PEMBROKESHIRE COUNTY COUNCIL ECO-PARK

ENVIRONMENTAL PERMIT APPLICATION

Noise Impact Assessment and Noise Management Plan V1

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About WRAP

WRAP is a climate action NGO working around the globe to tackle the causes of the climate crisis and give the planet a sustainable future.

Our core purpose is to help you tackle climate change and protect our planet by changing the way things are produced, consumed, and disposed of.

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Written by: SLR Consulting Ltd

Template MR208 V9

Contents

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Glossary

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio of the root-mean-square pressure of the sound and a reference pressure (2x10-5 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Frequency Octave bands (and Third Octave bands)	Sound can occur over a range of frequencies extending from the very low, such as the rumble of thunder, up to the very high such as the crash of cymbals. Sound is generally described over the frequency range from 63 Hz to 4000 Hz (4 kHz). This is roughly equal to the range of frequencies on a piano. Frequency is often divided into ('first') octave bands for analysis, with the range above considered within 7 octave bands with centre frequencies at 63 Hz, 125 Hz, 250 Hz, 1 kHz, 2 kHz and 4 kHz. 'Third' octave bands split this further into smaller frequency bands. This is typically only referenced in assessment of tonality of a noise source by identifying peaks (tones) in the frequency spectrum, i.e. when applying a rating penalty for tonality within a BS 4142:2014 assessment.
L_{Aeq}	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{A10} & L_{A90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{A10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{A90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{A10} index to describe traffic noise. The 'A' in the notation indicates a

	single weighted figure using the 'A' weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies.
L_{AFmax}	L_{AFmax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{AFmax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{Aeq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using a 'fast' response.
Sound pressure level (SPL)	Represents a noise level that can be measured directly, the result of pressure variations in the air achieved by the sound waves, on a dB scale.

1.0 Introduction

The Waste and Resource Action Programme (WRAP), on behalf of Pembrokeshire County Council (PCC) has retained SLR Consulting Limited (SLR) to undertake a Noise Impact Assessment (NIA) and Noise Management Plan (NMP) for the proposed new Pembrokeshire County Council Eco Park in Milford Haven. The Eco Park will consist of a Waste Transfer Station (WTS), and a Waste and Recycling Centre (WRC). The NIA and NMP are required as part of an Environmental Permit Application to Natural Resources Wales (NRW).

The format of the NMP is based on the requirements presented in Horizontal Guidance Note IPPC[1] H3, *Horizontal Guidance for Noise, Part 2 – Noise Assessment and Control*.

It is supported by the NIA, which has been undertaken to the guidance carried out in British Standard 4142:2014+A1:2019, *Methods for rating and assessing industrial and commercial sound*. This standard is intended to be used to assess the potential impact of sound (of an industrial or commercial nature) at noise-sensitive receptors within the context of the existing noise environment.

Whilst reasonable effort has been made to ensure that this report is easy to understand, it is necessarily technical in nature and a glossary of terminology is included.

Table 1-1 below details the SLR Acoustic Team members that have worked on the Project.

Table 1-1: SLR Acoustic and Vibration Team Members

Name	Grade	Education	IOA Membership
Michelle Dawson	Technical Director	• Post Graduate Diploma in Acoustics and Noise Control (2009) • MSc Environmental Assessment (2001 Sheffield University) • BSc Geography (2000 Sheffield University)	Corporate Member of the Institute of Acoustics (MIOA)
Rosie James	Principal Acoustic Consultant	• I.O.A Certificate of Competence in Environmental Noise Measurement	Practitioner member of the Institute of Environmental

[1] Integrated Pollution Prevention and Control

		(University of Birmingham) • BSc Environmental Studies University of Sunderland	Management and Assessment P.I.E.M.A
James Burchell	Associate Acoustic Consultant	• Post Graduate Diploma in Acoustics and Noise Control (2014) • BSc Audio and Recording Technology	Corporate Member of the Institute of Acoustics (MIOA)
Miriam Pratap	Associate Acoustic Consultant	• Sound, Light and Live Event Technology, University of Derby (2016)	Corporate Member of the Institute of Acoustics (MIOA)

2.0 Guidance and Standards

2.1 Horizontal Guidance Note IPPC H3, Horizontal Guidance Note for Noise

The purpose of the Horizontal Guidance Note IPPC H3, *Horizontal Guidance for Noise, Part 2 – Noise Assessment and Control* ('H3 guidance) is to provide supplementary information, relevant to all sectors, to assist operators in preventing and minimising emissions of noise. Part 2 of the guidance describes the principles of noise measurement and prediction, and the control of noise by design, by operational and management techniques and abatement technologies.

Outline methods of noise control are provided such as:

- The use of inherently quieter processes;
- The selection of inherently quiet plant or *'low noise options'*;
- The use of the site layout to maximise natural screening, screening by buildings and/or separation distances;
- The orientation of directional noise sources away from receptors; and
- The use of noise barriers and/or bunding.

2.2 British Standard BS 4142:2014+A1:2019

The assessment of impact contained in BS 4142:2014+A1:2019 is undertaken by comparing the sound rating level, i.e. the specific level of the source plus any acoustic feature corrections, to the measured representative background sound level outside the sensitive receptor location.

In accordance with BS 4142:2014+A1:2019, the significance of an industrial or commercial sound source depends on both the margin by which the rating level exceeds the background sound level and the context in which the sound occurs. It is therefore essential to place the sound in context, as an "*effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs".*

BS 4142:2014+A1:2019 (Section 3) provides the following definitions:

- Ambient Sound: Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. *NOTE: The ambient sound comprises the residual sound and the specific sound when present*.
- Ambient Sound Level, La = $L_{Aeq,T}$: Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many

sources near and far, at the assessment location over a given time interval, T. *NOTE: The ambient sound level is a measure of the residual sound and the specific sound when present*.

- 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 interval, T, measured using time weighting F and quoted to the nearest whole number of decibels (dB).
- Rating Level, $L_{AR,Tr}$: Specific sound level plus any adjustment for the characteristic features of the sound.
- Residual Sound: Ambient sound remaining at the assessment location when the specific sound source is supressed 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 at the assessment location over a given time interval, T.
- Specific Sound Level, $L_s = L_{Aeq,T}$: Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T.
- Specific Sound Source: Sound source being assessed.

To account for the acoustic character of sound sources, BS4142:2014+A1:2019 states that penalties should be applied with respect to "*the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention".*

In this respect, the acoustic 'character' of a specific sound can be described using the following definitions from BS 4142:2014+A1:2019:

- Tonality – "For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible".
- Impulsivity – "A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible".
- Intermittency – "When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied".

- Other Sound Characteristics – "Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied."

BS4142:2014+A1:2019 defines the impact of the specific sound level by subtracting the measures background sound level from the rating level. This assessment is detailed in Table 1 and is reproduced from Section 11 of BS 4142:2014+A1:2019 where it states: "*Typically, the greater this difference, the greater the magnitude of impact."*

Table 2-1: BS 4142:2014+A1:2019 Assessment of Impacts

Rating Level minus Background Sound Level	Assessment of Impacts
Around +10dB or more	A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
Around +5dB	A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

In addition, BS 4142:2014:A1:2019 states:
"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."

BS 4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

BS 4142:2014+A1:2019 also notes that *"adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact"*. Finally, BS 4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

3.0 Site Description

PCC propose to develop a multi-faceted Eco Park to support its county-wide collection service implementing the Welsh Government Blueprint. Additionally, the new site location will allow the vehicle fleet to be relocated, reducing current waste mileage, and increasing productivity.

The development consists of four phases as detailed below. Phases 1-3 would be constructed first, followed by Phase 4.

- Phase 1 – recycling transfer facility and associated access roads. This phase will also contain an office and visitor centre, offering the opportunity for groups to come learn about waste and recycling;
- Phase 2 – vehicle and staff parking area. A vehicle maintenance workshop and staff welfare facilities are also planned as part of this phase;
- Phase 3 – residual waste and recycling facility; and
- Phase 4 – publicly accessible Waste & Recycling Centre (WRC).

To assist in minimising noise emissions from the site, a 3m high acoustic barrier is proposed along the northern site boundary and a 3m high acoustic barrier is proposed to be located at the western side of the Phase 3 covered glass bay, as shown on Drawings 004 and 005.

The site is situated approximately 3km north west of Milford Haven and approximately 8km south west of Haverfordwest. The National Grid Reference (NGR) for the site is SM 88985 09338.

The area to the north of the site consists predominantly of open/agricultural land and commercial/industrial premises associated with Puma Energy are located immediately to the south and west. Pembrokeshire Coast National Park lies approximately 30m from parts of the site's northern boundary and extends to the north and west. An individual residential property (holiday let property – human receptor) lies approximately 25m north of the EP boundary and further residential and farm/agricultural buildings are located approximately 75m north of the EP boundary.

The nearby residential properties to the site are identified as Noise-Sensitive Receptors (NSRs) and are detailed in Table 3-1 below. The NSRs are illustrated in Figure 1 below.

Table 3-1: Noise Sensitive Receptors

NSR ID	NSR Name and Description	Co-Ordinates	Approximate Distance to Site Plant (m)
NSR01	Holiday let property (human receptor) adjacent to the west of the Site in between Robeston Cross and	188767, 209482	200

	Robeston West (SA73 3TL). Representative of the group of properties in Robeston West including Lawn View and Little Welsh Wood.		
NSR02	Thornhill, residential property located to the north-east of the Site (SA73 3TN)	189519, 209815	600
NSR03	Woodson, residential property located in Lower Thornton (SA73 3UQ), to the east of the Site	190344, 209103	1100
NSR04	Rickeston Water, residential property located in Rickeston (SA73 3TJ), to the west of the Site.	187795, 209368	1100
NSR05	Residential property at Robeston Cross, to the north of the Site.	188894, 209465	80

Figure 1 Noise Sensitive Receptors (NSR) and Monitoring Positions (MP)

3.1 Description of Operations

Proposed operations at the site will be to accept and process up to 74,999 tonnes per annum (tpa) of non-hazardous, hazardous, and commercial wastes arising from household and commercial premises. Waste will be delivered to the site in local authority and commercial vehicles or delivered directly to the WRC by members of the public and commercial businesses.

The site will host a number of supporting ancillary services, namely HGV parking, a garage for routine and minor repairs, vehicle washing facilities, an education centre, and office accommodation. A satellite garage and workshop facility will be located on site (Phase 2) to deal with routine checks, inspections, and minor maintenance to support the fleet of waste vehicles and plant which will be based and operate from the site. All major maintenance activities will be delivered from the separately permitted Thornton Depot. Vehicles operating from the site will be able to re-fuel on site from a dedicated fuelling area. On site facilities for vehicle washing will also be provided.

PCC's fleet of waste collection vehicles will operate from the site, with parking provided to allow drivers and operatives to park whilst out on waste vehicles. On returning to site at the end of each shift, vehicles may need to be re-fuelled and washed.

The site layout is illustrated on Drawings 003, 004, and 005.

4.0 Noise Impact Assessment

Sound surveys were undertaken between Thursday 14th and Monday 25th October 2021 to determine the prevailing acoustic environment at the nearby NSRs.

4.1 Survey Locations

The survey locations, which are representative of the closest NSRs are presented in Table 4-1. A plan showing the location of the sound surveys and nearby NSRs is provided in Figure 1 above. Photographs of the monitoring equipment in-situ are included as Figures 4 to 7 of Appendix 01.

It should be noted that the sound level meter at MP3 went off-line on the 22nd October 2021 and the sound level meter at MP4 when off-line on the 19th October 2021 due to battery failure. Calibration of the meters was found to have no signification drift therefore data has been deemed suitable for use in the assessment.

Table 4-1: Measurement Positions

MP ID	Representative NSR	Co-Ordinates
MP1	NSR01 and NSR05, to the north-west and west of the Site. MP1 was located at NSR01, which is approximately 130m west of NSR05. Baseline sound levels at NSR01 are considered representative of sound levels at NSR05, although is considered to provide a robust scenario as NSR05 is located closer road links and a junction, meaning baseline sound levels at NSR05 have the potential to be higher than those measured at NSR01.	188809, 209475
MP2	NSR02, to the north-east of the Site	189519, 209815
MP3	NSR03, to the east of the Site	190410, 209109
MP4	NSR04, to the west of the Site	187795, 209368

4.2 Survey Equipment

The noise survey was undertaken using the equipment listed in Table 4-2. The sound level meters were field- calibrated before and after the survey using an acoustic calibrator. No significant drifts were observed, and the data was signed off by the surveyor as such, i.e. the drift observed was less than 0.2dB.

The calibration chain is traceable via the United Kingdom Accreditation Service to national standards held at the National Physical Laboratory. In accordance with BS4142:2014+A1:2019 the sound level meters were laboratory calibrated within 2 years and the calibrators within 1 year. Calibration certificates for all of the equipment are available on request.

Table 4-2: Survey Equipment

Survey Location	Equipment	Serial Number	Calibration Date
MP1	Rion NL52 Class 1 Sound Level Meter Rion NC-74 Acoustic Calibrator	00331823 34336013	23/09/2022 04/10/2023
MP2	Rion NL52 Class 1 Sound Level Meter Rion NC-74 Acoustic Calibrator	00976174 34478298	02/03/2023 21/10/2022
MP3	Cirrus CR:171B Class 1 Sound Level Meter Cirrus CR:515 Acoustic Calibrator	G061094 72210	23/01/2023 09/03/2023
MP4	Cirrus CR:171B Class 1 Sound Level Meter Cirrus CR:515 Acoustic Calibrator	G079816 81268	31/01/2023 18/05/2023

The microphone at each location was placed at 1.5m above the ground in free-field conditions, i.e. at least 3.5m from the nearest vertical reflecting surface.

4.3 Noise Level Parameters

Measurements at each location were logged every 15 minutes and the following noise level indices were recorded:

- $L_{Aeq,T}$: The A-weighted equivalent continuous noise level over the measurement period, T.

- L_{A90}: The A-weighed noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise.
- L_{A10}: The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe road traffic noise.
- L_{AFmax}: The maximum A-weighted noise level during the measurement period.

4.4 Weather Conditions

Details of weather conditions were captured throughout the survey via a Davis VantageVue weather station installed at MP1. Figure 2 illustrates the weather conditions monitored during the noise survey, where it can be seen that the air temperature remains above 5°C, wind speeds below 5 m/s and no rain for the duration of the survey. These conditions are suitable for the determination of background sound levels in accordance with BS4142:2014+A1:2019.

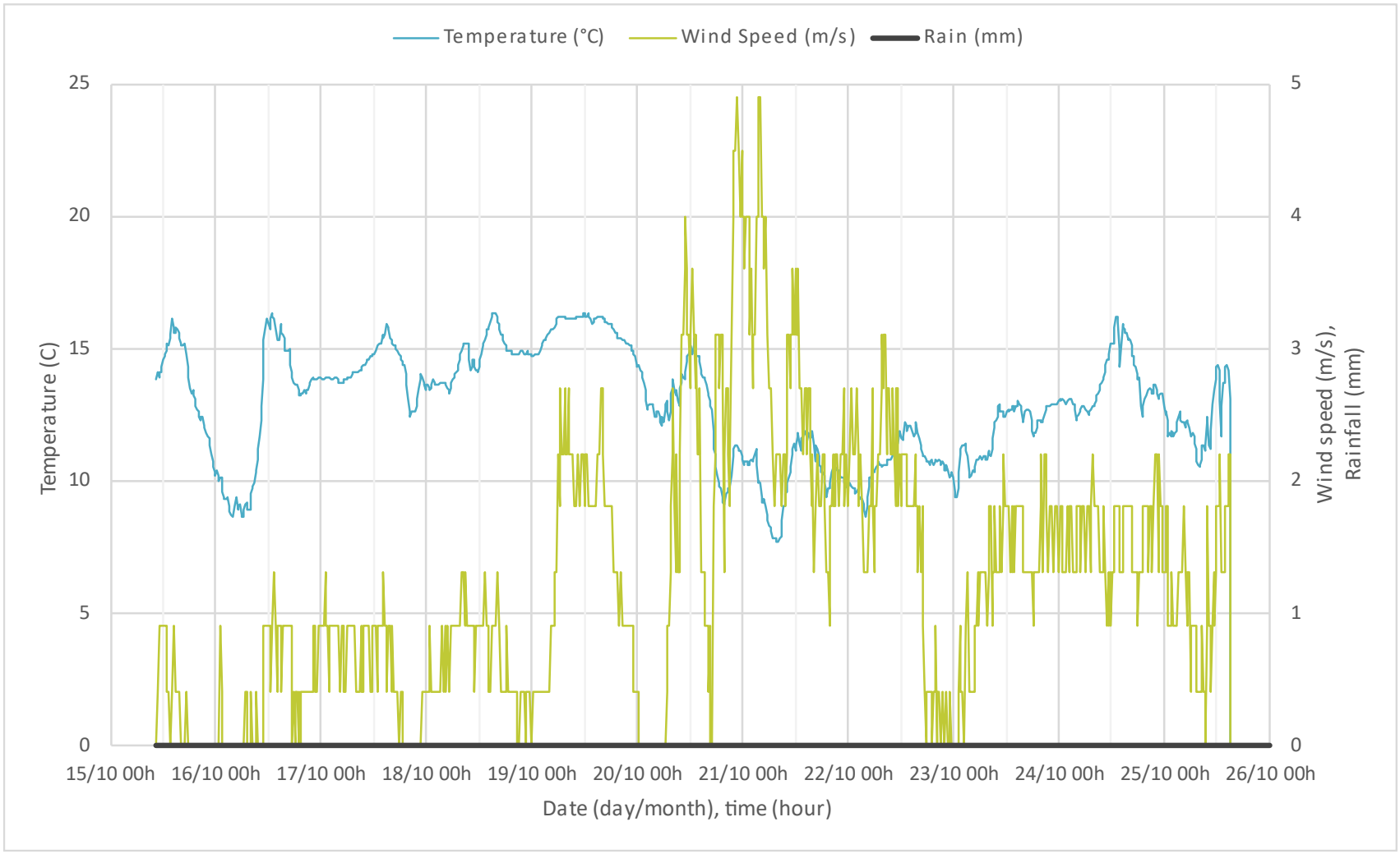

Figure 2: Weather Conditions During Noise Survey

Figure 3 illustrates the predominant wind direction throughout the duration of the noise survey.

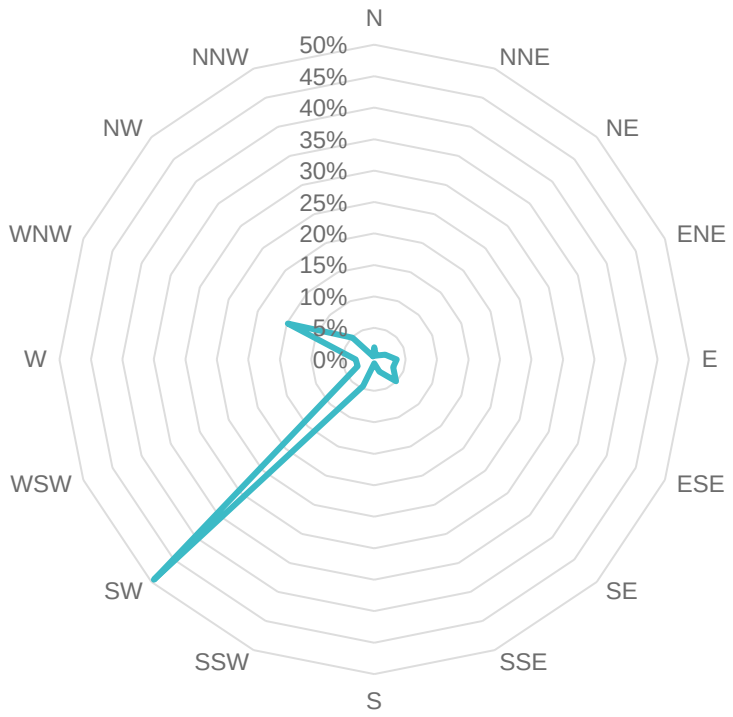

Figure 3: Wind Direction Plot Graph

4.5 Results

Analysis has been undertaken on the data captured at each of the monitoring locations to determine representative background sound levels during periods of the day and night.

For limited periods during the background sound survey ground investigation (GI) works were being undertaken across the Site. These were not occurring during equipment deployment and collection so are not referred to in the soundscape. As a precaution, any noise data measured during times when noisy equipment was being used for GI works has been excluded from the analysis. This is predominantly during times when a 9T tracked excavator was in use as follows:

- 18/10/21 0815 – 14:00 hours and 14:40 – 16:30 hours;
- 19/10/21 14:00 – 16:00 hours; and
- 20/10/21 11:00 – 16:00 hours.

4.5.1 Soundscape

During equipment installation and retrieval, details of the soundscape at each survey location were noted and are presented in Table 4-3.

Table 4-3: Details of Soundscape

Location	Soundscape
MSP1 / NSR01 / NSR05	Generally tranquil with natural sound such as bird song, also noted low frequency hum from the oil refinery and distant road traffic noise.
MSP2 / NSR02	Road traffic noise was noted to be the dominant source with traffic on the adjacent road flowing fairly constantly. Other natural noises noted here including wind disturbed vegetation, birds, and livestock nearby.
MSP3 / NSR03	Quiet and tranquil rural location with agricultural and natural noises. Noises noted include distant tractors, bird song, stream water, occasional passing pedestrians, horses, and cars.
MSP4 / NSR04	Distant road traffic noise and natural sounds such as wind in trees and birdsong. Occasional passing cars on the road in front of the house.

4.5.2 Measured Noise Levels

Survey Results

A time-history plot of the measured sound levels at each of the survey locations MP1 to MP4 are presented in Appendix 02, Figures 8 to 11 respectively. Each plot includes ambient sound, using the L_{Aeq}, 15 min parameter, and background sound, using the L_{A90}, 15 min parameter. The number of occurrences of each integer background sound level is presented in Figures 12 to 19 for MP1 to MP4, respectively, for the daytime operational hours (07:00 – 19:00 hours) and night-time operational hours (05:00 – 07:00 hours) in accordance with periods set out in BS4142:2014+A1:2019.

It should be noted that maintenance can occur up to 20:00 but as this doesn't include all other Site activities it is not considered the worst-case noise producing period. Background sound levels do not significantly reduce in the hour period between 19:00 to 20:00.

It is discussed in BS4142:2014+A1:2019 that there is no single background sound level for any given location, as this is a fluctuating parameter, which can be seen from the data presented in Appendix 02. However, assessment must be made using a representative value for background sound, which should not automatically be assumed to be either the minimum, mean average, or modal value.

Reviewing the statistical distribution of background sound levels presented in Figures 24 to 27 and considering the percentage of time the sound level falls above and below values, the background sound levels which are representative of the measurement positions are set out in Table 4-4 for the daytime and night-time periods when the proposed development would be operational.

To help understand the context of the noise climate at the site, Figures 20 to 23 display the statistical distribution of the ambient noise levels measured at each of the noise survey locations during the operational daytime and night-time periods.

Table 4-4: Representative Background Sound Levels, dB

Receptor	Derived Background Sound Level Daytime 0700 – 1900 hours, $L_{A90, 15\ min}$	Derived Background Sound Level, Night-time 0500 – 0700 hours, $L_{A90, 15\ min}$
NSR01	35	32
NSR02	37	30
NSR03	32	30
NSR04	34	24
NSR05	35	32

Table 4-5 presents the representative background sound level over the daytime and the night-time period that the site will operate. As part of the assessment, the impact during the following two periods will also be assessed. During these two time periods traffic movements to and from the site are expected to be at their highest (as informed by the Transport Assessment produced by Capita, dated November 2021):

- Night-time: 06:00-07:00.
- Daytime: 14:00-15:00.

The most commonly occurring baseline background sound levels at each NSR during these two time periods are detailed in Table 7 (see also graphs in Appendix 02).

Table 4-5: Measured Baseline Background Sound Levels During "Peak Hours"

Receptor	Background Sound Level Daytime 1400 – 1500 hours, $L_{A90, 15\ min}$	Derived Background Sound Level Night-time 0600 – 0700 hours, $L_{A90, 15\ min}$
NSR01	37	35
NSR02	38	34
NSR03	34	32
NSR04	36	31
NSR05	37	35

5.0 Noise Assessment

5.1 Noise Model Assumptions

The sound predictions in this assessment have been undertaken using a proprietary software-based noise model, Cadna, which implements the full range of UK calculation methods. The calculation algorithms set out in ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation* have been used and the model assumes:

- A ground absorption factor of 0.5 for mixed ground.
- No ground screening effects.
- Downwind propagation between the source and the receiver.
- Receiver height of 1.5m during the daytime and 4.0m during the night-time to reflect ground floor and first floor windows respectively. However, it is noted that receptor NSR05 is single storey, therefore a receptor height of 1.5m has been assumed during the night-time.
- Attenuation predicted for 500Hz in accordance with ISO9613-2 when only A-weighted sound power levels known.

5.2 Operational Hours

The site's typical operating hours for the WTS and WRC areas, are as follows:

- WTS: Waste collections (via RRVs and CCVs) and ongoing haulage of transferred materials would typically be undertaken at the Site from 07:00 to 17:00, Monday to Friday. To ensure continuity of service, the Site would occasional be operational (and waste collections would be undertaken) on Saturdays and Sundays, public holidays and over the Christmas and New Year period; and
- WRC: Open to the public 7 days a week during the summer months (1st April to 31st October) and 5 days a week during the winter months from 8am to 6pm. In order to maintain the site for public use, the site is serviced by vehicles and operatives between 6:30am and 8pm.

5.3 Noise Sources

The following plant and operating assumptions have been made for each Phase of the proposed development and all cover normal operations.

Plant and operating assumptions have been informed by discussions with PCC. An overview of noise sources can be seen in Table 5-1.

Abnormal Operations are not assessed as during abnormal operations it is likely that the sort line, baler, and conveyor (some of the noisiest operations at the site) would be off and there would be no compaction at the WRC. Therefore, during abnormal operations many of the noise sources listed in Table 5-1 would not be operating. The assessment presented is therefore considered robust.

Table 5-1: Model Noise Sources

Noise Source	Coordinates		Height (m)
	X (m)	Y (m)	
Glass Dumping	189026.09	209300.12	1.00
Wood Dumping	189057.09	209282.93	2.00
Metal Dumping	189045.29	209288.33	2.00
Tyre Dumping	189035.55	209293.33	2.00
Spare Dumping	189068.40	209280.05	2.00
	189141.32	209353.39	2.00
	189133.06	209357.30	2.00
	189123.85	209360.91	2.00
	189114.22	209365.04	2.00
	189106.27	209368.64	2.00
Household	188935.18	209381.60	1.50

Pressure Washer	188893.89	209290.64	0.50
WRC Compactor	188944.82	209336.37	1.00
WRC Glass Container	188905.60	209374.62	0.20
HGV Reversing	188819.96	209369.10	2.00
	188823.51	209368.53	2.00
	188826.26	209368.20	2.00
	188829.68	209367.70	2.00
	188832.77	209366.86	2.00
	188835.27	209366.53	2.00
	188838.60	209366.03	2.00
	188841.44	209365.86	2.00
	188844.86	209365.45	2.00
	188876.30	209377.62	2.00
	189029.17	209306.68	2.00
	188877.30	209372.95	2.00
	188878.14	209368.87	2.00
	188878.39	209365.28	2.00

	188878.80	209362.94	2.00
	188879.22	209359.69	2.00
	188879.47	209356.77	2.00
	188880.22	209353.60	2.00
Glass Bulking	189025.32	209297.75	2.00
Transformer	188990.75	209420.32	2.00
Pressure Washer	189083.52	209284.36	0.50
Blower	189091.92	209291.79	0.50
WRC Compactor	188953.10	209337.70	1.00
Telehandler	189120.34	209353.87	1.00
Lifting Full Container	189052.72	209299.86	1.00
	188940.95	209377.60	1.00
Dropping Container	188944.52	209377.60	1.00
P1 Tipping Reverse	189115.11	209354.70	2.00
Metal Tipping	188958.80	209373.49	2.00
Cars Entering	189007.98	209233.74	0.5
Heavy Veh Exiting	189156.30	209321.63	0.5

	189007.11	209232.91	0.5
	188959.66	209330.25	0.5
	189021.29	209219.52	0.5
Heavy Veh Parking	189156.45	209321.53	0.5
Loading Shovel	188922.33	209337.58	0.5
	189074.47	209285.10	0.5
Car	188811.99	209301.45	0.5
HGV Parking	189112.06	209350.81	0.5
	189142.67	209337.06	0.5
	188992.19	209332.85	0.5
	188992.29	209333.03	0.5
HGV Load/Unload	188924.97	209320.98	0.5
Forklift	189115.33	209354.48	0.5
	189125.86	209350.08	0.5
HGV Tipping	189069.93	209386.67	0.5
HGV Fuelling	188870.55	209352.03	0.5
Shovel Loader	189113.47	209265.61	0.5

HGV to Glass Bay	189036.81	209325.31	0.5

5.3.1 Phase 1

The following plant will be utilised within the Phase 1 building[2]:

- Sorting System, including:
  - Over band magnet
  - Eddy current separator
  - Floor infeed conveyors/hoppers/infeed systems
  - Infeed conveyors
  - Bottle perforators
  - Picking station with conveyor
- 2 balers:
  - 1 for cardboard
  - 1 for plastic, cans, and cartons – CKTR82 – 80T Twin ram baler

At the time of writing, noise data for all the above sources is not available. SLR has conducted operational noise surveys at similar facilities, including internal noise measurements, which typically reach up to a maximum of 85 dB L_{Aeq} (when in full operation, not accounting for intermittency). This is considered to be a worst-case noise level to apply to the above operations within buildings. It should be noted that this is also the 'upper exposure action value' as detailed in the Noise at Work Regulations.

The sound reduction indices of the facades have been assumed to be Rw 26dB based upon low-performance lightweight cladding for the external wall and roof, and doors being open 100% of the time, as a worst-case scenario.

Mobile plant associated with Phase 1 and phase 3 is as follows:

- Loading shovel machine/telehandler (between Phase 1 and Phase 3);
  - JCB 542 70 telescopic wheeled loader, with 2.4m wide bucket.
  - JCB 560 80

[2] Corner coordinates:

Corner	X	Y
Corner 1	189040.1	209373.3
Corner 2	189172.5	209313.7
Corner 3	189157.4	209279.1
Corner 4	189025.5	209340.3

- Teletruck (external bays and inside buildings)
  - JCB teletrack 30
- Forklift (external bays and inside buildings)
  - Toyota 8FDJ35-67666
- Cleansing equipment
  - Pressure washer Nilfisk MH5M
  - Stihl BGA85 battery blower
- HGVs (forward and reverse)
- Tipping (external bays).

For Phase 1 external noise sources, the data in Table 5-2 has been used within the noise model.

Table 5-2: Phase 1 External Noise Sources

Description	Sound Powel Level (dB L_{WA})	On-time/Number of Movements (per hour)
Loading Shovel	101	5 movements
Forklift	99	8 movements
Teletruck	100	10 minutes
Pressure Washer	96	50%
Blower	98	50%
HGV	91	62 (peak) 18 (average) movements
HGV Reverse	91	15 seconds
Tipping	95	10 minutes

It is assumed that Phase 1 will not operate during the night-time period.

5.3.2 Phase 2

For staff and vehicle parking, a review of the Transport Assessment by Capita dated November 2021 has been undertaken. The report presents trip generation per hour. For the daytime period the worst-case hour period (14:00-15:00) has 273 vehicles movements including 62 HGVs. For the night-time period the worst- case hour period (06:00-07:00) has 147 vehicle movements including 47 HGV movements.

Table 5-3 provides details of the vehicle sound sources used in the assessment. Noise levels have been determined from measurements that SLR have conducted on past projects of cars and HGVs at various speeds, or from an appropriate guideline document.

Table 5-3: Phase 2 Noise Sources – Vehicles

Description	Sound Power Level (dB LWA)	On-Time (per hour)	Number of Movements Per Hour		
			Busiest Daytime Hour (1400 – 1500)	Average Daytime Hour	Busiest Night-Time Hour
HGV (refuse vehicle)	91	-	62 movements at 32 km/h	18 movements at 32 km/h	47 movements at 32 km/h
Cars	84	-	211 movements at 32 km/h	112 movements at 32 km/h	100 movements at 40 km/h
HGV Idling	87.5	10 minutes per vehicle	-	-	-
HGV Reversing Alarm	91	30 seconds per vehicle	-	-	-

It is assumed that HGV vehicles are reverse parked when returning to the depot during the daytime period and therefore in normal circumstances no reversing alarms would be used during the early morning (night-time) period. However, checks of the vehicles are undertaken at the start of the day; during this period it is assumed that vehicles would be idling for 10 minutes, although based on information provided by the operator, this is likely to be shorter.

Vehicle routing of HGV arrivals and departures during the night-time period will be via the southern access, thereby avoiding the northern road when the WRC is not open; it is noted that the routing of HGVs has been carefully considered and designed to reduce sound levels as far as practicable at NSRs.

The Maintenance building[3] will be used to provide rapid response repairs. As only light maintenance would be undertaken within the workshop (for example the changing of a panel or

[3] Corner X Y
Corner 1 188851.52 209277.11

lights), an internal noise level of 70 dB L_{Aeq} (when in full operation, not accounting for intermittency) has been assumed.

The sound reduction indices of the facades have been assumed to be Rw 26dB based upon low-performance lightweight cladding for the external wall and roof, and doors being open 100% of the time, as a worst-case scenario.

Mobile plant associated with Phase 2 is as follows:

- Vehicle Wash (pressure washer based)

The vehicle wash will be used during daytime hours only when vehicles return. The pressure washer would be located directly to the north of the Maintenance building.

For the Phase 2 external noise sources, the data within Table 5-4 has been used within the noise model.

Table 5-4: Phase 2 External Noise Sources

Description	Sound Power Level (dB L_{WA})	On-Time (per hour)
Pressure Washer	96	50%

A fuel point will be located within Phase 2; HGV movements to and from the fuel point have been included within the model, assuming that 25% (14 arrivals) will refuel during the peak hour.

5.3.3 Phase 3

Phase 3 will comprise a main building[4] and covered waste bays. As noise data for this building is not available, and internal noise level of 85 dB L_{Aeq} (when in full operation, not accounting for intermittency) has been assumed.

The sound reduction indices of the facades have been assumed to be R_w 26dB based upon low-performance lightweight cladding for the external wall and roof, and doors being open 100% of the time, as a worst-case scenario.

Noise sources associated with the covered waste bays are:

- Glass tipping
- Wood tipping

Corner 2 188853.18 209265.78
Corner 3 188875.52 209269.78
Corner 4 188873.52 209281.78

[4] Corner X Y
Corner 1 189084.8 209277.95
Corner 2 189138.47 209254.28
Corner 3 189125.47 209226.27
Corner 4 189072.13 209249.94

- Metal tipping
- Tyre tipping
- Spare tipping
- Glass Bulking
- HGV movements to and from covered bays
- Loading shovel – as detailed above in phase 1

For unloading into the Phase 3 covered bays, SLR has conducted measurements of noise levels producing from the tipping of various different materials into containers. A point source sound power level of 95 dB L_{WA} has been used for each bay/skip. Tipping typically lasts for only a few seconds each tip, as a worst-case a total of 10-mintues has been included in the hour for each area to account for this activity.

For the Phase 3 external sound sources, the data in Table 11 have been used within the noise model.

Table 5-5: Phase 3 Noise Sources

Description	Sound Power Level (dB LWA)	On-time/Number of Movements (per hour)
Glass tipping (assumed western-most bay)	107	2 minutes
Wood tipping	95	10 minutes
Metal tipping	95	10 minutes
Tyre tipping	95	10 minutes
Spare tipping	95	10 minutes
Glass Bulking (assumed western-most bay)	124	2 minutes
Loading Shovel	101	5 movements
HGV	91	18 movements

HGV Reverse	91	2.25 movements

5.3.4 Phase 4 – WRC

The WRC has been developed in line with that operated at Crane Cross WRC. The noise assessment for Crane Cross WRC (ref 002-UA004581-UE31-1 dated 31 March 2014 by Hyder) has been reviewed and the information used to model the proposed development. Table 7-7 of the Crane Cross WRC assessment presents the source noise levels from activities including percentage on-time and is recreated in Table 5-6 below.

Table 5-6: Noise Sources at 10m – WRC, dB

Description	Number	% On Time	Plant Noise	
			$L_{Aeq,\ 1\ min}$	L_{Amax}
Skip Compactor	2	5	65	86.3
Glass Container being filled	1	2	78.5	88.1

In addition to the above, noise sources associated with the WRC are:

- Loading shovel;
- Container lift and drop
- Household tipping
- HGV movements to and from skips

For Phase 4 sound sources, the sound power levels in Table 5-7 have been used within the noise model.

Table 5-7: Phase 4 Noise Sources

Description	Sound Power Level (dB L_{WA})	On-time/Number of Movements (per hour)
Glass tipping (assumed western-most bay)	107	2 minutes
Household tipping	95	10 minutes

Loading shovel	101	2 movements
HGV	91	2 movements
Container lift	97.2	0.5 minutes per hour
Container drop	99.4	0.5 minutes per hour

In addition to the above information associated with each phase, a transformer will be located within the northern area of the site, with an assumed power level of 81 dB. This sound power level is based on manufacturer's data relating to the proposed backup generator, which would only operate during exceptional circumstances. Manufacturer's information relating to the 100kVA transformer indicates a sound power level of 59dB; the use of 81 dB is therefore considered robust.

5.4 Predicted Sound Levels

The predicted specific sound levels are shown in Table 5-8, Table 5-9, and Table 5-10 below for each of the NSRs at a height of 1.5 m for the daytime period and 4.0m for the night-time period (except NSR05 which is single storey, therefore a receptor height of 1.5m has been assumed during the night-time).

Daytime receivers in the model are located within amenity space and night-time receivers have been placed adjacent to the most affected facades.

It is noted that additional receivers have been input to the noise model to represent all dwellings at the southern edge of Robeston West (nearest the Site); the presented results for NSR01 are the highest predicted sound levels within Robeston West.

Predicted specific sound levels are shown for daytime average (07:00-19:00), daytime peak (14:00-15:00) and night-time (06:00-07:00) scenarios.

It is noted that the night-time period 06:00-07:00 has been selected for assessment as this is when the majority of HGV movements will take place.

Table 14 shows predicted specific sound levels without a barrier at the northern site boundary, Table 15 shows specific sound levels with a 2m barrier and Table 16 shows specific sound levels with a 3m barrier in place at the northern boundary.

Table 5-8: Sound Levels at Noise-Sensitive Receptors, dB(A) (no barrier)

Receptor	Predicted Specific Sound Level		
	Daytime (0700 – 1900)	Daytime (1900 – 1500)	Night-Time (0600 – 0700)
NSR01	26.2	26.4	27.1
NSR02	29.5	29.6	14.5
NSR03	19	19.2	7.5
NSR04	19.9	20.3	10.2
NSR05	36.9	38.1	28

Table 5-9: Sound Levels at Noise-Sensitive Receptors, dB(A) (2m barrier)

Receptor	Predicted Specific Sound Level		
	Daytime (0700 – 1900)	Daytime (1900 – 1500)	Night-Time (0600 – 0700)
NSR01	25.2	25.3	27.1
NSR02	29.5	29.6	14.5
NSR03	19	19.2	7.5
NSR04	19.9	20.3	10.2
NSR05	36	37.3	28

Table 5-10: Sounds Levels at Noise-Sensitive Receptors, dB(A) (3m barrier)

Receptor	Predicted Specific Sound Level		
	Daytime (0700 – 1900)	Daytime (1900 – 1500)	Night-Time (0600 – 0700)
NSR01	24.7	24.8	27.1
NSR02	29.4	29.6	14.5
NSR03	19	19.2	7.5
NSR04	19.9	20.3	10.2
NSR05	35.3	36.4	27.9

5.5 Acoustic Feature Corrections

BS4142:2014+A1:2019 acoustic feature corrections to be applied to the specific level to determine the rating level. These corrections relate to the perception of the sound outdoors at the receptor location. Due to the relatively large separation distances between the noise generating activities and the receptor locations it is considered that determining potential corrections for individual activities is not required. Instead, the determination of corrections has been applied to the site as a whole.

A description of the corrections can be found in Section 2.0 of this report. Table 5-11 details the corrections to be applied to the specific sound level at the nearest noise-sensitive receptors.

Table 5-11: Character is Noise Source at Receptors

Feature	Correction Range	Comment	Correction Applied	
			Daytime	Night-Time
Tonal	0 – 6dB	It is considered that tonal qualities would likely be associated with reversing alarms on	0dB	0dB

		external vehicles, however, based on the low specific sound contributions of these sources, once corrected for distance, in comparison to the background noise level, they are not considered perceptible enough at the NSR to accrue a correction.		
Impulsive	0 – 9dB	There is the potential for impulsive noise to be noticeable above the acoustic soundscape during glass tipping. However, due to the low level against the existing noise climate it is considered to be only just perceptible at the NSR.	3dB	0dB
Other Sound Characteristic	0 – 3dB	The intermittency of HGVs and RCVs would be distinctive against the residual acoustic environment during early	0dB	3dB

		morning (night-time) period.		
Intermittency	0 – 3dB	The general characteristics of the specific sound should not be significantly different or distinctive against the existing noise environment. Therefore, no correction has been applied.	0dB	0dB

Based on the data presented in Table 5-11 an acoustic feature correction of 3dB will be applied to the specific sound level at the nearest noise-sensitive receptors for the day and night-time period.

5.6 BS 4142:2014+A1 Assessment Results

The corrections described in Table 5-11 above have been added to the predicted specific sound levels shown in Table 13 to derive the rating levels at each of the nearest noise-sensitive receptors.

The rating levels have then been compared to the derived background sound levels and assessed accordingly.

The results of the BS4142:2014+A1:2019 assessment are shown in Table 5-12 for each of the receptors. It must be noted that the rating levels and the representative background sound levels have been rounded to the nearest decibel.

Table 5-12: BS4142:2014+A1:2019 Assessment

Receptor	Period	Derived Background Sound Level $L_{Aeq, T}$	Without Barrier			2m Barrier			3m Barrier		
			Predicted Specific Sound Level, $L_{Aeq, T}$	Predicted Rating Level, $L_{Ar, T}$	Difference Between Rating and Background Levels	Predicted Specific Sound Level, $L_{Aeq, T}$	Predicted Rating Level, $L_{Ar, T}$	Difference Between Rating and Background Levels	Predicted Specific Sound Level, $L_{Aeq, T}$	Predicted Rating Level, $L_{Ar, T}$	Difference Between Rating and Background Levels
NSR01	Daytime (0700 – 1900)	35	26	29	-6	25	28	-7	25	28	-7
	Daytime (1400 – 1500)	37	26	29	-8	25	28	-9	25	28	-9
	Night-Time (0600 – 0700)	35	27	30	-5	27	30	-5	27	30	-5

NSR02	Daytime (0700 – 1900)	37	30	33	-5	30	33	-5	29	32	-5
	Daytime (1400 – 1500)	38	30	33	-5	30	33	-5	30	33	-5
	Night-Time (0600 – 0700)	34	15	18	-17	15	18	-17	15	18	-17
NSR03	Daytime (0700 – 1900)	32	19	22	-10	19	22	-10	19	22	-10
	Daytime (1400 – 1500)	34	19	22	-12	19	22	-12	19	22	-12
	Night-Time	32	8	11	-22	8	11	-22	8	11	-22

	(0600 – 0700)										
NSR04	Daytime (0700 – 1900)	34	20	23	-11	20	23	-11	20	23	-11
	Daytime (1400 – 1500)	36	20	23	-13	20	23	-13	20	23	-13
	Night-Time (0600 – 0700)	31	10	13	-18	10	13	-18	10	13	-18
NSR05	Daytime (0700 – 1900)	35	37	40	5	36	39	4	35	38	3
	Daytime (1400 – 1500)	37	38	41	4	37	40	3	36	39	2

	Night-Time (0600 – 0700)	35	28	28	-4	28	31	-4	28	31	-4

5.7 Analysis of Results

It can be seen from Table 5-12 that:

- At NSR01, NSR02, NSR03 and NSR04, without and with an acoustic barrier in place at the northern site boundary, rating levels during the daytime periods range from -5 to -13dB below the background sound levels.
- At NSR01, NSR02, NSR03, NSR04 and NSR05, without and with an acoustic barrier in place at the northern site boundary, rating levels during the night-time period ranges from -4 to -22dB below the background sound levels.
- At NSR05 during the daytime:
    - Without an acoustic barrier in place, the exceedance of the rating level above the background level is +5dB during the peak period and +4dB over the average period.
    - With a 2m high barrier in place, the exceedance of the rating level above the background level is +4dB during the peak period and +3dB over the average period.
    - With a 3m high barrier in place, the exceedance of the rating level above the background level is +3dB during the peak period and +2dB over the average period.
- With reference to guidance contained within BS4142:2014+A1:2019, the results indicate that rating levels will be below the likely onset of adverse impact at all locations.

With reference to guidance contained within BS4142:2014+A1:2019, as rating levels are predicted to be less than 5dB above the background levels for the assessed scenarios, it is concluded that impact at noise-sensitive receptor locations will be low.

Regarding the installation of a barrier at the northern boundary, a barrier of 3m height is shown to provide a small amount of attenuation (2dB) of the specific sound, which will reduce the potential for adverse impact.

Further to the above, testing using the noise model shows that, for shorter single sound events, installation of the noise barrier can be expected to provide increased attenuation of L_{Amax} (or 'maximum') sound levels. For glass bulking the model shows that the L_{Amax} sound level at NSR05 (the nearest NSR) would be reduced by approximately 7dB, from 67dB(A) to 60dB(A), with the implementation of a 3m high barrier. As this level would not exceed the World Health Organisation recommended value of 60dB L_{Amax} outside the facades of living spaces (so that people may sleep with windows open), it is considered that noise impact during the daytime (when the majority of activities will take place) will not be significant.

To help understand the context of L_{Amax} sound levels at NSR05, Figure 3 displays the 15-minute logged L_{Amax} sound levels measured during the operational daytime periods and provides a comparison against the predicted L_{Amax} level (60dB(A)) from glass bulking, with the 3m high barrier

in situ. Analysis shows that L_{Amax} levels ranged from approximately 52dB(A) to 78dB(A) at NSR05, with 38% being greater than 60dB(A).

Figure 4: Comparison of Measured Baseline L_{Amax} and Predicted Glass Bulking L_{Amax} Sound Levels at NSR05

As glass bulking is likely the noisiest activity that will take place, this provides a good indication that a 3m acoustic barrier will assist in reducing the noise impact from other operational individual noise events.

A 3m high acoustic barrier has therefore been selected as the optimal barrier solution (taking into account considerations and constraints other than noise) to assist in reducing sound levels and minimising noise impact at NSRs as far as practicable.

It is considered that with the identified mitigation strategy, all reasonable steps have been taken to reduce sound levels at nearby noise-sensitive receptors.

6.0 Uncertainties

6.1 Baseline Sound Survey

BS4142:2014+A1:2019 requires consideration of uncertainty associated with measured baseline levels. Measurement uncertainty was minimised for the background sound measurement using the following steps:

- Measurement locations were representative of the nearest noise-sensitive receptors to the site;
- Measurement positions were located away from reflecting surfaces and leaf vegetation;
- Measurements were undertaken using a logging period of 15-minutes considered to provide representative background sound levels;
- The sound measurements included weekday and weekend periods;
- Measurements were rounded to the nearest one decimal place before the final calculations;
- Instrumentation was appropriate and in accordance with Section 5 of BS4142:2014+A1:2019; and
- The survey was undertaken by a competent acoustician.

6.2 Operational Noise Levels

BS4142:2014+A1:2019 requires consideration of uncertainty associated with the operational levels of the various noise sources utilised in the assessment.

Source data has been assumed to be worst-case. During detailed design it is considered that noise levels would reduce when specific plant is selected.

6.3 Predicted Noise Levels

Based on the accuracy of the prediction methodology, i.e. ISO9613-2, the uncertainty of the Cadna model accuracy, i.e. contour data, barrier corrections for buildings, etc., it is considered that the results of the assessment are as accurate as reasonably practicable and considered to be within +/-3dB.

6.4 Impact of Uncertainties

Although the above uncertainties could result in rating levels being higher relative to background sound levels, with the exception of NSR05, the rating level would still not exceed the typical background levels. It is therefore considered that absolute levels would remain low and therefore the impact would not change.

7.0 Noise Management Plan

The noise assessment in Sections 5 and 6 of this report has indicated that, in accordance with the guidance in BS 4142:2014+A1:2019, the predicted rating levels would be below the likely onset of adverse impact at all locations during the operation of the facility.

Notwithstanding this, best practice measures for the control of noise levels within the site would be implemented. These measures are detailed in the following sub-sections, along with other site management procedures.

7.1 Objectives

NMPs are developed and employed to the following principals:

- Identify and employ all appropriate measures to minimise the generation of noise and subsequent exposure/impact;
- Prevent exposure of people outside the site to levels of noise which would result in complaints; and
- Minimise the risk of unplanned 'noisy' events which have the potential to result in off-site noise complaints.

It is a working document with the specific aims of ensuring that:

- Noise impact is considered as part of all operations;
- Noise is primarily controlled at source by good operational practices, the correct use and maintenance of plant, and by operator training; and
- All appropriate measures are taken to prevent or, where that is not reasonably practicable to minimise noise emanating from the site.

7.1.1 Status

The specification for the periodic review and update of this NMP is on an annual basis as a minimum. The site's management team have overall responsibility for the implementation and administration of this NMP. The NMP is issued to all contractors on the site, and they are required to read and adhere to the NMP for the duration of their contract. This NMP is intended to be a live document which serves as a reference during daily operations on the site and as such, will be updated on a more frequent basis if:

- Significant changes are made to the plant and/or operations within the site;
- NRW requests that the NMP is updated, in their role as regulator; or

- Complaints are received, which on subsequent investigation result in the identification of further control measures or remedial action, in addition to those set out within this NMP.

7.2 Receptors

For reference, and in accordance with Appendix 4 of the H3 guidance, the closest receptors have been identified and are presented in Table 7-1. This also includes the representative background sound levels and predicted specific sound level (for daytime and night-time periods) at each receptor location, which are all identified as residential properties. The information in Table 19 is referenced to the NIA presented in Sections 5 and 6 of this document.

Table 7-1: Receptors

Receptor	Approximate Distance to Site Plant (Direction)	Representative Background Sound Level, L_{A90}	Specific Sound Level, L_{A90}
Residential property (holiday let – human receptor) adjacent to the west of the Site in between Robeston Cross and Robeston West (SA73 3TL). Representative of the group of properties in Robeston West including Lawn View and Little Welsh Wood.	200 (west)	35	25
Thornhill, residential property located to the north-east of the Site (SA73 3TN)	600 (north-east)	37	29
Woodson, residential property located in Lower Thornton (SA73 3UQ), to the east of the Site	1100 (east)	32	19
Rickeston Water, residential property located in Rickeston (SA73 3TJ), to the west of the Site.	1000 (west)	34	20
Residential property at Robeston Cross, to the north of the Site.	80 (north)	35	35

Section 5.3 of the NIA identifies the noise sources on site for each phase of the proposed development. As each receptor is located at a different distance and direction from the site (as

per Table 19), the contributing noise sources will be different depending on their relative position within the site.

Following the receipt of a complaint, the noise sources should be revised based on the perception of operations at the noise-sensitive receptors.

7.3 General Noise Management

7.3.1 Sources of Noise

The sources of noise to which this Noise Management Plan relates to are included in the Noise IMPACT Assessment. Plant included is all plant that operates under normal conditions. The plant is identified in Section 7.3.

7.3.2 Site Infrastructure Design

The design of the site's infrastructure affords a level of noise mitigation and management including:

- A 3m high acoustic barrier (a Gramm METASoundBlok (Rated A5 and B3) is installed at the site's northern boundary and the western side of the Phase 3 covered glass bay;
- The glass bay is covered and located behind the main recycling building. It is also surrounded by a 4m high bay wall;
- During the night (between the hours of 5am and 7am) HGV departures are rerouted to use the southern access, removing the need for HGV movements on the northern internal road (i.e. the distance between HGV movements and receptors is increased) during the most sensitive operational hours;
- With the exception of the WRC, in which all activities are outdoors, waste sorting and baling operations are only carried out within the main recycling building. At the WRC all waste operation activities occur within the appropriate designated containers/areas; and
- Doors to the recycling building and residual building will be in regular use during normal operational hours, but will remain closed where practicable.

7.3.3 Plant Operations

Within the constraints of efficient site operations and the requirements of the relevant British Standards, the following mitigation measures are observed:

- The use of particularly noisy plant is limited, i.e. wherever possible, particularly noise plant is not used early in the morning;

- The number of plant items in use at any one time is minimised;
- Plant maintenance operations are undertaken within the Phase 2 area as far away from noise sensitive receptors as possible;
- All vehicles are washed and re-fuelled at the end of the day when vehicles return as opposed to early in the morning;
- Collection vehicles are reversed into parking spaces at the end of the day to reduce the noise from reversing beacons early in the morning;
- Vehicle idling time on site is minimised;
- The speed of vehicle movements is kept to a minimum, and speed limits are implemented on site to reduce noise levels associated with high engine speeds;
- Operations are designed to be undertaken with any directional noise emissions pointing away from noise sensitive receptors where practicable; and
- When replacing older plant, the quietest plant available is considered wherever possible.

7.3.4 Training

The site induction programme and site rules include good working practice instructions for site staff, supervisors and contractors to help minimise noise whilst working on the site.

The working practice instructions include, but are not limited to, the following points:

- Avoid unnecessary revving of engines;
- Minimise drop heights where practicable;
- Plant used intermittently should be shut down between operational periods;
- Avoid reversing wherever possible;
- Drive carefully and within the site speed limit at all times;
- Report any defective equipment/plant as soon as possible so that corrective maintenance can be taken; and
- Site personnel are trained in the need to minimise noise and are responsible for monitoring and reporting excessive noise when carrying out their everyday roles.

7.3.5 Maintenance

A high level of equipment servicing and maintenance is adhered to on site, including:

- Visual and aural inspections and checks of all plant and equipment, to ensure that any interim maintenance is identified and repairs are undertaken by a qualified engineer as soon as possible, i.e. a 'stop and fix' policy, utilising spare parts held on site in the event of required maintenance;
- All servicing and maintenance of plant is conducted in line with manufacturers recommendations, and subject to the planned preventative maintenance schedule;
- Where maintenance is required, this is undertaken as far away from receptors as possible;
- All equipment maintenance is recorded in the maintenance record and checklists contained within the EMS; and
- Site access and operational areas are maintained and repaired to minimise noise resulting from uneven and poor surfacing.

7.3.6 Public Relations

It is essential to maintain good public relations with local residents; therefore, the following procedures are implemented on site:

- Maintaining a tidy and efficient site;
- Advance notice and an explanation of activities is given for anything that might cause complaint;
- All staff are environmentally aware and are trained to deal with complaints and issues;
- Good lines of communication are ensured by:
    - Nominating a point of contact for issues relating to the site;
    - Keeping a systematic record of complaints and the remedial actions taken (see Section 7.4);
    - Following up complaints with correspondence and action;
    - Being prepared to be flexible; and
    - Trying to co-operate and avoid being adversarial.

7.3.7 Incidents that may Influence Noise Risk

In line with Public Relations the following may be considered important when considering noise impact upon nearby NSRs:

- Abnormal operations such as the rerouting of HGVs due to road repairs.

- Emergency works such as the testing of alarms. Tests should be completed on a weekday at a less intrusive time, for example 10 am.
- Emergency operations such as a power or outage requiring the use of the sites backup generator.
- Machinery breakdown resulting in less processing equipment being used and waste likely needing to be redirected elsewhere. Waste present onsite may need to be removed- thus increased use of HGVs and small mobile plant.
- A fire incident. Sorting kit and machinery shut down, but increased use of cleaning equipment; may also be associated with increased use of small mobile plant to move waste around, and increased use of cleansing equipment for clean-up.
- Spillage: possibly pausing certain operations or traffic if spillage is on access road; while increased use of cleansing equipment.
- Odour or dust incident. Waste may need to be rapidly removed from site, thus increased use if HGVs; and cleansing equipment.

Should any of the above occur consideration must be given to informing NSRs and updating the residents as appropriate.

7.4 Complaints Procedure

A complaints system is maintained by PCC for the site, ensuring that any complaints relating to noise are recorded and investigated as appropriate.

The site's management team are the point of contact in the event of a complaint regarding noise from within the site. Each noise complaint will be logged upon receipt and a record of all complaints will be kept including the remedial actions taken. This will be via the use of a record sheet contained within the EMS which follows the format in Table 7-2.

Table 7-2: Noise Complaint Form

Noise Complaint Form	
Name and address of complainant	
Contact number for complainant	
Date and time of complaint	

Date, time and duration of offending noise	
Weather conditions e.g. dry, rain, fog, snow	
Wind strength and direction, e.g. light, steady, strong, gusting	
Complainant's description of noise e.g. hiss, hum, rumble, continuous, intermittent	
Does complainant have other comments about the offending noise?	
Any other previous known complaints relating to the site? (All aspects, not just noise)	
Potential noise sources that could give rise to the complaint	
Operating conditions at the time the offending noise occurred	
Any other relevant information	
Action taken	
Final outcome	
Date:	Form completed by:
Reference No.:	Signed:

7.4.1 Receipt of a Complaint or Request from NRW

If a complaint is received by a local resident, an investigation shall be instigated within one working day to identify the cause of the complaint.

Such an investigation will involve the identification and possible cessation of the activity or activities considered to be the cause of the complaint and/or the investigation of mitigation measures to reduce the noise emission levels from the activity or activities.

Any deviation from agreed working practices shall be identified immediately and conformance to the working practice reinstated.

A complaints response system is maintained by PCC, enabling any complaints regarding noise to be reported and appropriate action taken.

7.5 Noise Monitoring

If continuous offsite noise emissions are detected, alongside complaints being received by members of the public, correspondence with NRW would be undertaken to discuss the potential requirement for quantitative noise monitoring at the areas / receptors of concern.

7.6 Conclusion

SLR has been appointed by WRAP on behalf of PCC to produce a NIA and a NMP for the Eco-Park in Milford Haven, Pembrokeshire.

The NMP is required in support of the site's permit application and has been based on the requirements presented in Horizontal Guidance Note IPPC H3 (Part 2). It has been supported by a NIA which has been undertaken in accordance with the guidance of BS4142:2014. This standard is intended to be used to assess the potential impact of sound (of an industrial or commercial nature) at noise-sensitive receptors within the context of the existing noise environment.

The NIA has found that noise rating levels are predicted to be less than 5dB above the background levels for the assessed scenarios and it is concluded that impact at noise sensitive receptor locations will be low.

The NMP includes guidance on general noise management of plant operations, and details of the steps that should be taken if a noise complaint is received by a local resident.

Appendix 1: Monitoring Equipment in Situ

Figure 5 Monitoring Position MP1

Figure 6 Monitoring Position MP2

Figure 7 Monitoring Position MP3

Figure 8 Monitoring Position MP4

Appendix 2: Monitoring Results

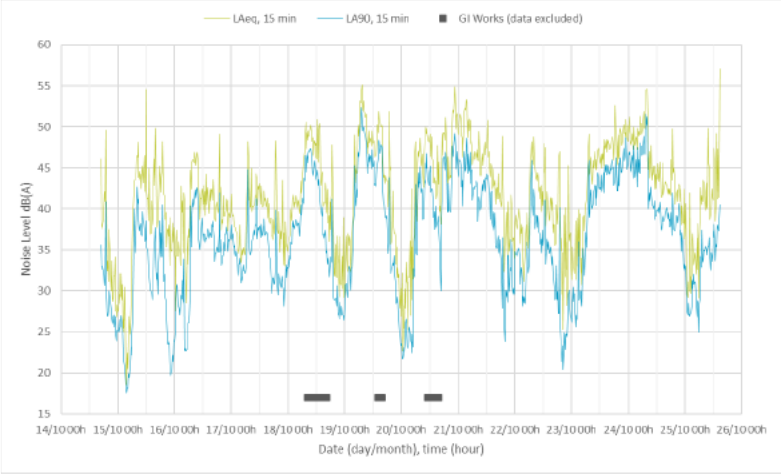

Figure 9 Time-history Sound Levels at MP1, dB (A)

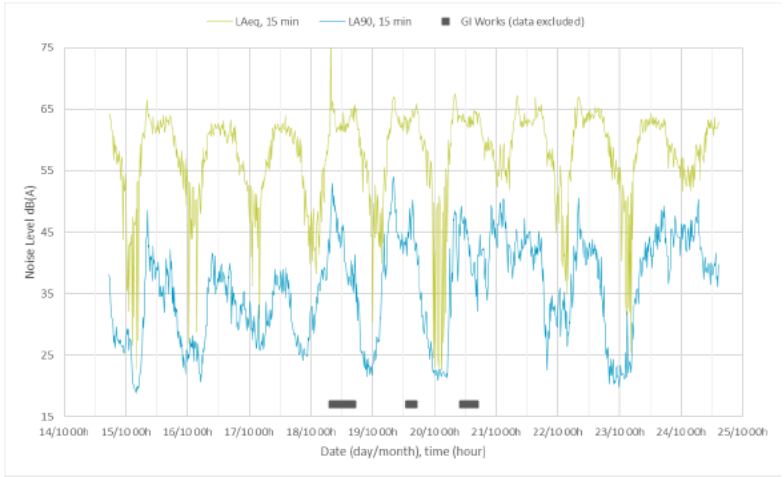

Figure 10 Time-history Sound Levels at MP2, dB(A)

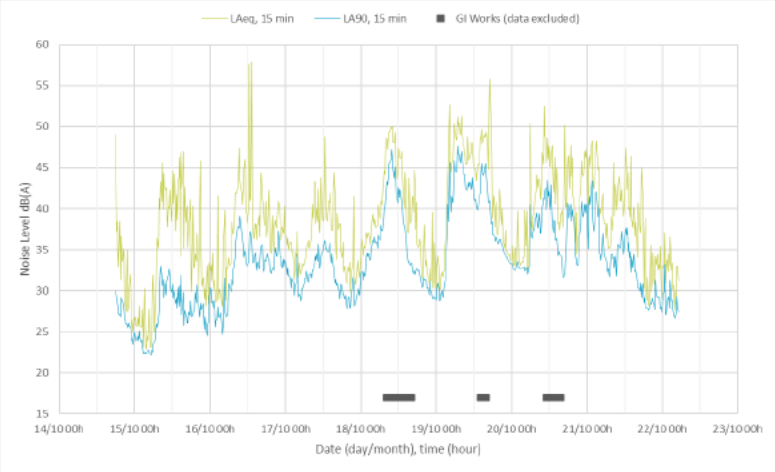

Figure 11 Time-history Sound Levels at MP3, dB(A)

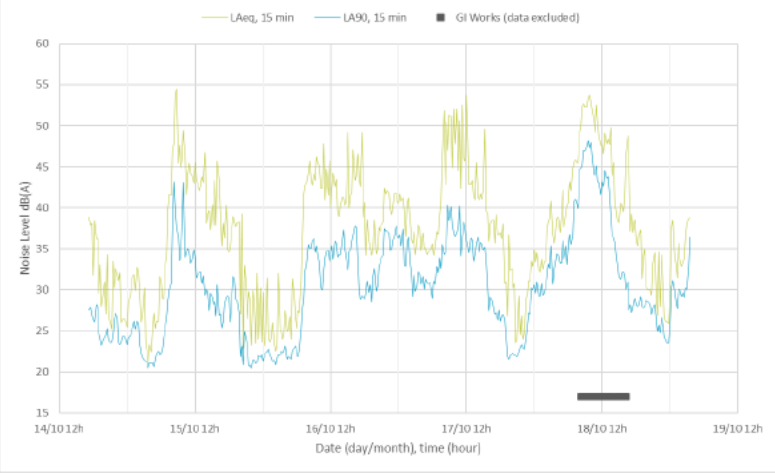

Figure 12 Time-history Sound Levels at MP4, dB(A)

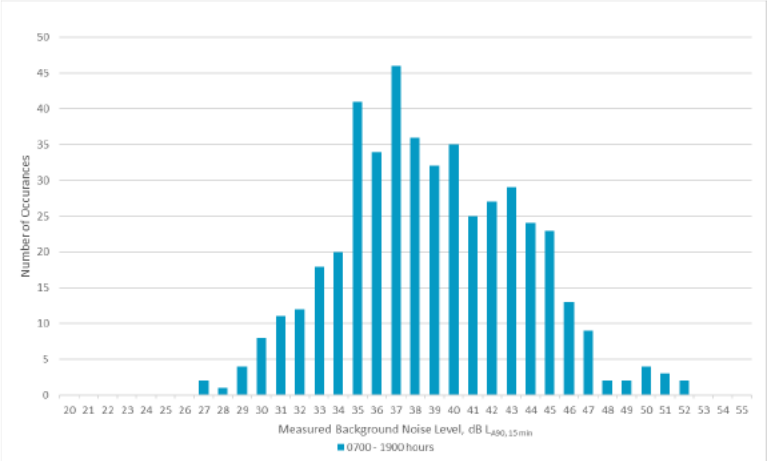

Figure 13 Occurrence of Background Sound Levels at MP1, Daytime

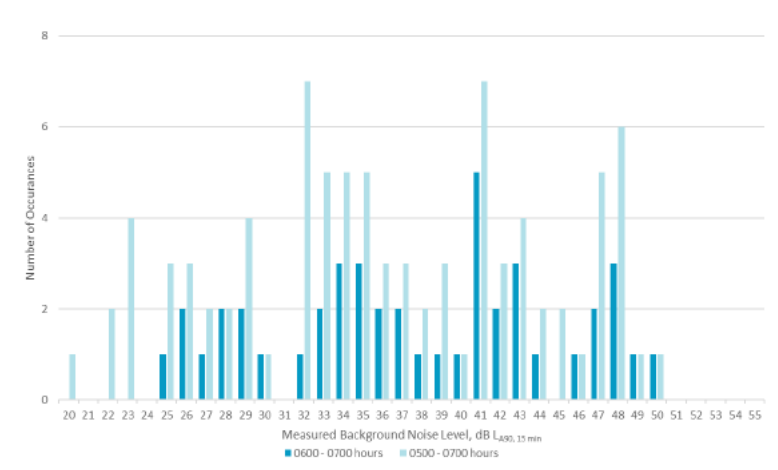

Figure 15 Occurrence of Background Sound Levels at MP1, Night-Time

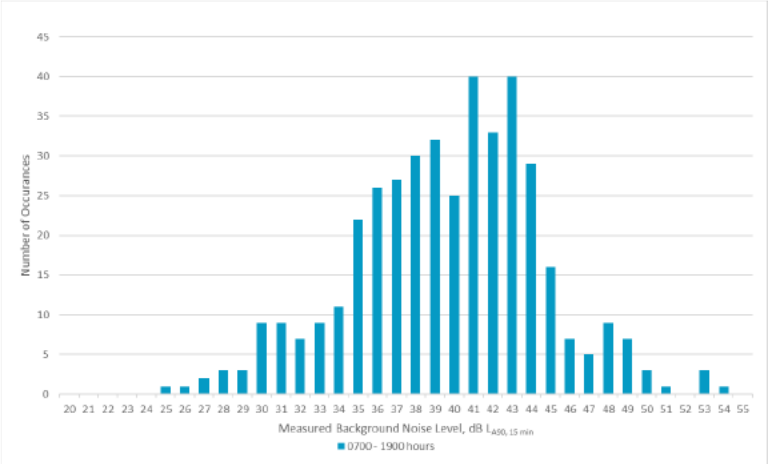

Figure 14 Occurrence of Background Sound Levels at MP2, Daytime

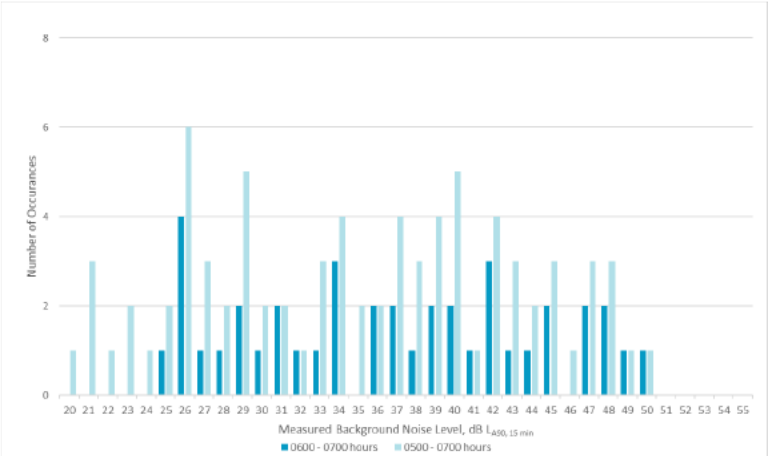

Figure 15 Occurrence of Background Sound Levels at MP2, Nigh-time

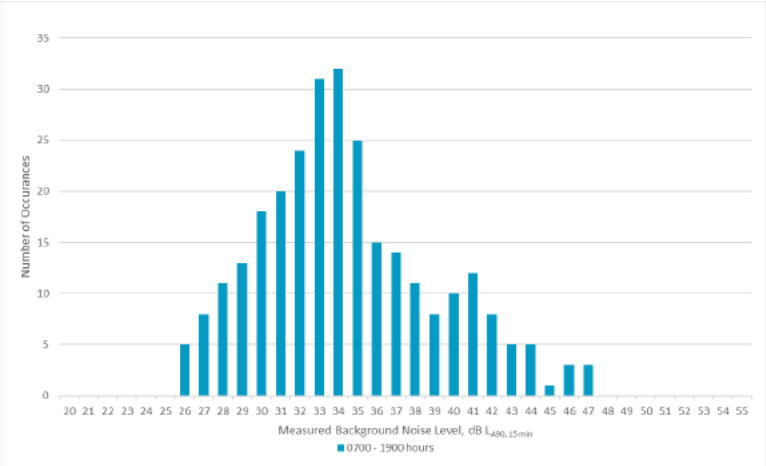

Figure 16 Occurrence of Background Sound Levels at MP3, Daytime

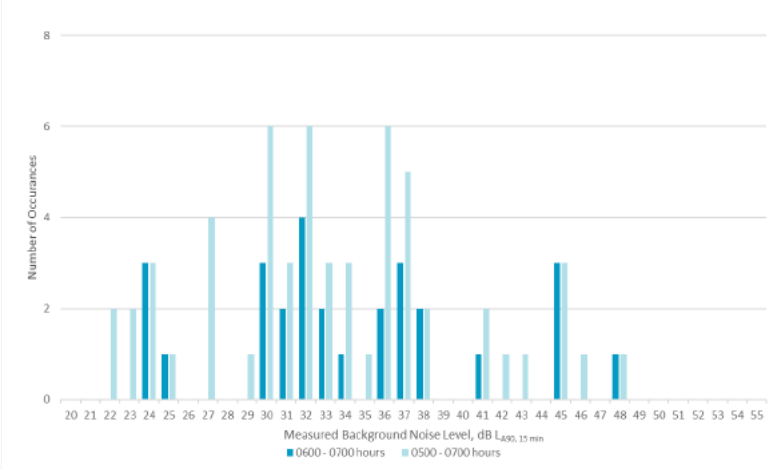

Figure 16 Occurrence of Background Sound Levels at MP3, Night-time

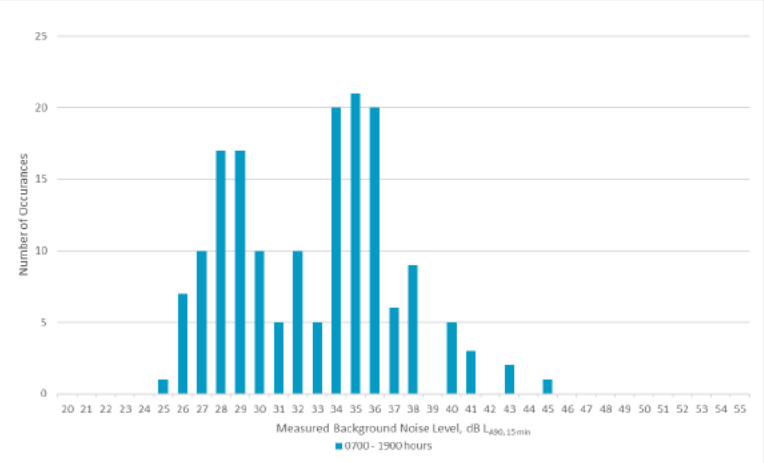

Figure 18 Occurrence of Background Sound Levels at MP4, Daytime

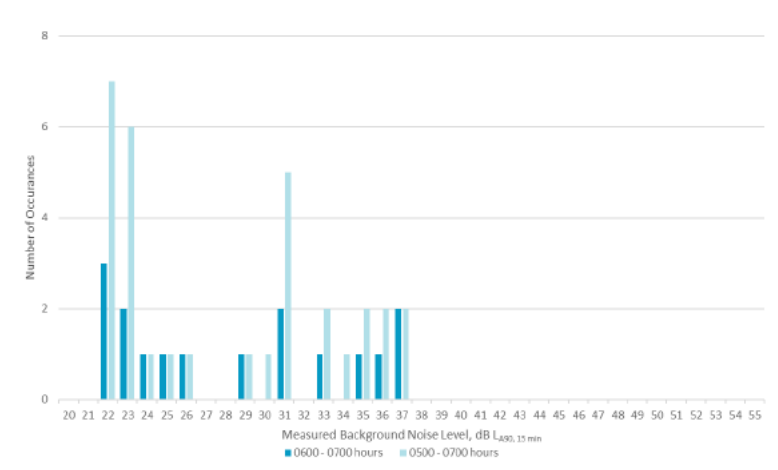

Figure 17 Occurrence of Background Sound Levels at MP4, Night-time

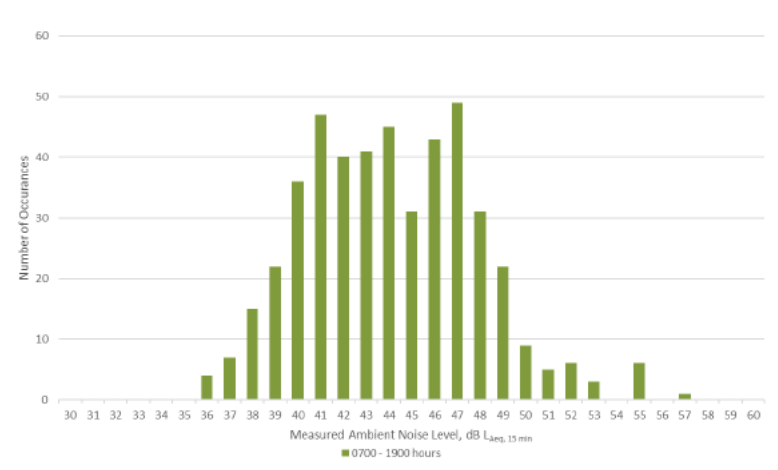

Figure 20 Occurrence of Ambient Sound Levels at MP3, Daytime

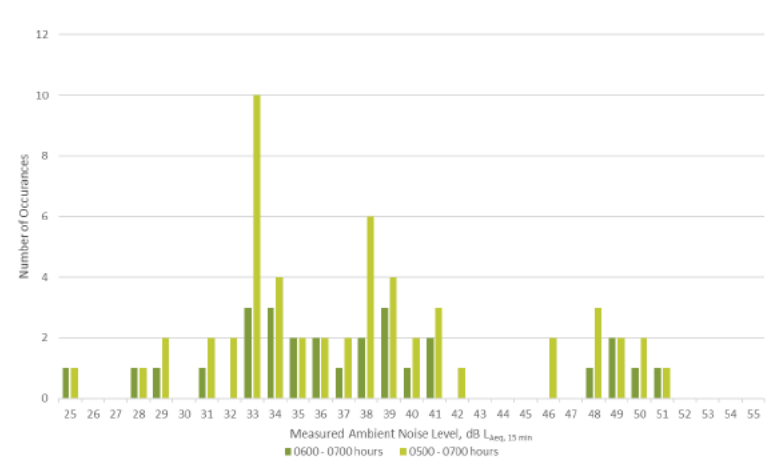

Figure 19 Occurrence of Ambient Sound Levels at MP3, Night-time

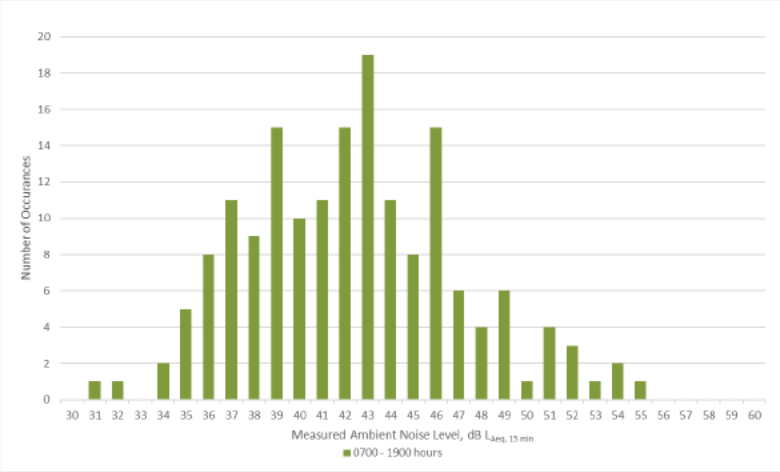

Figure 21 Occurrence of Ambient Sound Levels at MP4, Daytime

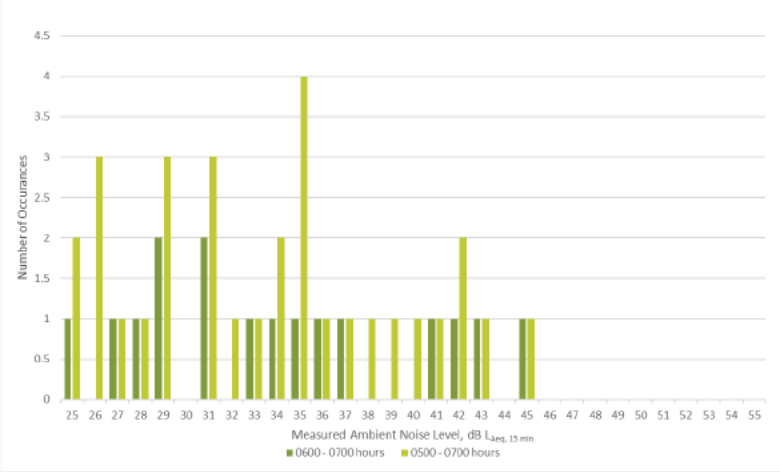

Figure 20 Occurrence of Ambient Sound Levels at MP4, Night-time

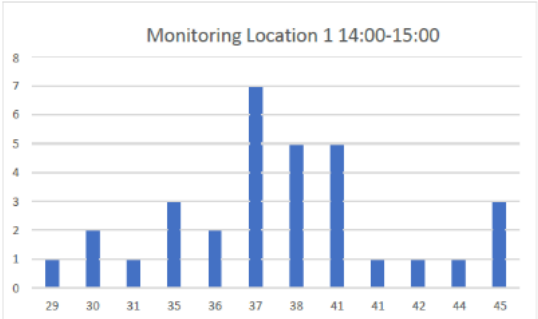

Figure 22 Occurrence of Background Sound Levels at MP1, 1400 – 1500

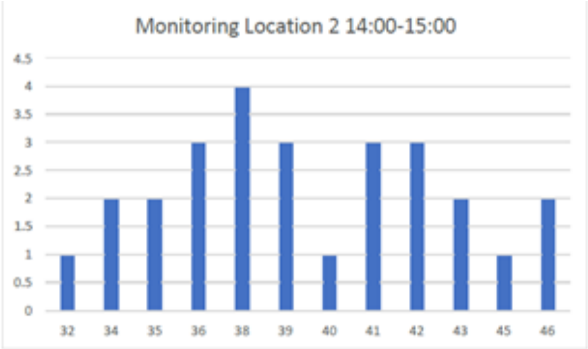

Figure 23 Occurrence of Background Sound Levels at MP2, 1400 – 1500

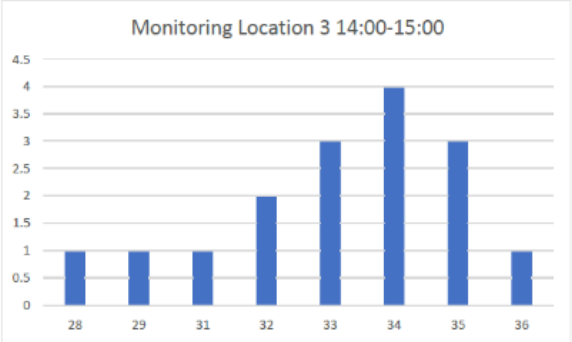

Figure 24 Occurrence of Background Sound Levels at MP3, 1400 – 1500

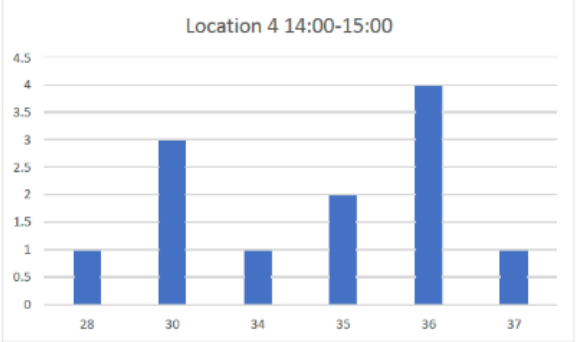

Figure 25 Occurrence of Background Sound Levels at MP4, 1400 – 1500

WRAP's vision is a thriving world in which climate change is no longer a problem.

Our mission is to make the world a more sustainable place. We bring people together, we act on the facts, and we drive change.

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