5	27.7	15.8
BPS_S	72.6	72.6	74.5	77.0	54.8	58.0	45.9	31.1	19.2
BPS_W	69.2	69.2	71.1	73.5	51.4	54.5	42.5	27.7	15.8
BPS_R	72.9	72.9	74.8	77.2	55.0	58.2	46.2	31.4	19.5
SGP_N	97.9	98.6	93.0	84.1	76.2	76.0	65.5	56.2	49.3
SGP_E	99.2	99.9	94.3	85.4	77.5	77.3	66.8	57.5	50.6

Source	Octave Band Sound Level Power Level, dB L_{WA}								
	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
SGP_S	97.9	98.6	93.0	84.1	76.2	76.0	65.5	56.2	49.3
SGP_W	99.2	99.9	94.3	85.4	77.5	77.3	66.8	57.5	50.6
SGP_R	98.3	98.9	93.3	84.4	76.5	76.4	65.9	56.6	49.7
STH_N	95.0	90.0	82.8	78.1	68.6	69.7	64.6	61.2	51.4
STH_E	91.7	86.7	79.4	74.7	65.2	66.3	61.3	57.8	48.1
STH_S	95.0	90.0	82.8	78.1	68.6	69.7	64.6	61.2	51.4
STH_W	91.7	86.7	79.4	74.7	65.2	66.3	61.3	57.8	48.1
STH_R	93.4	88.4	81.2	76.4	67.0	68.0	63.0	59.5	49.8
ACC_N	102.6	99.7	94.6	89.7	76.6	76.4	70.2	62.6	59.4
ACC_E	103.5	100.5	95.4	90.5	77.5	77.3	71.1	63.4	60.2
ACC_S	102.6	99.7	94.6	89.7	76.6	76.4	70.2	62.6	59.4
ACC_W	103.5	100.5	95.4	90.5	77.5	77.3	71.1	63.4	60.2
ACC_R	105.0	102.1	97.0	92.1	79.1	78.8	72.7	65.0	61.8
HGV (WRA)	94.9	94.9	99.9	99.9	99.9	95.9	94.9	89.9	87.9
Telehandler	105	105	95	86	88	90	87	79	72
HGV (Urea/Sodium Bicorbinate/Ash & APCR)	88.9	88.9	93.9	93.9	93.9	89.9	88.9	83.9	81.9

APPENDIX D – COORDINATE INFORMATION

Appendix D1: Coordinate Data, Proposed Line Sources

Name	X	Y	Height, m
HGV	451060.5	433264.3	1
HGV	451078.5	433262.1	1
HGV	451091.9	433260.8	1
HGV	451100.2	433261.8	1
HGV	451106.1	433265.4	1
HGV	451111.1	433269.5	1
HGV	451116.1	433272.2	1
HGV	451122.5	433272.7	1
HGV	451128.8	433271.9	1
HGV	451133.7	433269.3	1
HGV	451137.2	433265.5	1
HGV	451138.1	433260.5	1
HGV	451136.3	433253.4	1
HGV	451133	433248.6	1
HGV	451127.6	433245.1	1
HGV	451120.2	433244	1
HGV	451111.9	433244.1	1
HGV	451102.2	433244.8	1
HGV	451092.9	433246	1
HGV	451076.4	433248.2	1
HGV	451058	433250.4	1
Telehandle	451164.5	433288.2	1
Telehandle	451301.6	433270.5	1
Telehandle	451308.9	433268.8	1
Telehandle	451314.4	433264.3	1
Telehandle	451316.3	433257.9	1
Telehandle	451309.2	433207.4	1
Telehandle	451306.1	433202.1	1
Telehandle	451299.4	433200.1	1
Telehandle	451165	433217.9	1
Telehandle	451125.4	433241.7	1
Telehandle	451117.8	433250.8	1
Telehandle	451114.7	433261.1	1
Telehandle	451117.6	433274.6	1
Telehandle	451126	433282.4	1
Telehandle	451138.7	433284.4	1
Telehandle	451153.2	433282.9	1
Telehandle	451164.5	433288.2	1

Appendix D2: Coordinate Data, Proposed Buildings/Structures

Building/Object	X	Y	Height, m
WRA	451175.4	433240.5	16
WRA	451151.1	433243.9	16
WRA	451155	433272.7	16
WRA	451179.3	433269.4	16
FSA	451210.9	433273.3	33.2
FSA	451205.9	433236.4	33.2
FSA	451175.3	433240.6	33.2
FSA	451180.3	433277.5	33.2
SEAB	451205.9	433236.5	25.6
SEAB	451203.9	433222	25.6
SEAB	451163.4	433227.5	25.6
SEAB	451165.4	433242	25.6
BPS	451218.3	433269.3	10
BPS	451219.8	433279.8	10
BPS	451243	433276.7	10
BPS	451241.6	433266.1	10
SGP	451210.4	433270.5	36
SGP	451249.1	433265.2	36
SGP	451245.1	433236.4	36
SGP	451206.5	433241.7	36
STH	451206.5	433241.8	28.5
STH	451248.4	433236.1	28.5
STH	451245.7	433216.3	28.5
STH	451203.8	433222	28.5
ACC	451296.8	433234.2	20
ACC	451293	433205.7	20
ACC	451258	433210.4	20
ACC	451261.9	433238.9	20
FGT	451276.8	433239.4	20
FGT	451261.6	433241.4	20
FGT	451263.6	433255.7	20
FGT	451278.8	433253.7	20
EDG	451145.9	433239.7	6
EDG	451145.3	433238.9	6
EDG	451144.5	433238.4	6
EDG	451143.5	433238.2	6
EDG	451142.6	433238.4	6
EDG	451141.8	433238.9	6
EDG	451141.2	433239.7	6
EDG	451141	433240.7	6
EDG	451141.2	433241.7	6
EDG	451141.8	433242.5	6
EDG	451142.6	433243	6
EDG	451143.5	433243.2	6
EDG	451144.5	433243	6
EDG	451145.3	433242.5	6
EDG	451145.9	433241.7	6
EDG	451146.1	433240.7	6
ESA	451308.5	433237.3	4
ESA	451308.2	433236.8	4
ESA	451307.7	433236.5	4
ESA	451307.1	433236.4	4
ESA	451306.6	433236.5	4
ESA	451306.1	433236.8	4
ESA	451305.7	433237.3	4

Building/Object	X	Y	Height, m
ESA	451305.6	433237.9	4
ESA	451305.7	433238.5	4
ESA	451306.1	433239	4
ESA	451306.6	433239.3	4
ESA	451307.1	433239.4	4
ESA	451307.7	433239.3	4
ESA	451308.2	433239	4
ESA	451308.5	433238.5	4
ESA	451308.7	433237.9	4
EXS	451286.6	433248.6	4
EXS	451286.3	433248.3	4
EXS	451286	433248	4
EXS	451285.5	433248	4
EXS	451285.1	433248	4
EXS	451284.8	433248.3	4
EXS	451284.5	433248.6	4
EXS	451284.5	433249	4
EXS	451284.5	433249.5	4
EXS	451284.8	433249.8	4
EXS	451285.1	433250	4
EXS	451285.5	433250.1	4
EXS	451286	433250	4
EXS	451286.3	433249.8	4
EXS	451286.6	433249.5	4
EXS	451286.6	433249	4
FEA	451305	433217.6	12
FEA	451304	433216	12
FEA	451302.5	433215	12
FEA	451300.6	433214.6	12
FEA	451298.8	433215	12
FEA	451297.2	433216	12
FEA	451296.2	433217.6	12
FEA	451295.8	433219.4	12
FEA	451296.2	433221.2	12
FEA	451297.2	433222.8	12
FEA	451298.8	433223.8	12
FEA	451300.6	433224.2	12
FEA	451302.5	433223.8	12
FEA	451304	433222.8	12
FEA	451305	433221.2	12
FEA	451305.4	433219.4	12
RSA	451270.7	433260.5	14
RSA	451270.2	433259.7	14
RSA	451269.3	433259.1	14
RSA	451268.3	433258.9	14
RSA	451267.3	433259.1	14
RSA	451266.5	433259.7	14
RSA	451265.9	433260.5	14
RSA	451265.7	433261.5	14
RSA	451265.9	433262.5	14
RSA	451266.5	433263.4	14
RSA	451267.3	433263.9	14
RSA	451268.3	433264.1	14
RSA	451269.3	433263.9	14
RSA	451270.2	433263.4	14
RSA	451270.7	433262.5	14
RSA	451270.9	433261.5	14

Building/Object	X	Y	Height, m
RSA	451276.7	433259.7	14
RSA	451276.2	433258.9	14
RSA	451275.3	433258.3	14
RSA	451274.3	433258.1	14
RSA	451273.3	433258.3	14
RSA	451272.5	433258.9	14
RSA	451271.9	433259.7	14
RSA	451271.7	433260.7	14
RSA	451271.9	433261.7	14
RSA	451272.5	433262.6	14
RSA	451273.3	433263.2	14
RSA	451274.3	433263.4	14
RSA	451275.3	433263.2	14
RSA	451276.2	433262.6	14
RSA	451276.7	433261.7	14
RSA	451276.9	433260.7	14
RSA	451282.7	433258.9	14
RSA	451282.2	433258	14
RSA	451281.3	433257.5	14
RSA	451280.3	433257.3	14
RSA	451279.3	433257.5	14
RSA	451278.4	433258	14
RSA	451277.9	433258.9	14
RSA	451277.7	433259.9	14
RSA	451277.9	433260.9	14
RSA	451278.4	433261.7	14
RSA	451279.3	433262.3	14
RSA	451280.3	433262.5	14
RSA	451281.3	433262.3	14
RSA	451282.2	433261.7	14
RSA	451282.7	433260.9	14
RSA	451282.9	433259.9	14
RSA	451275.8	433267.2	14
RSA	451275.2	433266.3	14
RSA	451274.4	433265.7	14
RSA	451273.3	433265.5	14
RSA	451272.3	433265.7	14
RSA	451271.5	433266.3	14
RSA	451270.9	433267.2	14
RSA	451270.7	433268.2	14
RSA	451270.9	433269.2	14
RSA	451271.5	433270	14
RSA	451272.3	433270.6	14
RSA	451273.3	433270.8	14
RSA	451274.4	433270.6	14
RSA	451275.2	433270	14
RSA	451275.8	433269.2	14
RSA	451276	433268.2	14
RSA	451283.8	433266.1	14
RSA	451283.2	433265.2	14
RSA	451282.4	433264.6	14
RSA	451281.4	433264.4	14
RSA	451280.4	433264.6	14
RSA	451279.5	433265.2	14
RSA	451279	433266.1	14
RSA	451278.8	433267.1	14
RSA	451279	433268.1	14

Building/Object	X	Y	Height, m
RSA	451279.5	433268.9	14
RSA	451280.4	433269.5	14
RSA	451281.4	433269.7	14
RSA	451282.4	433269.5	14
RSA	451283.2	433268.9	14
RSA	451283.8	433268.1	14
RSA	451284	433267.1	14
UEK	451292.2	433259	4
UEK	451291.8	433258.4	4
UEK	451291.2	433258	4
UEK	451290.4	433257.9	4
UEK	451289.7	433258	4
UEK	451289.1	433258.4	4
UEK	451288.7	433259	4
UEK	451288.5	433259.8	4
UEK	451288.7	433260.5	4
UEK	451289.1	433261.1	4
UEK	451289.7	433261.5	4
UEK	451290.4	433261.7	4
UEK	451291.2	433261.5	4
UEK	451291.8	433261.1	4
UEK	451292.2	433260.5	4
UEK	451292.3	433259.8	4
UEK	451298.1	433258.4	4
UEK	451297.8	433257.9	4
UEK	451297.3	433257.6	4
UEK	451296.8	433257.5	4
UEK	451296.3	433257.6	4
UEK	451295.8	433257.9	4
UEK	451295.5	433258.4	4
UEK	451295.4	433258.9	4
UEK	451295.5	433259.5	4
UEK	451295.8	433259.9	4
UEK	451296.3	433260.3	4
UEK	451296.8	433260.4	4
UEK	451297.3	433260.3	4
UEK	451297.8	433259.9	4
UEK	451298.1	433259.5	4
UEK	451298.2	433258.9	4
WTP	451306.2	433249.1	6
WTP	451305.8	433248.5	6
WTP	451305.2	433248.1	6
WTP	451304.4	433247.9	6
WTP	451303.7	433248.1	6
WTP	451303.1	433248.5	6
WTP	451302.6	433249.1	6
WTP	451302.5	433249.9	6
WTP	451302.6	433250.6	6
WTP	451303.1	433251.3	6
WTP	451303.7	433251.7	6
WTP	451304.4	433251.8	6
WTP	451305.2	433251.7	6
WTP	451305.8	433251.3	6
WTP	451306.2	433250.6	6
WTP	451306.4	433249.9	6

Appendix D3: Coordinate Data, Receptors

Receptor	Coordinates	
	X	Y
R1	450802.5	433712.6
R2	451005.9	433723.9
R3	451649.5	433676.6