Paul Horsley Acoustics Ltd
Acoustics & Noise Control Consultancy

Acoustic Report

Grangetown Prairie
Energy from Waste Development
Pre-Works Baseline Noise Survey

Our Reference – J2895

Survey Dates – 5th to 6th December 2019

Survey and Report by – Paul Horsley MIOA

Report compiled by: Paul Horsley MIOA

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Limitations

The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at that time.

All of the comments and opinions contained in this report, including any conclusions, are based on the information obtained by Paul Horsley Acoustics Ltd during our investigations.

There may be other conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

Any diagram or opinion of the possible configuration of the findings is conjectural and given for guidance only and confirmation of intermediate ground conditions should be considered if deemed necessary.

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a) the date on which this assessment was undertaken; and
b) the date on which the final report is delivered.

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EXECUTIVE SUMMARY

A Noise Assessment has been undertaken by our Noise Consultant for a planning application for the proposed development of a parcel of land at Grangetown Prairie, Cleveland.

It is proposed to develop the site for use as an Energy from Waste facility. At this stage this proposal is outline only.

Daytime, evening and night time measurements were undertaken between 5th and 6th December 2019 at 3 No nearby residential locations. The noise measurements established typical ambient and background noise levels at these locations.

At this stage of the development detailed floor plans or layouts have not yet been produced. In order to determine the limitations for noise from the proposed site, the noise data gathered outside the closest noise sensitive premises will be utilised.

There are 2 No specific considerations to be made for such a large development, these being;
1 – Construction Phase and 2 – Operational Phase.

Use has been made of the National Standards available for such applications, with BS5228:2009-1+A1:2014 and BS4142:2014 respectively.

The proposed limits for the noise output from the site have been provided in order to achieve the requirements of the above Standards. These limits consider all relevant time periods including Daytime, Evening and Nighttime periods, since the site is proposed to operate 24 hours daily.

Mitigation selections should take cognisance of the limitations proposed for the cumulative effect of the site construction and operation once commissioned

Provided the limitations are adhered to there should be no loss of existing amenity for the nearby residential premises considered and as such no complaints relating to noise generated by the site activities.

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1.0 INTRODUCTION

1.1 The noise assessment has been conducted in accordance with the guidance set out in BS4142:2014.

1.2 This report therefore describes a noise survey of the noise sensitive areas closest to the proposed position of the site, the subsequent analysis to determine the noise environment of the proposed development and it then compares the results with the adopted criteria. Recommendations are also made with respect to the design noise limitations for the future development.

1.3 Whilst every effort has been made to ensure that this report is easy to understand, it is technical in nature. To assist the reader, a glossary of terminology is included in Appendix A.

2.0 THE SITE

Site Location

2.1 The site under consideration is a vacant plot of brown field land, formerly known as South Tees Eco Park and now identified as Grangetown Prairie forms part of the South Tees Development Corporation Master Plant for the re-development of the area.

2.2 The site is located to the northern side Grangetown, Cleveland approximately 6.5Km to the northeast of Middlesborough Town Centre.

2.3 The specific site under consideration is a single parcel of land within the overall development site described above which contains 6 No plots. The parcel is positioned to the north western corner of the site and is primarily rectangular in shape occupying an area of land approximately 350m x 400m maximum. Refer to Figure 1 for a site locational plan.

Site Description

2.4 The plot of land under consideration is best described as undulating and currently has no specific road access, other than to the western perimeter from Eston Road and on-site tracks from the nearby former British Steel works positioned approximately 750m east of the site.

2.5 The site is best described as a fallow plot of waste land.

2.6 The site is bounded to the north by a railway line serving the former industrial sites and the east coast towns south of the Tees. The eastern and southern site boundaries are to be formed by the other parcels of development land, whose uses are not yet identified, with new access roads formed at the boundary of these parcels of land. The western site boundary will be formed by a newly built primary access road leading from a new roundabout at the junction with Eston Road and Middlesborough Road East. Beyond the western site boundary are established industrial units serving heavy industry in the area.

2.7 The A66 trunk road is located approximately 480m beyond the southern site boundary and will form the primary access road onto the site via Eston Road.

Receptor Locations

2.8 The closest noise sensitive receptors to the proposed development site are positioned south of the A66 trunk road.

2.9 The sample receptor positions considered within this report are representative of the dwellings closest to the site and are equidistant to the A66.

2.10 The closest noise sensitive receptor locations considered are provided in the following table

Table 2.1 Receptor Locations

Location No	Receptor Position	Distance and Orientation from Site
1	No 21 Jones Road	660m SW
2	No 3 St James Court	560m SSE
3	No 139 Bolkow Road	825m ESE

3.0 GUIDANCE

3.1 The purpose of any criterion or standard for environmental noise should be to safeguard against unacceptable levels of community response, deemed as a feeling of annoyance during daytime or disturbance at night. WHO defines annoyance as "a feeling of displeasure evoked by noise."

3.2 The main source of information relating to noise and the community response are field studies including noise measurements and social surveys. They attempt to establish a correlation between the two sets of results.

3.3 In the absence of any definitive guidance and in order to establish suitable noise criteria, it is necessary to rely on general guidance and assessment methods used for community noise sources. Discussions on the current methods are given below.

3.4 The newly incumbent National Planning Policy Framework, NPPF, provides advice to planning authorities in England on how they must seek to minimise the adverse impact of noisy activities on noise sensitive receptors. This NPPF, replacing PPG 24, and is not prescriptive with respect to specific noise levels, and is mainly concerned with the advising on good practice for environmental noise assessment.

3.5 In the absence of definitive noise criterion within the NPPF most Local Authorities in England default to the daytime noise levels inside dwellings not to exceed NR 35; and NR 25, to be achieved inside dwellings at night to avoid sleep disturbance, based upon ingress of external noise sources.

3.6 The NPPF guides that, where a development plan does not exist, is silent or is out of date, a Local Authority should grant permission unless:
"…any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole".

3.7 This assessment will therefore seek to address whether there will be any adverse impacts from the proposed development and to quantify those impacts if they exist.

Noise Policy Statement for England

3.8 The document "Noise Policy Statement for England" sets out the following vision for ongoing noise policy:

"Promote good health and a quality of life through the effective management of noise within the context of Government policy on sustainable development."

3.9 This vision should be achieved through the following Noise Policy Aims:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:"
"avoid significant adverse impacts on health and quality of life;"
"mitigate and minimise adverse impacts on health and quality of life; and"
"where possible, contribute to the improvement of health and quality of life."

3.10 To achieve this vision the Noise Policy Statement sets three noise levels to be defined by the assessor:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.

3.11 The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL Noise levels, the Policy Statement requires that:

"all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development….. This does not mean that such adverse effects cannot occur."

3.12 Where noise levels are below the LOAEL it is considered there will be no adverse effect. Once noise levels are below the NOEL there will be no observable change.

British Standard 8233: 2014

3.13 The scope of British Standard 8223: 2014: *Sound insulation and noise reduction for buildings* is the provision of guidance for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations; the primary intention of these is to guide the design of new buildings or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

3.14 The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 3.1.

Table 3.1 - Indoor Ambient Noise Levels in Spaces When They Are Unoccupied

Activity	Typical Situations	Design Range LAeq, T dB	
		0700h to 2300h	2300h to 0700h
Resting	Living rooms	35	--
Dining	Dining Room / Area	40	--
Sleeping	Bedrooms	35	30

3.15 BS8233 states in Note 4 that:

"Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values."

3.16 As such it has been considered appropriate to define a limit for regular maximum indoor noise levels of 45dB(A) with sporadic events not exceeding 50dB(A).

3.17 BS8233 also suggests noise limits for external areas or a property such as gardens or balconies. It states that:

'For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized

that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centre's or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.'

British Standard 4142:2014 "Method for Rating and Assessing Industrial and Commercial Sound'

3.18 This recently revised standard provides a method for rating and assessing sound of an industrial and/or commercial nature. The method uses outdoor sound levels to assess the likely effect of sound on people who might be inside or outside a dwelling or premises used for residential purposes. It is limited to applicable sounds and is not intended for noise amounting to nuisance or rating noise outside the scope of the Standard.

3.19 Unlike the previous version of the Standard, rating levels are not prescriptive, but more context based, with the following applicable to rating values:

3.20 Typically, the greater this difference (variance between impact of background and rating level), the greater the magnitude of impact.

3.21 A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context.

3.22 A difference of around +5 dB is an indication of an adverse impact, depending upon the context.

3.23 The lower the rating level is relative to the measured sound level, the less it is that the specific sound source will have an adverse impact or a significant impact. Where the rating does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon context.

3.24 The Standard introduces additional rating elements, these being subject assessments of tonality, and impulsivity of a sound source, with weighted rating values accordingly applied at the judgment of the assessor.

3.25 The introduction of Uncertainty has been applied to the measured values; again, consideration of this is left to the professional executing the survey and assessment. However, steps are provided within the Standard for the reduction of uncertainty in both measurement and calculations of the sound source and rating value.

3.26 Actual meteorological conditions are now required to be recorded and reported upon for the survey and report.

BS 5228-1: 2009 +A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 (Noise)

3.27 This code of practice provides guidance and recommendations on methods for the measurement of construction noise and assessing its impact on those exposed to it. It also makes reference to the legislative background to noise control on construction sites and gives recommendations for basic methods of noise control. Suitable methods are provided for the calculation of noise from construction activities, including basic information regarding noise levels from a range of construction equipment.

3.28 The standard provides guidance for the identification of the significance of noise levels from surface construction activity. Significance can be considered in relation to fixed limits for noise and vibration, or alternatively in considering the potential change in the ambient noise level with the construction noise. A significance criterion is developed from noise measurements of existing ambient noise levels at the nearest sensitive receptors to the site. Sensitive receptors are considered to be residential housing; hotels and hostels; buildings in religious use; buildings in educational use and buildings in health and/or community use.

3.29 Measurements of the ambient noise level at the sensitive receptors are the basis of the significance criteria. The measured ambient noise level is rounded to the nearest 5dB(A).

3.30 Section E.3.2 of BS5228:2009-1+A1:2014 provides an example of an appropriate significance methodology, based on an 'ABC' methodology. This is an example indicating the threshold of potential significant effect at dwellings when the site noise level, rounded to the nearest decibel,

exceeds the listed value. The table can be used as follows: for the appropriate period (night, evening/weekends or day), the ambient noise level is determined and rounded to the nearest 5 dB. This is then compared with the site noise level. If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessment then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect.

Table 3.2: Example threshold of potential significant effect at buildings, BS5228:2009-1+A1:2014 (Table E.1)

Assessment category & threshold value period	**Threshold Value, in decibels (dB), $L_{Aeq,T}$**		
	Category A[A)]	**Category B[B)]**	**Category C[C)]**
Night-time (2300 – 0700)	45	50	55
Evenings and Weekends[D)]	55	60	65
Daytime (0700-1900) & Saturdays (0700-1300)	65	70	75
Note 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level			
Note 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.			
Note 3 Applied to residential receptors only.			
[A)] Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. [B)] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. [C)] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values. [D)] 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.			

3.31 The effects of construction noise are temporary and defined by the intrusion that construction noise causes in the existing noise environment (or soundscape) of the area. If, when considering mitigation, the noise levels are still above the relevant threshold in Table E.1 of BS 5228-1 (Table 1), the standard states that noise insulation may be offered (using the discretionary powers provided by Regulation 5 of the Noise Insulation Regulations) if those noise levels remain for a long enough period of time (i.e. for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months).

4.0 ENVIRONMENTAL NOISE SURVEY

Survey Equipment

- Integrating Sound Level Meter, RION NA-27, Type 1, Serial No 431986
- RION UC-53A Microphone Serial No 307060
- RION NC-74 Calibrator Serial No 530712
- Windshield
- Tripod

Survey Methodology

4.1 An attended pre-development environmental noise assessment survey was carried out encompassing daytime, late evening and nighttime periods between 5th and 6th December 2019 by the author. The noise measurements established typical ambient and background noise levels externally at the closest noise sensitive dwellings to the proposed site.

4.2 LA_{eq}, $LA_{90,}$ $LA_{10\ and}$ LAF_{max} sound measurements were taken using the sound analyser. The meter was calibrated before and after the measurements using the calibrator to ensure accuracy of the results. No variations were noted between calibrations and the results obtained can be deemed to be an accurate representation of the levels recorded.

4.3 The measurement indices noted above are defined as follows:

LA_{eq}, T	the "A" weighted equivalent continuous noise level of sample period T
LA_{10}, T	the "A" weighted level exceeded for 10% of sample period T
LA_{90}, T	the "A" weighted level exceeded for 90% of sample period T
$L_{AF_{max}}$	The "A" weighted maximum level during the sample period T

4.4 In order to ascertain the existing typical background noise climate, sound recordings were taken over contiguous 15 minute sample periods during the daytime, late evening and nighttime periods.

4.5 The meter was mounted on the tripod at a height of 1.5m above ground and at least 3m from any reflective plain.

4.6 The equipment used during the survey is detailed above. The noise monitoring equipment has been calibrated to a traceable standard within the 2 years preceding the survey. Calibration certificates are available upon request.

4.7 3 No measurement locations were surveyed in order to establish the typical ambient and background noise levels close to the proposed development site. The measurement locations are hereby referred to in this report as follows:

'Location 1' – sound level meter positioned adjacent to No 21 Jones Road, 660m SW of site.
'Location 2' – sound level meter positioned outside No 3 St James Court, 560m SSE of site.
'Location 3' – sound level meter positioned outside No 139 Bolkow Road, 825m ESE of site.

4.8 The measurement locations are shown within Figure 1.

Prevailing Weather Conditions

4.9 Weather conditions during the survey were as follows:

5th Dec 2019 - Daytime – 8°C, Overcast sky, Wind 0-10 mph SW, 1010mb, 79% rh.
5th Dec 2019 – Evening – 11°C, Overcast sky, Wind 0-10 mph SW, 999mb, 84% rh.
6th Dec 2019 - Nighttime – 12°C, Overcast sky, Wind 0-10 mph SW, 994mb, 85% rh.

Noise Survey Results

4.10 During the monitoring period separate noise samples were recorded, using a 1/1 Octave Centre Band analysis. These monitoring samples were collected from the noise sensitive positions described above, generally at the same location for daytime, evening and nighttime periods. This was to establish the general baseline noise levels experienced by the dwellings prior to the development commencing.

4.11 The table of results on the following pages indicate the noise levels recorded for the site location selected during the monitoring period, with a brief description of the noise sources contributing to the individually monitored noise levels recorded.

4.12 The above monitoring locations should be read in conjunction with the site layout appearing in Figure 1 of this report.

4.13 Refer to Appendix B for the survey results frequency analysis table.

Noise Survey Results Tables

4.14 Below are the table of results for the baseline noise monitoring completed outside the closest relevant noise sensitive residential premises to the proposed Grangetown Prairie site

Table 4.1 Location 1 Results – Jones Road

Location	Period	Data ID	LAmax	LAeq	LA10	LA90	Measurement Duration	Date	Time	Comment
			dB	dB	dB	dB				
1	Daytime	1	74.1	58.0	60.4	52.9	00:15:00.00	05-12-2019	09:05:15	Traffic flow along A66 and local road network dominant source.
		2	68.5	55.6	57.5	52.9	00:15:00.00	05-12-2019	09:20:15	
		3	74.5	58.4	60.1	53.5	00:15:00.00	05-12-2019	09:35:15	
		4	76.8	59.2	60.0	52.9	00:15:00.00	05-12-2019	09:50:15	
		5	73.1	56.7	58.1	52.9	00:15:00.00	05-12-2019	10:05:15	
		6	66.5	55.9	58.4	52.2	00:15:00.00	05-12-2019	10:20:15	
		23	63.6	55.9	58.0	52.9	00:15:00.00	05-12-2019	17:58:56	
		24	62.8	56.4	58.8	53.4	00:15:00.00	05-12-2019	18:13:56	
Average Daytime Values			**72.4**	**57.8**	**59.0**	**53.0**				
1	Evening	25	65.4	56.8	59.4	52.0	00:15:00.00	05-12-2019	20:34:13	Traffic flow along A66 and local road network dominant source.
		26	59.6	54.6	55.6	51.5	00:15:00.00	05-12-2019	20:49:13	
		27	59.9	56.7	58.1	55.6	00:15:00.00	05-12-2019	21:04:13	
		28	55.3	54.1	55.0	53.0	00:15:00.00	05-12-2019	21:19:13	
Average Evening Values			**61.5**	**55.7**	**57.4**	**53.3**				
1	Nightime	37	56.5	47.7	50.2	42.9	00:15:00.00	06-12-2019	00:10:24	Traffic flow along A66 and local road network dominant source. Birdsong audible during early morning period
		39	51.0	43.8	46.6	40.5	00:15:00.00	06-12-2019	00:25:24	
		40	62.4	50.5	53.0	40.7	00:15:00.00	06-12-2019	00:40:24	
		54	48.2	40.7	42.6	38.3	00:15:00.00	06-12-2019	00:55:24	
		53	61.4	49.4	50.6	42.3	00:15:00.00	06-12-2019	05:30:49	
		38	59.8	53.3	57.6	47.7	00:15:00.00	06-12-2019	05:45:49	
		55	69.2	57.7	60.6	50.4	00:15:00.00	06-12-2019	06:00:49	
		58	63.7	55.0	58.2	49.1	00:15:00.00	06-12-2019	07:10:54	
Average Nighttime Values			**62.8**	**52.5**	**55.5**	**46.0**				

Table 4.2 Location 2 Results – St James Court

Location	Period	Data ID	LAmax	LAeq	LA10	LA90	Measurement Duration	Date	Time	Comment
			dB	dB	dB	dB				
2	Daytime	7	68.7	59.1	62.2	54.0	00:15:00.00	05-12-2019	11:02:17	Traffic flow along A66 and local road network dominant source.
		8	70.4	59.0	61.7	55.0	00:15:00.00	05-12-2019	11:17:17	
		9	67.7	57.8	59.8	54.6	00:15:00.00	05-12-2019	11:32:17	
		10	70.3	58.5	61.1	53.7	00:15:00.00	05-12-2019	11:47:17	
		11	70.7	60.2	63.1	54.0	00:15:00.00	05-12-2019	12:02:17	
		12	71.3	59.6	61.8	56.3	00:15:00.00	05-12-2019	12:17:17	
		21	69.2	58.4	61.5	53.4	00:15:00.00	05-12-2019	17:22:30	
		22	70.8	60.6	64.6	54.2	00:15:00.00	05-12-2019	17:37:30	
Average Daytime Values			**70.0**	**59.2**	**62.2**	**54.5**				
2	Evening	29	62.5	57.7	60.8	53.1	00:15:00.00	05-12-2019	21:39:31	Traffic flow along A66 and local road network dominant source.
		30	62.4	53.4	55.9	48.8	00:15:00.00	05-12-2019	21:54:31	
		31	57.9	53.1	56.2	49.7	00:15:00.00	05-12-2019	22:09:31	
		32	58.9	52.6	54.7	49.3	00:15:00.00	05-12-2019	22:24:31	
Average Evening Values			**60.9**	**54.7**	**57.6**	**50.6**				
2	Nightime	41	58.6	42.1	44.1	38.9	00:15:00.00	06-12-2019	01:20:39	Traffic flow along A66 and local road network dominant source. Birdsong audible during early morning period
		42	59.3	48.0	51.2	40.3	00:15:00.00	06-12-2019	01:35:39	
		43	56.5	47.5	52.4	38.3	00:15:00.00	06-12-2019	01:50:39	
		51	50.9	42.9	46.0	36.9	00:15:00.00	06-12-2019	02:05:39	
		52	54.9	46.5	50.6	36.8	00:15:00.00	06-12-2019	04:58:12	
		44	60.4	50.3	54.3	42.1	00:15:00.00	06-12-2019	05:13:12	
		56	74.3	65.5	68.6	57.4	00:15:00.00	06-12-2019	06:20:29	
		59	77.1	65.6	69.0	58.4	00:15:00.00	06-12-2019	07:34:59	
Average Nighttime Values			**70.1**	**60.3**	**63.0**	**52.1**				

Table 4.3 Location 3 Results – Bolckow Road

Location	Period	Data ID	LAmax	LAeq	LA10	LA90	Measurement Duration	Date	Time	Comment
			dB	dB	dB	dB				
3	Daytime	13	71.9	62.0	64.1	59.3	00:15:00.00	05-12-2019	13:07:20	Traffic flow along A66 and local road network dominant source.
		14	75.8	61.8	63.5	56.9	00:15:00.00	05-12-2019	13:22:20	
		15	69.2	61.0	63.4	56.3	00:15:00.00	05-12-2019	13:37:20	
		16	69.7	60.9	62.9	57.6	00:15:00.00	05-12-2019	13:52:20	
		17	67.9	61.2	63.5	57.5	00:15:00.00	05-12-2019	14:07:20	
		18	67.1	61.6	64.0	58.0	00:15:00.00	05-12-2019	14:22:20	
		19	71.8	60.9	63.7	55.9	00:15:00.00	05-12-2019	16:46:58	
		20	69.4	60.5	63.5	55.7	00:15:00.00	05-12-2019	17:01:58	
Average Daytime Values			**71.2**	**61.3**	**63.6**	**57.3**				
3	Evening	33	58.4	52.1	53.6	49.7	00:15:00.00	05-12-2019	22:45:55	Traffic flow along A66 and local road network dominant source. Electrical hum from sub station transformers on opposite side of A66 audible drone between traffic
		34	55.4	51.8	53.4	50.5	00:15:00.00	05-12-2019	23:00:55	
		35	51.6	50.4	51.1	49.7	00:15:00.00	05-12-2019	23:15:55	
		36	53.8	51.1	53.2	49.1	00:15:00.00	05-12-2019	23:30:55	
Average Evening Values			**55.5**	**51.4**	**52.9**	**49.8**				
3	Nightime	45	50.2	46.1	48.1	44.0	00:15:00.00	06-12-2019	02:23:41	Traffic flow along A66 and local road network dominant source. Electrical hum from sub station transformers and generator engines on opposite side of A66 audible drone
		46	52.7	43.8	46.2	41.4	00:15:00.00	06-12-2019	02:38:41	
		47	54.3	46.1	48.0	43.1	00:15:00.00	06-12-2019	02:53:41	
		48	50.3	41.3	43.2	38.9	00:15:00.00	06-12-2019	03:08:41	
		49	46.4	44.7	45.6	43.8	00:15:00.00	06-12-2019	03:23:41	
		50	47.6	44.7	45.4	43.9	00:15:00.00	06-12-2019	03:38:41	
		57	67.5	60.5	62.9	56.6	00:15:00.00	06-12-2019	06:48:07	
		60	66.4	61.1	63.7	58.0	00:15:00.00	06-12-2019	07:55:51	
Average Nighttime Values			**61.3**	**55.1**	**57.6**	**51.8**				

4.15 As can be seen from the table of results above, the primary noise sources in the vicinity of the noise sensitive residential premises considered is due to traffic flow along the A66 and nearby local road networks.

4.16 For all measurement locations, for the daytime, late evening and night time periods, it is considered that the noise levels measured are representative of the typical noise environment at the survey locations.

4.17 For the purposes of this assessment it is considered that the noise levels measured at the survey locations are representative of those noise levels that will be incident on the most exposed façades of the existing dwellings once the site has been developed.

5.0 ASSESSMENT

Development Proposals

5.1 The proposal for the site is the construction of an Energy from Waste facility (EfW).

5.2 The proposed capacity of the site is 450,000 tonnes of waste per annum, equating to approximately 1200 tonnes per day.

5.3 The operation is likely to produce 35 Megawatts of energy for the national grid or private sales.

5.4 The Energy Recovery Facility (ERF) is likely to be located within a building 170m x 70m and include for a 70m to 80m high stack. The maximum height of the building will be 45m. These dimensions are subject to detailed design and layout and provided for guidance purposes only.

5.5 The remaining site will be used for landscaping and vehicle parking with additional buildings required to service the main ERF facility.

5.6 The process of generating energy from the waste feedstock within the ERF is described below:

- Waste is delivered to the ERF facility, mainly by road;
- Waste is transferred to the ERF tipping hall and the boiler hall;
- Waste is combusted to produce heat;
- Heat is used to produce steam;
- Steam is used to generate electricity by driving a turbine within the turbine hall;
- Electricity production is supplied to the National Grid or private sales;
- The exhaust gases are cleaned prior to emission to atmosphere;
- Particulate matter is collected and treated before being recovered and recycled;
- Residual waste that cannot be re-used will be landfilled.

Recommendations and Design Targets

5.7 It is recommended that in order not to unduly affect the existing amenity of the nearby residential premises considered, the noise climate in the vicinity of the premises should not be increased as a result of the proposed development.

5.8 There are 2 No specific noise climates to considered as part of a development proposal of this scale;

Firstly, the construction stage and,

Secondly, the operational stage once the construction has been completed and commissioned.

5.9 If we account for the individual stages noted above there are varying noise criteria that can be applied.

Construction Stage Design Target

5.10 For the first stage – Construction. The noise criteria applicable would be BS5228:2009-1+A1:2014

5.11 As noted in section 3.2 above specific construction works noise criteria apply to the site noise output. Below is a table of noise limitations applicable to the nearby residential premises as a result of the construction phase of the development.

Table 5.1 Daytime (0700-1900) and Saturday (0700-1300) Construction Noise Limits

Location	Average Measured dB, $L_{Aeq,T}$	Average $L_{Aeq,T}$ Rounded to closest 5dB as per BS5228-1:2009+A1:2014	BS5228-1 Table E.1 Daytime Threshold Value, dB $L_{Aeq,T}$
1 – Jones Road	57.8	60.0	**65.0**
2 – St James Court	59.2	60.0	
3 – Bolckow Road	61.3	60.0	

Table 5.2 Evening (1900-2300) & Weekends Construction Noise Limits

Location	Average Measured dB, $L_{Aeq,T}$	Average $L_{Aeq,T}$ Rounded to closest 5dB as per BS5228-1:2009+A1:2014	BS5228-1 Table E.1 Evening Threshold Value, dB $L_{Aeq,T}$
1 – Jones Road	55.7	55.0	**60.0**
2 – St James Court	54.7	55.0	
3 – Bolckow Road	51.4	50.0	

Table 5.3 Nighttime (2300-0700) Construction Noise Limits

Location	Average Measured dB, $L_{Aeq,T}$	Average $L_{Aeq,T}$ Rounded to closest 5dB as per BS5228-1:2009+A1:2014	BS5228-1 Table E.1 Nighttime Threshold Value, dB $L_{Aeq,T}$
1 – Jones Road	52.5	50.0	**55.0**
2 – St James Court	60.3	60.0	
3 – Bolckow Road	55.1	55.0	

5.12 The construction limits noted above are not to be exceeded by any plant, equipment or operations pertaining to the development of the site prior to the commissioning of the operations on site.

5.13 Provided that the above limits are adhered to there will be no effective loss of amenity for the existing residential premises within the vicinity of the site.

5.14 Once the construction plan has been developed a further assessment of the actual output noise will need to be completed to ensure that the above limitations are being adhered to.

Operational Stage Design Targets

5.15 No limiting noise criteria has been provided for the site once operational, however, it is recommended that consideration is given to the potential noise sources likely to be introduced to the area as a consequence of the development.

5.16 Introduction of limiting noise levels will ensure that the existing amenity of the nearby residential premises is preserved and that justifiable complaints relating to noise are not forthcoming.

5.17 The recommendation would be not to increase to existing baseline noise climate as a consequence of the development by more than +0 dB, which would be in keeping with the recommendations of BS4142:2014.

5.18 In order not to increase the baseline noise climate background level a -10 dB limit is set to the existing values for the site plant and activities when considered at the receptor location.

5.19 Since the site is likely to operation 24 hours daily, it is a good assumption that the plant and activities associated with the site will operate accordingly on a demand basis.

5.20 The design target for plant and activities should, therefore, take account of the lowest recorded background levels monitored for the relevant periods.

5.21 Under normal circumstances the nighttime period is considered to be the main noise sensitive period where the background levels are usually quietest and it is these values that will be used to set the design target for the operational stage of the development.

5.22 However, for robustness the daytime and evening limits will be provided for reference purposes.

Table 5.4 Maximum Operational Stage Design Target Noise Levels - Jones Road Premises

Assessment Period	Existing Noise Climate		Proposed Design Target	
	LAeq dB	LA90 dB	LAeq dB	LA90 dB
Daytime (0700-1900) Sat Morning (0700-1300)	55	52	**45**	**42**
Evening & Weekends	54	51	**44**	**41**
Nighttime (2300-0700)	41	38	**31**	**28**

Table 5.5 Maximum Operational Stage Design Target Noise Levels - St James Court Premises

Assessment Period	Existing Noise Climate		Proposed Design Target	
	LAeq dB	LA90 dB	LAeq dB	LA90 dB
Daytime (0700-1900) Sat Morning (0700-1300)	58	53	**48**	**43**
Evening & Weekends	53	49	**43**	**39**
Nighttime (2300-0700)	42	37	**32**	**27**

Table 5.6 Maximum Operational Stage Design Target Noise Levels When Considered at Bolckow Road Residential Premises

Assessment Period	Existing Noise Climate		Proposed Design Target	
	LAeq dB	LA90 dB	LAeq dB	LA90 dB
Daytime (0700-1900) Sat Morning (0700-1300)	60	56	**50**	**46**
Evening & Weekends	50	49	**40**	**39**
Nighttime (2300-0700)	41	39	**31**	**29**

5.23 The above limits should be achieved for the cumulative effect of all the noise sources the proposed development site once commissioned and include for plant, equipment and vehicle movements on site.

5.24 The noise levels considered at the premises should exclude any tonal or other specific acoustic feature.

5.25 Mitigation measures for the site should be selected to achieve the above design target values as necessary.

6.0 CONCLUSIONS

6.1 An attended noise survey was carried out of the existing environmental noise exposure over a typical period between 5th and 6th December 2019, in respect of the proposed outline planning permission being sought for the development of a parcel of land at Grangetown Prairie, Cleveland for the production of an Energy from Waste facility.

6.2 The noise assessment was completed at the closest relevant noise sensitive residential premises to the proposed site.

6.3 The locations selected were, Jones Road, 660m SW; St James Court, 560m SSE; and, Bolckow Road, 825 ESE of the proposed site boundaries respectively.

6.4 The results of the survey indicate that the locations selected are subject to a primary background being due traffic movement along the A66 and locally.

6.5 The proposal includes for the development of the land for the production of an Energy from Waste facility. At this stage this proposal is outline only.

6.6 The assessment of noise impact for this development has been undertaken by providing an assessment of the current Standards and Guidelines with respect to noise limits.

6.7 This report utilizes the noise survey data gathered for the positions selected and the subsequent analysis to determine the baseline noise environment of the locations and it then compares the results with the adopted criteria.

6.8 Based upon the criterion utilised, recommendations are also made with respect to the limiting noise levels from the development site for the 2 No specific phases.

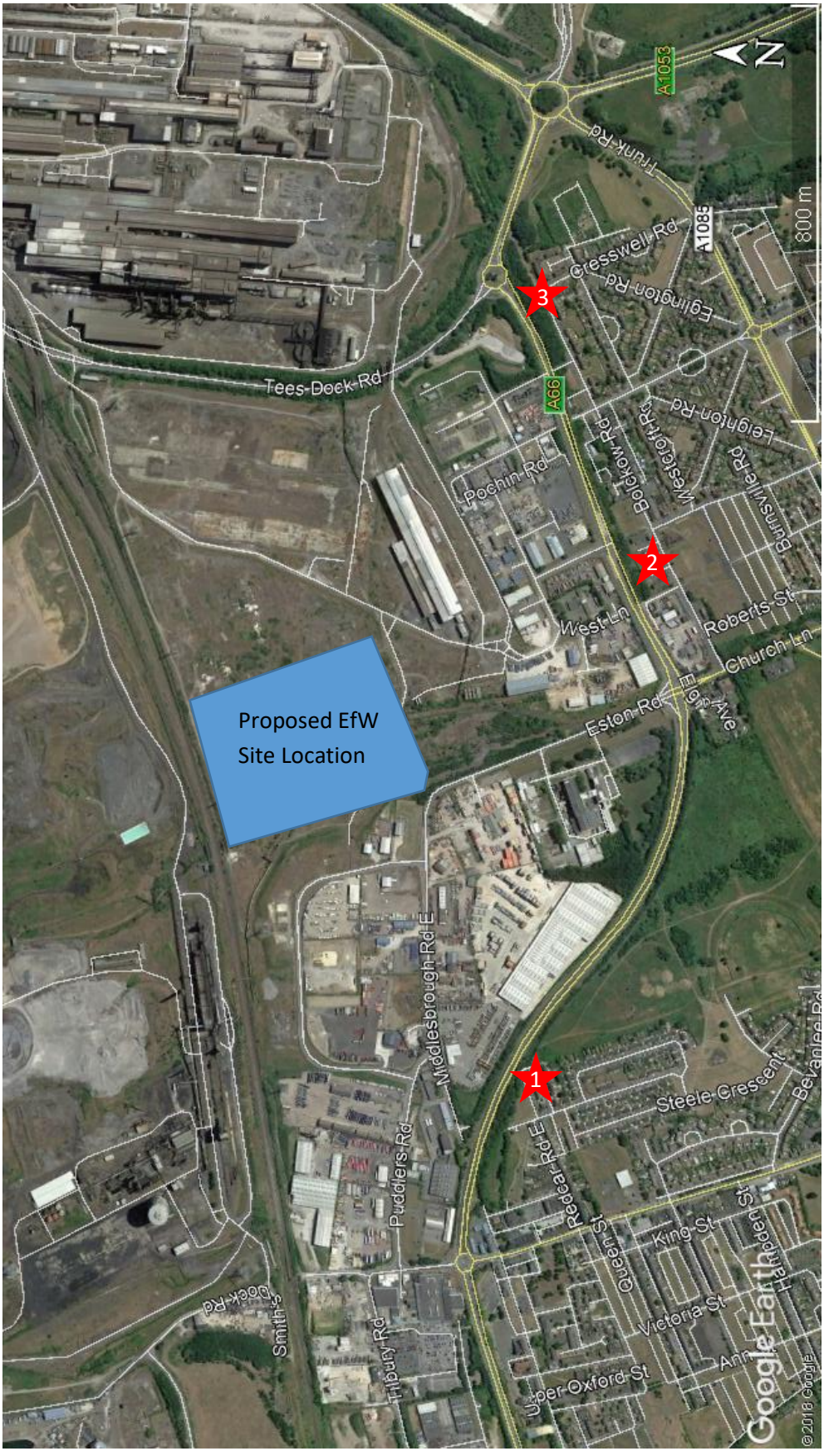
6.9 These phases being; 1 – Construction Phase, and, 2 – Operational Phase.

6.10 Individual limits are provided for the 2 No phases based upon achieving the recommendations of BS5228:2009+A1:2014 for the construction phase and BS4142:2014 for the operational phase.

6.11 Since the site will operate 24 hours daily, the limitations consider daytime, evening and nighttime periods in their recommendations.

6.12 Mitigation selections for the 2 No phases should be selected to achieve the maximum design target values proposed and are for the cumulative output noise levels of the site as a whole.

Figure 1 Site Location Plan and Monitoring Locations



APPENDIX A

Glossary of Terminology

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 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A.1 - Sound Levels Commonly Found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field 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.

L_{Aeq} This 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_{10} & L_{90} 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_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.

L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. LAmax is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment.

Appendix B Noise Survey Frequency Analysis Results

					Leq dB in Freqency Bands Hz									
Location	Period	Data ID	LAmax	LAeq	63	125	250	500	1	2	4	8	LA10	LA90
			dB	dB	Hz	Hz	Hz	Hz	kHz	kHz	kHz	kHz	dB	dB
1	Daytime	1	74.1	58.0	69.9	62.9	58.3	54.8	53.7	50.3	43.9	36.0	60.4	52.9
		2	68.5	55.6	67.8	58.5	52.0	50.8	51.9	47.9	41.8	36.8	57.5	52.9
		3	74.5	58.4	70.8	70.1	57.5	54.3	52.8	49.0	43.2	37.9	60.1	53.5
		4	76.8	59.2	69.6	63.0	59.2	54.9	55.1	50.8	45.3	37.1	60.0	52.9
		5	73.1	56.7	68.7	58.7	52.1	51.3	53.0	49.3	43.1	36.6	58.1	52.9
		6	66.5	55.9	68.0	58.5	52.1	51.5	52.5	48.0	40.2	33.9	58.4	52.2
		23	63.6	55.9	66.1	58.4	52.4	50.8	52.3	48.8	39.8	31.2	58.0	52.9
		24	62.8	56.4	68.2	61.0	53.1	51.3	52.8	48.8	39.0	30.0	58.8	53.4
Average Daytime Values			**72.4**	**57.8**									**59.0**	**53.0**
1	Evening	25	65.4	56.8	71.2	68.8	61.9	59.8	52.6	49.7	47.3	41.6	59.4	52.0
		26	59.6	54.6	61.6	56.1	51.7	51.7	50.1	46.9	42.3	36.1	55.6	51.5
		27	59.9	56.7	64.1	59.2	54.9	53.4	51.0	49.5	46.2	38.1	58.1	55.6
		28	55.3	54.1	60.9	56.3	50.6	49.0	49.4	47.7	43.0	37.1	55.0	53.0
Average Evening Values			**61.5**	**55.7**									**57.4**	**53.3**
1	Nightime	37	56.5	47.7	58.0	48.9	42.5	41.3	43.4	40.9	38.5	32.6	50.2	42.9
		39	51.0	43.8	53.7	46.5	41.7	39.3	38.9	36.4	33.1	29.6	46.6	40.5
		40	62.4	50.5	60.2	51.9	45.5	44.2	45.7	43.2	41.5	38.7	53.0	40.7
		54	48.2	40.7	50.5	44.1	40.6	39.1	34.5	30.9	29.0	27.5	42.6	38.3
		53	61.4	49.4	53.6	48.0	46.0	45.4	43.4	41.7	41.5	37.1	50.6	42.3
		38	59.8	53.3	68.4	54.6	46.0	45.7	48.6	46.7	44.0	37.9	57.6	47.7
		55	69.2	57.7	65.7	56.8	53.0	50.7	54.0	51.7	44.3	36.8	60.6	50.4
		58	63.7	55.0	68.4	56.7	49.4	50.8	50.5	48.6	40.7	32.3	58.2	49.1
Average Nighttime Values			**62.8**	**52.5**									**55.5**	**46.0**

					Leq dB in Freqency Bands Hz									
Location	Period	Data ID	LAmax	LAeq	63	125	250	500	1	2	4	8	LA10	LA90
			dB	dB	Hz	Hz	Hz	Hz	kHz	kHz	kHz	kHz	dB	dB
2	Daytime	7	68.7	59.1	71.0	61.1	55.0	54.2	56.4	50.2	41.0	34.8	62.2	54.0
		8	70.4	59.0	72.8	62.3	55.1	54.7	55.9	50.3	42.0	35.2	61.7	55.0
		9	67.7	57.8	69.4	60.3	54.4	53.7	54.5	49.2	41.9	36.4	59.8	54.6
		10	70.3	58.5	71.8	60.5	54.4	54.0	55.2	49.6	43.9	40.1	61.1	53.7
		11	70.7	60.2	72.1	63.7	56.3	56.5	57.0	50.8	42.1	36.2	63.1	54.0
		12	71.3	59.6	71.3	63.6	56.1	56.1	56.2	50.2	42.3	36.1	61.8	56.3
		21	69.2	58.4	64.0	58.1	55.9	55.9	54.9	49.1	41.4	35.1	61.5	53.4
		22	70.8	60.6	66.8	61.2	59.1	59.0	56.2	51.0	43.5	38.3	64.6	54.2
Average Daytime Values			**70.0**	**59.2**									**62.2**	**54.5**
2	Evening	29	62.5	57.7	63.9	61.1	54.9	53.6	54.0	49.6	45.1	37.9	60.8	53.1
		30	62.4	53.4	64.2	56.0	52.6	50.9	48.2	44.9	41.4	33.7	55.9	48.8
		31	57.9	53.1	56.3	53.4	50.7	48.2	50.0	45.0	38.4	29.9	56.2	49.7
		32	58.9	52.6	56.4	53.5	50.7	47.5	49.1	44.6	39.9	32.3	54.7	49.3
Average Evening Values			**60.9**	**54.7**									**57.6**	**50.6**
2	Nightime	41	58.6	42.1	51.1	43.4	41.1	38.5	37.5	34.0	29.4	24.4	44.1	38.9
		42	59.3	48.0	64.7	56.8	52.7	48.8	45.3	38.5	32.2	25.3	51.2	40.3
		43	56.5	47.5	54.6	47.7	41.5	40.4	44.9	40.6	29.1	23.1	52.4	38.3
		51	50.9	42.9	60.9	47.4	41.5	39.7	38.5	33.6	27.2	22.3	46.0	36.9
		52	54.9	46.5	53.7	49.1	42.9	40.7	43.8	38.2	29.6	22.4	50.6	36.8
		44	60.4	50.3	61.1	53.9	45.3	45.7	47.3	41.7	34.1	26.9	54.3	42.1
		56	74.3	65.5	66.7	61.3	61.1	61.7	63.0	56.0	45.9	35.8	68.6	57.4
		59	77.1	65.6	67.9	61.5	61.9	62.0	63.0	55.9	46.0	37.1	69.0	58.4
Average Nighttime Values			**70.1**	**60.3**									**63.0**	**52.1**

					Leq dB in Freqency Bands Hz									
Location	Period	Data ID	LAmax	LAeq	63	125	250	500	1	2	4	8	LA10	LA90
			dB	dB	Hz	Hz	Hz	Hz	kHz	kHz	kHz	kHz	dB	dB
3	Daytime	13	71.9	62.0	70.3	64.8	60.5	55.9	59.3	53.4	46.1	40.5	64.1	59.3
		14	75.8	61.8	73.5	66.5	60.3	54.9	58.7	53.1	45.3	40.4	63.5	56.9
		15	69.2	61.0	74.0	69.9	63.9	59.8	58.9	52.4	43.0	38.3	63.4	56.3
		16	69.7	60.9	70.6	65.2	59.1	54.8	58.1	52.0	44.4	38.3	62.9	57.6
		17	67.9	61.2	68.8	63.8	59.7	54.9	58.7	52.4	42.4	34.9	63.5	57.5
		18	67.1	61.6	69.6	63.7	59.1	55.0	59.1	52.9	46.1	42.1	64.0	58.0
		19	71.8	60.9	69.2	63.7	60.1	53.8	58.4	52.3	42.9	36.0	63.7	55.9
		20	69.4	60.5	67.5	64.1	60.8	53.3	57.8	51.7	42.1	35.0	63.5	55.7
Average Daytime Values			**71.2**	**61.3**									**63.6**	**57.3**
3	Evening	33	58.4	52.1	62.4	59.4	49.4	49.0	47.1	43.6	37.8	30.7	53.6	49.7
		34	55.4	51.8	61.4	61.3	49.8	48.1	46.5	43.1	38.5	31.8	53.4	50.5
		35	51.6	50.4	61.7	61.4	49.7	47.0	44.2	41.1	35.4	28.3	51.1	49.7
		36	53.8	51.1	60.9	58.9	48.9	46.7	46.6	43.0	37.0	29.3	53.2	49.1
Average Evening Values			**55.5**	**51.4**									**52.9**	**49.8**
3	Nightime	45	50.2	46.1	55.5	54.0	43.2	42.6	41.8	38.1	31.0	24.6	48.1	44.0
		46	52.7	43.8	54.0	53.8	41.1	40.8	39.1	35.1	28.1	24.4	46.2	41.4
		47	54.3	46.1	53.9	53.3	44.5	43.5	43.0	36.5	30.0	22.9	48.0	43.1
		48	50.3	41.3	53.2	52.9	41.2	39.8	35.0	29.9	23.7	20.1	43.2	38.9
		49	46.4	44.7	54.4	60.8	45.1	39.3	36.5	31.9	25.5	23.2	45.6	43.8
		50	47.6	44.7	56.1	61.2	43.8	39.5	35.7	30.8	25.2	23.0	45.4	43.9
		57	67.5	60.5	69.6	67.5	56.3	54.7	58.2	50.6	40.8	33.4	62.9	56.6
		60	66.4	61.1	70.1	68.6	57.1	54.1	58.7	51.5	40.7	31.4	63.7	58.0
Average Nighttime Values			**61.3**	**55.1**									**57.6**	**51.8**